N° 503-504 - 2018

Economie ET Statistique

Economics AND Statistics

Mélanges

Varia

Insee

Economie ET Statistique

Economics AND Statistics

Directeur de la publication / Director of Publication:
Jean-Luc TAVERNIER
Rédaction en chef / Editor in Chief:
Sophie PONTHIEUX (interim)
Rédacteur associé / Associate Editor: Clément CARBONNIER
Assistant éditorial / Editorial Assistant: Étienne de LATUDE
Traductions / Translations: UBIQUS
Tour PB5, 1 avenue du Général-de-Gaulle, 92074 Paris La Défense Cedex
Maquette PAO et impression / CAP and printing: JOUVE
1, rue du Docteur-Sauvé, BP3, 53101 Mayenne

OÙ SE PROCURER
Economie et Statistique / Economics and Statistics

Les numéros sont en accès libre sur le site www.insee.fr. Il est possible de s'abonner aux avis de parution sur le site.

La revue peut être achetée sur le site **www.insee.fr** via la rubrique « Acheter nos publications ». La revue est également en vente dans 200 librairies à Paris et en province.

WHERE TO GET
Economie et Statistique / Economics and Statistics

All the issues and articles are available in open access on the Insee website **www.insee.fr.** Publication alerts can be subscribed on-line.

The printed version of the journal (in French) can be purchased on the Insee website www.insee.fr and in 200 bookshops in Paris and province.

INSTITUT NATIONAL DE LA STATISTIQUE ET DES ÉTUDES ÉCONOMIQUES
Directeur Général : Jean-Luc TAVERNIER
Direction Générale : 88, avenue Verdier, CS 70058, 92541 MONTROUGE Cedex
Tél : +33 (0)1 87 69 50 00

N° 503-504 - 2018

Economie ET Statistique

Economics AND Statistics

Economie et Statistique / Economics and Statistics

Issue 503-504 – 2018

VARIA

WORK INCENTIVES IN FRANCE

NEW IMPACTS OF GLOBALIZATION
Selection of Papers Presented at the 66th Congress of the French Economic Association (AFSE)

Introduction – Socio-Fiscal Incentives to Work: Taking Stock and New Research

Olivier Bargain*

Abstract – Income taxation and means-tested transfers have considerably changed in France over the past fifteen years, with potentially strong implications for work incentives and inequality. In the upper half of the distribution, the rise of the CSG – in absolute terms and relatively to the progressive income tax – is increasingly leading our system towards a flat tax profile. At the bottom, high effective marginal tax rates have shifted – their distribution has changed from a U-shape to a tilde-shape – due to the expansion of in-work transfers (PPE, RSA *activité*, then *Prime d'Activité*). The upcoming reform of unemployment benefits will also change the incentives to return to work. This introduction presents three original articles that characterize these changes and their implications, and attempts to assess their contributions in the light of current policy debates and the evolution of our empirical knowledge on the issue of work incentives.

JEL classification: D31, H20, H21, H22, H23, H31, I38, J64, J65

Keywords: work incentives, tax and benefits system, unemployment insurance

* *Université de Bordeaux, CAE et IUF (olivier.bargain@u-bordeaux.fr)*

Received on 21 November 2018
Translated from the original version: "Introduction – Incitations socio-fiscales et retour en emploi : un point d'étape"

To cite this article: Bargain, O. (2018). Introduction – Socio-Fiscal Incentives to Work: Taking Stock and New Research. *Economie et Statistique / Economics and Statistics*, 503-504, 5-12. https://doi.org/10.24187/ecostat.2018.503d.1954

In France, tax on labour – and its impact on incentives to work – has changed significantly over the last 15 years or so. This series of three interesting articles sheds new light on the topic and provides an opportunity to set the work in a broader context while highlighting the main political issues and reviewing the scientific debate.

The first article by **Michaël Sicsic** analyses the incentives that target working time (intensive margin) and the choice of whether to work or not (extensive margin). The intensive margin depends on effective marginal tax rates (EMTR) while the extensive margin depends on non-marginal rates (effective participation tax rates or EPTR). This analysis takes an original approach, assessing the long-term evolution of financial incentives to work in France. It draws on the INES microsimulation model (developed by Insee and the DREES[1]) – which reproduces the tax and benefits system in place between 1998 and 2014 –, and ERFS data (Insee's Tax and Social Incomes Survey, pairing the Labor_Force survey with tax data from the General Directorate of Public Finance). This study thus reviews the calculation of financial incentives over a long period, including early years for which we did not have access to administrative data on incomes.

First of all, the results provide a surprising snapshot of the recent tax and benefits system (Figure III). We see that, given the predominant share of national insurance contributions plus CSG (general welfare contributions) and CRDS (social debt repayment contributions), our system produces a "flat tax" of 32% for a large proportion of the gross income distribution (between the 45th and 75th percentile). Progressive income taxation only leads to a modest surtax for the upper quarter. EMTR only exceed 40% for the upper 5%.

It is more usual to observe high marginal rates in the lower end of the distribution: EMTR exceed 40% at between 0.3-1.2 times the minimum wage (Smic). Not only do these low income earners pay the same level of social contributions and CSG-CRDS (about 20%, on average) as the richest groups – plus, for some of them, a small amount of income tax – but, most importantly, they are also subjected to the degressive nature of means-tested benefits, in particular the RSA (*revenu de solidarité active*) income support and housing benefits (AL).

Overall, these results recall the critical need to make our tax system more progressive. One avenue worth exploring is making CSG progressive (or merging it into the income tax brackets, see Landais *et al*., 2011; Bargain, 2015), although, as we will see, this makes little difference for the lowest incomes.

Changes made over the past few years have had a marked effect on the lower end of the distribution. The gain made on returning to work increases – so EPTR decrease – in the lower quarter of the distribution thanks to the introduction of in-work transfers, such as the working tax credit (*prime pour l'emploi,* PPE) followed by the RSA reform in 2009, which includes an in-work benefit component. In contrast, mean EMTR increase considerably in the "0.3-1.2 times the minimum wage" bracket due to the benefits' phasing out, which now come into effect at higher income levels than previously (in 1998, the phase out of the "RMI" income support only concerned very low work incomes). The EMTR curve thus shifts from a U to a tilde shape, similar to

1. *The statistical department of the Ministry of Social Affairs and Health.*

that found in the United Kingdom (Bourguignon, 1998, p. 42) or in other countries that combine minimum social benefits with in-work transfers.[2]

At the end of the 1990s, the incentive for introducing in-work financial support was precisely seen as a way to counter potential "inactivity traps" due to the RMI. The existence of these traps has never been conclusively demonstrated and some research actually tends to minimize their effects (Bargain & Vicard, 2014). The origin of the PPE and RSA reforms in particular lies to some extent in international – mainly Anglosphere – influence and the notion of "make work pay" (Banks *et al*., 2005), which may reflect a shift in social preferences to the benefit of the "deserving poor" (those at work) compared to the "idle poor" (Immervoll *et al*., 2007; Bargain *et al*., 2013). To these factors, we can add a growing awareness among public decision-makers concerning likely behavioural responses – and the consolidation of empirical results showing that labour supply elasticities are often higher at the extensive margin and among the low-skilled (Lundberg & Norell, 2018).

With this new EMTR shape, future research will have to assess the risk of a disincentive at the intensive margin: higher mean EMTR at minimum wage level may contribute to keeping people with low qualifications in low-paid jobs. Interestingly, the article demonstrates the wide disparities in situations, especially the strong variation in EMTR below 1.3 times the minimum wage (Figure II). The introduction of employment aid (especially the RSA in-work benefit component) seems to have had a beneficial effect in this respect, reducing the frequency of very high EMTR (Table 3).

Michaël Sicsic's analysis is particularly rich because it also breaks down EMTR according to marital status and gender. However, one word of caution: EMTR do not seem to differ much for men and women, but these calculations make no assumptions about the nature of the first or second earner in the event of an increase in activity (and this issue is even more relevant regarding EPTR). We should not therefore interpret this relative symmetry as the end of a gender imbalance regarding incentives to work. It is worth noting that the main economic argument in favour of an individualisation of the redistribution system is one of a strong disincentive for the second earner, regardless of gender.

Antoine Ferey's article also looks at the issue of incentives – at the intensive and extensive margins – and, more specifically, examines the role of housing benefit (AL). He also uses ERFS data but a different microsimulation model, the IPP model (TAXIPP), and focuses on 2011 and single people without children. The author confirms the tilde shaped curve for mean EMTR and a possible gain in social optimum compared to the U-shaped curve (which is only optimal if we ignore the behavioural responses at the extensive margin, i.e. in the Mirrlees model). However, he recalls that the optimality of tilde shaped curves using Saez (2002) type models is not a definitive conclusion: these models do not take into account individual heterogeneity and the presence of very high EMTR for some.

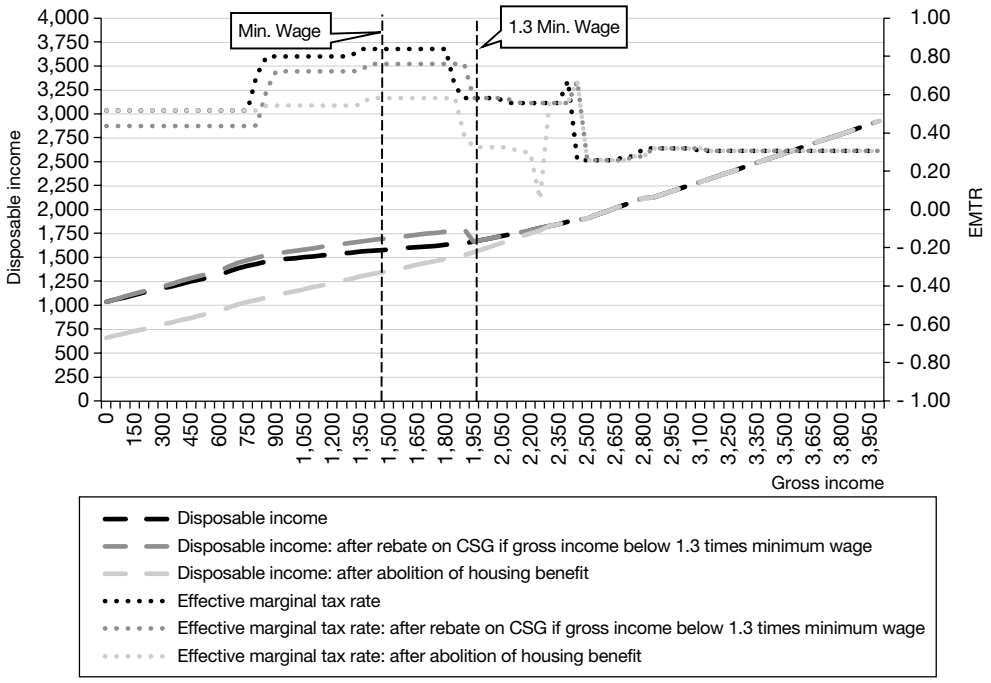
One interesting aspect is precisely the link established by the author between a characterisation of EMTR in case studies (i.e. varying the gross income for a given family

2. *Future research could study the implicit social welfare function (Bourguigon & Spadaro, 2010), which arises from the situation in 2014 or even the present configuration with the "working bonus" (*Prime d'activité*) replacing the working tax credit and the RSA in-work benefit. It is likely that the abnormally low social weight on the working poor, as seen for France and other countries with generous minimum social benefits in the early 2000s (Bargain* et al.*, 2013), has now gone up with the expansion of these make-work-pay policies, at least relatively to "the idle poor".*

configuration, here single people, as show in Figure 2) and a more original one based on data (thus incorporating the heterogeneity of EMTR due to individual situations, at each gross income level, as shown in Figure III). With this comparison, we can clearly see that the case studies reflect in fact the upper limit of the real distribution of EMTR,[3] while the mean EMTR vary between 46% (summit of the tilde) and 30% (higher up in the income distribution). The author also puts forward a breakdown of EMTR (and their dispersion) according to the contribution made by the various tax and benefit instruments. He shows that the summit of the tilde is drawn by the phase-out of housing benefit, which has a very strong impact on the heterogeneity of EMTR (depending on whether individuals are eligible or not for housing benefit). For the upper limit of the EMTR, at around 80%, the withdrawal rate from housing benefit (respectively other means-tested benefits) accounts for 27 (resp. 30) percentage points.

The very strong contribution that housing benefit makes to high EMTR is confirmed by similar simulations done using other tools, in particular the INES model for 2011 (Bargain, 2015, Figures 13 and 14). In qualitative terms, Antoine Ferey's results can be extended to family configurations other than single people aged 25-55. For example, the figure below shows the budget curves and EMTR levels for single parents with one child: because of the equivalence scale of welfare benefits, high EMTR go further (up to about 1.3 times the minimum wage, compared to 1 minimum wage for single people). The budget constraint becomes almost linear in the event of abolition of housing benefits: in this scenario, the system comes close to a negative "basic income-flat tax", and EMTR drop by about 26 points, a result in line with Antoine Ferey's findings for single people without children. The figure also shows that the impact of housing benefit is much greater than an alternative reform

Figure
Budget constraint and EMTR for a single-parent household with one child



Coverage: Single-parent households, mainland France.
Sources: Author's calculations based on the Ines 2011 model (Insee-DREES).

3. The first article also shows (in Figure IIa) that EMTR around 70-80%, for households around the minimum wage, correspond to the top decile of EMTR at these income levels.

that would make the CSG progressive with a full CSG rebate for incomes below 1.3 times the minimum wage. It should be noted that the high degressivity of housing benefits is merely the counterpart to its contribution to the disposable income of low-income households. Establishing the possible fiscal sub-optimality associated with high EMTR is only one type of characterisation of the tax and benefits system: non-Rawlsian objectives such as poverty reduction cannot but acknowledge the key role of housing benefits.

In this respect, one ambiguous aspect remains: the question of incidence. The TAXIPP model used by Antoine Ferey – like the simulations proposed in Michaël Sicsic's article – includes different scenarios concerning the incidence of national insurance contributions and thus provides an additional level of realism. The specific problem here concerns the incidence of housing benefit. The author reminds us that a significant portion of increases in housing benefit is captured by property owners (Fack, 2006). However, it remains to be seen to what extent this effect influences the margin or the totality of the housing benefit paid, i.e. to what extent the incidence actually curbs its redistributive effect. Future microsimulation work could perhaps define a concept of disposable income net of an average (local) rental cost. In terms of policy recommendation, the problem of housing benefit incidence has led several commentators to propose the payment of housing benefit directly to low-income tenants in the form of a supplement to their RSA income support or working bonus (Bozio *et al*., 2015; Bargain *et al*., 2017): such a measure would reduce (but not necessarily completely cancel out) the incidence bias. It would also simplify the welfare benefit system and confirm the role of housing benefit in fighting poverty.

The first two articles also characterise effective tax rates on returning to work (EPTR, or effective participation tax rates). To do this, they simulate the disposable income of people in employment in the event of withdrawal from the labour market. The EPTR distribution is therefore specific to individuals in work in the selected sample. A more complete analysis could add the EPTR of inactive individuals by calculating their disposable income in employment after predicting the gross income obtained in the event of activity (for example, with a simple Heckman model applied to income rather than hourly wages). Antoine Ferey's article offers an interesting sensitivity analysis on the type of income obtained in the event of non-employment. While labour supply models generally consider incentives over the long term (inactivity with RSA), a more realistic short-term approach requires the simulation of the unemployment benefits that the person would obtain in the event of involuntary withdrawal from the labour market; the article proposes a simple replacement rate of 60% of previous income. It then shows that housing benefits generate lower EPTR for the unemployed receiving benefits – and are therefore less of a disincentive to return to work – since unemployment benefits are included in housing benefit means testing.

Finally, **Damien Euzénat**'s article examines the attractiveness of a return to work in a slightly different way: he looks at measures of satisfaction with the job obtained, depending on whether it is found before or after the end of unemployment benefit entitlement. The author uses a survey conducted in 2013 by *Pole emploi* (the French unemployment office) and paired with the National Register of welfare recipients. Similar to generous welfare payments, high unemployment benefits are suspected of extending the duration of unemployment – informal evidence rests on the acceleration of returns to the labour market as people get closer to time when

entitlements become exhausted. There may also be a form of resignation whereby people accept default jobs before replacement incomes come to an end. The literature has never come up with a conclusive response to this question and the study puts forward an innovative approach to provide some possible answers. Alongside the objective indicators (remuneration and job stability) generally used in unemployment insurance studies, it uses subjective measures (interest in the job, feeling of being downgraded, opinion on working conditions, etc.). Until then, the literature on subjective well-being had looked at another aspect, namely the link between the drop in satisfaction during a spell of unemployment and the time taken to return to work (Clark, 2003; Gielen & van Ours, 2012). Studying how job satisfaction varies according to whether a new job was found before or after the end of unemployment benefit entitlements is thus new, and its application to French data a welcome addition to the national debate, given the imminent reform of the unemployment insurance system.

Econometric analysis shows that jobs found after or near the end of entitlement are less well paid, of shorter duration (fixed-term rather than open-ended contracts) and less highly rated than jobs found well before the end of entitlement. For the job satisfaction score, the difference is significant for a return to work after the end of the entitlement or a return up to 3 months before. The author obtains a negative effect ranging from 10% (2-3 months before the end of entitlement) to 18% (after the end of entitlement) compared to the average satisfaction rate. This estimation controls for the objective criteria (wage level in the new job and the type of employment contract): hence, the negative opinion of the jobs found around the end of entitlement is thus also applicable to non-monetary aspects (notably working conditions and unsuitability of the position in terms of experience and qualifications). One difficulty in normative terms is the question of what is most important for the individual and society. Beyond the problems of matching and the depreciation of human capital, the set of objective and subjective criteria could possibly be synthesized – in future work – in the form of monetary equivalents that respect individual preferences on how to weigh the different dimensions (cf. Schokkaert *et al*., 2009).

Several mechanisms can explain the results of this study, depending on our belief in the various main determinants of unemployment in France: conventional factors (reservation wage and effort) or Keynesian/frictional factors (labour demand and labour market fluidity). An extreme discourse would be: the least motivated (or most demotivated) drag their feet when it comes to returning to work and, in addition, do not make the necessary effort to find a suitable job. The opposite argument: the least employable struggle to find suitable employment and, under financial pressure, also resign themselves to accepting another type of job. The author proposes a very detailed analysis that suggests that the return to work when entitlement is exhausted is essentially motivated by financial needs. Comparing the situation just before and just after the end of entitlement helps verify the cyclical effect (labour demand). The link between the date of return to work and the reduction in consumer spending during the period of unemployment shows that those receiving benefits but whose consumption fell sharply during unemployment are actually very similar to those who have come to the end of their entitlement.

As the author acknowledges, public policy recommendations are not straightforward. From these results, it cannot be deduced that an increase in the maximum duration of compensation (unemployment benefit) – or an increase in compensation – would lead to an increase in satisfaction with the jobs found. However, it would appear

that more progressive unemployment insurance – with respect to income or skills or even the expected unemployment rate by category of individual (depending on qualification, age, etc.) – would make the system more efficient (by reducing the budgetary cost) while targeting higher replacement rates among those with less chance of returning to a satisfactory job. If we see this reasoning through, a normative touch could be added to Damien Euzénat's analysis, taking into account the heterogeneity in living standards: to what extent does the feeling of inadequacy and de-skilling obtained in his results characterize the lowest wages, the least qualified, etc.?

The comparison between the first two articles and the last one raises a final point: the dichotomy that exists in the literature between, on the one hand, a detailed analysis of the budgetary constraints affected by tax and benefit instruments (with a long-term vision, i.e. excluding unemployment insurance, of inactivity), and on the other hand, an analysis of unemployment duration (matching models, where the time horizon is the maximum duration of compensation). The first strand of literature focuses on social benefits and the second on the parameters of unemployment insurance. But how can we ignore the fact that RSA income support takes over when unemployment benefit comes to an end, and that the RSA's in-work benefit component also increases the gain to work compared to unemployment benefit payments? This dichotomy in the economic literature clearly illustrates the extreme specialisation of our profession – and the incremental aspect of research, recently denounced by Heckman and Moktan (2018). On the subject we are concerned with, recent literature on dynamic choices is beginning to take these different aspects on-board, but it is rarely operational for public decision analysts. Antoine Ferey's article creates an opening in this direction insofar as it considers work incentives not only on the basis of the situation of inactive populations receiving RSA income support, but also on the basis of a situation of unemployment. These shifts in time horizons are interesting and should more systematically be included in the range of indicators available to us when assessing tax and benefit incentives to return to work. □

BIBLIOGRAPHY

Banks, J., Disney, R., Duncan, A., & Van Reenen, J. (2005). The Internationalisation of Public Welfare Policy. *The Economic Journal*, 115(502), C62–C81.
https://doi.org/10.1111/j.0013-0133.2005.00980.x

Bargain, O. (2015). Les enjeux budgétaires et économiques de la réforme de l'imposition des revenus des ménages. Conseil des Prélèvements Obligatoires*, Rapport Particulier*.
https://www.ccomptes.fr/sites/default/files/EzPublish/20150204-rapport-particulier-Bargain.pdf

Bargain, O., Dolls, M., Peichl, A. Neumann, D. & Siegloch, S. (2013). Tax-Benefit Revealed Social Preferences in Europe and the US. *Annales of Economics and Statistiques*, 113-114, 257–289.
https://doi.org/10.15609/annaeconstat2009.113-114.257

Bargain, O. & Vicard, A. (2014). Le RMI et son successeur le RSA découragent-ils certains jeunes de travailler ? Une analyse sur les jeunes autour de 25 ans. *Économie et Statistique*, 467-468, 61–89.
https://www.insee.fr/fr/statistiques/1521320

Bargain, O., Carcillo, S., Lehmann, E. & L'Horty, Y. (2017). Mieux lutter contre la pauvreté par des aides monétaires. *Note du Conseil d'analyse économique* N° 41.
http://www.cae-eco.fr/Mieux-lutter-contre-la-pauvrete-par-des-aides-monetaires

Bozio, A., Fack, G. & Grenet, J. (Eds.) (2015a). Les allocations logement, comment les réformer ? *Opuscule CEPREMAP/IPP* N° 38.

Clark, A. E. (2003). Unemployment as Social Norm: Psychological Evidence from Panel Data. *Journal of Labor Economics*, 21(2), 323–351
https://doi.org/10.1086/345560

Fack, G. (2006). Are housing benefit an effective way to redistribute income? Evidence from a natural experiment in France. *Labour Economics*, 13(6), 747–771.
https://doi.org/10.1016/j.labeco.2006.01.001

Gielen, A.C & van Ours, J. C. (2012). Unhappiness and Job Finding. *IZA DP* N° 6320.
https://www.iza.org/de/publications/dp/6320/unhappiness-and-job-finding

Immervoll H., Kleven, H. J., Kreiner, C. T. & Saez, E. (2007). Welfare reform in European countries: A microsimulation analysis. *Economic Journal*, 117(516), 1–44.
https://dx.doi.org/10.1111/j.1468-0297.2007.02000.x

Heckman, J. J. & Moktan, S. (2018). Publishing and Promotion in Economics: The Tyranny of the Top Five. *IZA DP* N° 11868.
https://www.iza.org/publications/dp/11868/publishing-and-promotion-in-economics-the-tyranny-of-the-top-five

Landais, C., Piketty, T. & Saez, E. (2011). *Pour une révolution fiscale*. Paris : Le Seuil.

Lundberg, J. & Norell, J. (2018). Taxes, benefits and labour force participation: A survey of the quasi-experimental literature. Ratio Institute*, Working paper* N° 313.
http://ratio.se/publikationer/working-paper-no-313-taxes-benefits-and-labour-force-participation-a-survey-of-the-quasi-experimental-literature/

Financial Incentives to Work in France between 1998 and 2014

Michaël Sicsic*

Abstract – This study looks at incentives to work in France, measured using effective marginal tax rates (at the intensive margin) and effective participation tax rates (at the extensive margin). These show the proportion of an increase in earned income captured by the tax-benefit system, either because the taxes increase or because the benefits decrease. They are calculated using microsimulation based on the Insee survey *Revenus fiscaux et sociaux*. Between 1998 and 2014, incentives to work at the intensive margin rose for very low incomes, and then decrease as incomes rise. Incentives at the extensive margin rose in the first third of the distribution. The profile of the marginal rates changed from a U to a tilde shape. Incentives to work are lower for single people than for couples, but there is very little difference in incentive to work between men and women, except at the top of the distribution, to the detriment of married women.

JEL Classification: D31, H20, H23, H31, I38
Keywords: incentives to work, effective marginal tax rates, taxation, microsimulation

* *Insee and Cred, Université Paris 2 Panthéon-Assas (michael.sicsic@insee.fr)*

The author would like to thank Alexis Eidelman, Juliette Fourcot and Edith Darin for their contributions at the start of this project, and Laurence Rioux for her attentive proofreading at every stage of this work and her abundant advice. Thanks also to Olivier Bargain, Pierre Boyer, Antoine Ferey, Etienne Lehmann, Marie Reynaud, along with the participants at the Insee DSDS seminar (July 2016), at the 16th Journées LAGV (June 2017), at the 18th Public Economic Theory conference (PET, July 2017) and at the OFCE seminar (July 2017) for their comments on the previous versions of this work.

Received on 5 July 2017, accepted after revisions on 25 May 2018
Translated from the original version: "Les incitations monétaires au travail en Franceentre 1998 et 2014"

To cite this article: Sicsic, M (2018). Financial Incentives to Work in France between 1998 and 2014. *Economie et Statistique / Economics and Statistics*, 503-504, 13–35.
https://doi.org/10.24187/ecostat.2018.503d.1955

The French tax-benefit system helps reduce inequalities in living standards through income tax and monetary benefits.[1] However, the various tax-benefit schemes that ensure this redistribution have an impact on incentives to work via the marginal tax rates. These rates correspond to the proportion of an increase in earned income that comes back to the tax-benefit system, either because a tax increase, or because the decrease in a means-tested benefit. In general, the more redistributive the transfers, the higher the marginal tax rates (associated with a marginal increase in income) and participation tax rates (associated with a transition from unemployment to employment) which can reduce incentives to work and distort the behaviour of agents, particularly in their labour supply. For example, a top marginal tax rate increase makes work less financially rewarding and can prompt individuals to reduce their taxable income,[2] reducing the efficiency of the tax-benefit system.

In addition to income tax, other taxes (social security contributions) and means-tested benefits (minimum income support, housing benefits, family benefits, etc.) alter incentives to work (and potentially the labour supply). In fact, means-tested benefits create high marginal rates, their amount decreasing with an income increase beyond a certain threshold (the marginal rate can reach 100% in the case of minimum income benefits, which decrease by the same amount as the income increases). Degressive means-tested benefits reduce the gains of returning to work for non-workers, who have less incentive to find employment. The inactivity and poverty trap associated with these mechanisms were condemned in many reports at the end of the 1990s in France (CSERC, 1997; Bourguignon, 1998; Pisany-Ferry, 2000) and abroad.[3] Subsequently, a range of measures designed to "make work pay" were implemented in the 2000s. These included the creation of two in-work subsidies schemes: the *prime pour l'emploi* (an in-work tax credit scheme) and the *RSA activity* (a part of the minimum income support aimed at returnings to employment). As regards labour demand, taxation was reformed to increase the employment of low-wage earners via policies such as social security contribution reductions and the "CICE" business tax credit. Taxation and redistribution were therefore broadly reformed to encourage employment and combat unemployment (L'Horty, 2007).

The impact of these schemes on incentives and on labour supply has been evaluated by a number of studies, but most often for one specific scheme (income tax, RSA earned income supplement,[4] PPE working tax credit,[5] childcare support, etc.), whereas few studies have examined incentives to work and their changes as a whole. This is the purpose of our study.

An exhaustive summary measure of financial incentives to work at the intensive margin is given by the effective marginal tax rate (EMTR),[6] with the term "effective" taking into account the integrated analysis of all tax and benefit schemes. The purpose of this article is to present a detailed analysis of EMTR for employed people in France following a slight increase in their earned income. According to Bourguignon (1998) "the statistical distribution of marginal tax rates across the population shows the cost effectiveness of redistribution. It is surprising that this information is not developed, used and disseminated more systematically". We combine this analysis of incentives at the intensive margin with an analysis at the extensive margin by describing effective participation tax rates (EPTR). The EPTR is the twin of the EMTR, but at the extensive margin: it measures not the impact of a marginal variation in income, but of the transition from unemployment to employment. EPTR are directly dependent on EMTR: a one-off increase in marginal rates at a certain income increases the participation tax rates for higher incomes.

In this study, EMTR and EPTR are calculated for the years 1998, 2008 and 2014 using the Ines microsimulation model. This model is based on the Insee survey on tax-benefit income (*enquête Revenus fiscaux et sociaux*, ERFS) covering some 130,000 individuals, not taking into account possible behavioural responses. Our study includes all social security contributions, income tax, and national welfare benefits.[7] Two scenarios are presented on the tax incidence of employer contributions. The analysis also takes into account sub-annual profit-sharing schemes, giving a partial or total cumulative of benefits and earned income.

---

1. The decile ratio of living standards is divided by 4 after redistribution for two thirds, due to benefits (Insee, 2018).
2. See the literature review by Saez et al. *(2012) on the topic.*
3. Debate on "Making Work Pay", initiated by the OECD (OECD, and introduction of earned income tax credit schemes in the United States and in the UK (known as EITC and WFTC respectively).
4. See articles on the RMI and RSA in issues 346-347 and 467-468 of Economie et Statistique*, or Gurgand and Margolis (2008).*
5. See for example Bargain and Terraz (2003), and Lehmann et al. *(2013).*
6. For convenience sake, the term "marginal rates" will sometimes be used in this article.
7. Local taxes (residence and land taxes) and local benefits are not included.

This study is one of a series of EMTR studies based on microsimulation using representative data. In France, these studies were started by Bourguignon (1998) who calculated EMTR based on family budget survey of 1994. He found that the EMTR curve had a flattened U shape, but with peaks at certain deciles. Laroque and Salanié (1999), and Legendre *et al.* (2003) calculated EMTR at the end of the 1990s and obtained similar findings to Bourguignon (a more-or-less U-shaped curve), but they also calculated return-to-work incentive indicators.[8] Chanchole and Lalanne (2012) gave an overview of EMTR in 2009, calculated on the basis of net earned income and replacement and capital income, but not taking into account social contributions. Ferey (2018, this issue) simulates EMTR and EPTR according to several scenarios and finds a wavy EMTR curve in 2011, in a study on single childless individuals. Lastly, Immervol (2002), Immervol *et al.* (2007), Jara and Tumino (2013), and Leventi and Vujackov (2016) simulated EMTR (and EPTR in the case of Immervol *et al.*, 2007) for several European countries, including France.

Our work makes several contributions to the previous work carried out on France. Firstly, the analysis is carried out at individual level and not at household level, making it possible to study EMTR and EPTR in detail by gender and family configuration. Secondly, we present EMTR quantiles by income percentile. Thirdly, a breakdown of EMTR by transfer shows the impact of each transfer on the level of and change in the EMTR. Lastly, the analysis of the changes that occurred between 1998 and 2014 reveals the impact of the introduction of make-work-pay schemes in the 2000s, which has never previously been done on representative data.[9]

The rest of the article is structured as follows. The first part describes the main tax-benefit schemes and their impacts on nominal marginal rates based on 2014 legislation. The second part details the method used for calculating the EMTR and EPTR, the scope and the data. The third part presents the findings on the distribution of EMTR, their variability, their breakdown per transfer and per family structure and gender in 2014, along with the findings on EPTR in 2014, and a comparison of the EMTR and EPTR curves with those of 1998 and 2008. The analysis concludes with a discussion on the findings, particularly as regards the recommendations of the theoretical literature.

The Tax-Benefit System in France

This section gives a description of the main tax-benefit schemes in France that are explored in the analysis and the nominal marginal rates they incur (in other words, for a 100-euro increase, the amount by which contributions increase or benefits decrease). For further details on the parameters of legislation, the highly local thresholds which create infinite marginal rates, and representations of the marginal rates associated with each scheme for representative agents, see Online complement C1.

Income Tax

The two main characteristics of French income tax is that it is progressive (with marginal rates increasing by income bracket) and family-based (the tax rate scale applies to the net taxable income of the household divided by the number of parts according to the number of members in the household,[10] which gives the household tax allowance known as the *quotient familial*). The amount of tax payable is first calculated as the sum of the tax amounts obtained for each household tax allowance bracket after applying marginal rates, multiplied by the number of parts. In 2014, income tax assessments for 2013 comprised five tax brackets (Table 1).

Various schemes are then added to this calculation (capped household tax allowance, tax relief and credits, etc.), three of which significantly altered the marginal rates[11] in relation to the tax scale in 2014: the *décote*, an exceptional tax cut and the income tax threshold.

Firstly, the *décote* slightly altered marginal rates for those at the bottom of the scale. This scheme reduces tax for incomes between the bottom of the income tax scale and a ceiling, offset by an increase in marginal rates. This tax relief measure therefore eliminated the 5.5% bracket in 2014, and created a new 21% bracket in the place of the 14% at the start of the scale

8. But with a different method to ours (see methodology section).
9. This was carried out using representative tax profiles by Hagneré and Trannoy (2001), and Barnaud and Ricroch (2005) who show that there are cases in which EMTR were 100% at the bottom of the distribution in the 1990s, but that there were fewer such cases in the 2000s.
10. For a married couple, the two partners represent two parts, the first two dependents, 0.5 of a part each, and additional dependents, one part each. These parts vary according to the family configuration (people who are separated, single, or widowed).
11. The PPE (in-work tax credit) is taken into account later on. Legendre and Thibaut (2007) showed that income tax in 2006 actually had 16 brackets of marginal tax for a single person.

for a single person[12] (see Pacifico & Trannoy, 2015, and Online complement C1 for more details). Next, an exceptional tax cut, known as *réduction exceptionnelle d'impôt*, was implemented in 2014 for the bottom of the tax scale: this scheme increased the marginal rate after tax relief to 121% in the differential zone (see Figure C1-I of Online complement C1). Lastly, the *seuil de recouvrement* tax liability threshold of 61 euro created a marginal rate that was infinite at local level.

Social Security Contributions

Social security contributions (SSC) are taxes deducted from wages, and can be divided into two categories: employee social security contributions, deducted from the gross salary, and employer contributions, deducted from the "super-gross" salary.

Social security contributions have constant marginal rates per gross income bracket (defined based on the annual social security limit – known as the *plafond annuel de sécurité sociale*, or Social Security Threshold in English (hereafter SST) – and dependent on the type of employment, see Online complement C1). While marginal rates are therefore generally constant, caps make social security contributions degressive for high incomes (particularly after annual social security limits 3 and 4) and result in a low marginal rate.

As regards net contributions and taxes paid by the employer, two schemes in 2014 made them non-proportional, but also partly progressive at the bottom of the labor earning distribution:

• Tax relief on employer contributions for low wages, known as the "*allègements Fillon*", result in a decrease in social security contribution rates, strictly speaking, for minimum hourly wages, and are degressive up to 1.6 times the minimum hourly wage. Due to the degressiveness of this tax relief, the marginal rate is higher between 1 and 1.6 times the minimum hourly wage (see Figure C1-III of Online complement C1);

• The CICE is a business tax credit based on the wage bill, created in 2013. It is similar to an employer subsidy resulting in a reduction in employer contributions.[13] All wages below 2.5 times the minimum hourly wage qualify for this tax credit, from an amount equal to 6% of the gross pay in 2014. Where this threshold is exceeded, the labour cost increases significantly, leading to a very high marginal rate locally (see Table C1-6 of Online complement C1).

General social contributions (CSG, hereafter) and social debt repayment contributions (CRDS, hereafter) are deducted at source on individuals' earned, replacement and capital incomes. The proportionality of the two schemes implies that the marginal rate for earned income is 8%, even if this proportionality is mitigated by the existence of complete or partial exemption for replacement incomes.

Means-Tested Benefits

Welfare benefits include minimum income benefits, housing benefits (*allocations logement*) and family welfare benefits (*prestations familiales*). Only means-tested benefits give marginal rates that are non-zero: above a certain income threshold, the benefit decreases, often differentially (when the income increases

*12. The "*décote*" tax relief scheme multiplied the marginal rate from the first bracket by 3/2 in 2014. It should be noted that in 2015, the "*décote*" tax relief scheme was increased: the applicable ceiling for the calculation was raised from 1,016 to 1,135 euro for a single person, and people with a partner (1,870 euro for a married or civil union couple), and the amount decreasing the amount of tax paid also doubled. As such, in 2015, the "*décote*" tax relief scheme multiplied the marginal rate per bracket by 2.*
13. And is treated as such in the Ines model.

Table 1
Scale for 2014 Tax on 2013 Incomes

Household tax bracket *(quotient familial)* (in €)	Marginal tax rate (in %)
0 - 6,011	0
6,011 - 11,991	5.5
11,991 - 26,631	14
26,631 - 71,397	30
71,397 - 151,200	41
151,200 -	45

Sources: French tax code *(Code général des impôts)*.

by one euro, the benefit decreases by the same amount), which gives a marginal rate of 100% for the income taken into account. This is the case for minimum income benefits for which the differential zone extends to the amount of the allowance (see Online complement C1 for the amounts). Some benefits have a fixed rate up to a certain level of income and then differential beyond that: this is the case for the special disability allowance (ASI), family supplement (*complément familial*), and the school allowance (ARS).

In the case of minimum income support (RSA), which was created in 2009, and the adult disability allowance (AAH), the impact on marginal rates are moderated by profit-sharing schemes once back at work. Basic income support (RSA *socle*) is topped up by the earned income supplement (RSA *activité*) and therefore becomes degressive and no longer differential (see below). For the adult disability allowance, 20% of any earned income below 0.3 times the gross minimum wage is taken into account, and 60% of any earned amount above that; this results in a marginal rate of 20% then 60% until no longer qualifying for the scheme. These work incentive schemes (which are partially cumulative) help decrease marginal rates at the bottom of the distribution. Fully cumulative schemes also help offset all earned incomes for three months if the person returns to work, for income support and adult disability allowance.

The calculation for housing benefits is complex because it depends on many parameters (Trannoy & Wasmer, 2013; Bozio *et al.*, 2015; Ferey, 2018). It gives a net-income based marginal rate of zero up to a certain threshold, then of approximately 30% in the degressive zone of housing benefits. Lastly, certain benefits can very occasionally lead to negative marginal rates and infinite rates associated with non-payment thresholds (see Online complement C1).

Work Incentive Schemes: PPE and RSA *activité*

Two in-work subsidies schemes were created in the 2000s to reduce the disincentive to work for the unemployed or low-paid workers:[14] the working tax credit (*prime pour l'emploi,* PPE) in 2001, and the earned income supplement (RSA *activité*) in 2009. These two schemes are merged in the study because, firstly, they aim to increase incentives to work[15] (and were therefore merged in 2016 to form the *'prime d'activité'* earned income bonus) and, secondly, they are closely linked (in practical terms, the PPE working tax credit is calculated net of the RSA *activité*[16] and it is therefore more logical to consider the sum of the two).

PPE is an in-work support scheme in the form of a tax credit, aimed at increasing the gap between unemployed income and earned income. The benefit comprises two parts: a progressive phase and a degressive phase. The first part involves negative marginal rates (from -7.7%), whereas the second involves positive marginal rates (+19.3%) because an increase in revenue reduces the zone in which the PPE applies and therefore its amount.

The RSA *activité* tops up the RSA basic income support scheme which replaced the RMI minimum income scheme in 2009. It is for low-income workers whose resources are below a certain threshold. The RSA *activité* therefore makes it possible to achieve a guaranteed income (fixed amount plus 62% of the earned income) and gives a marginal rate of -62% (on posted income, net of social security contributions and deductible CSG). Therefore the marginal rate associated with the total RSA is 38% (100% for the RSA *socle* less 62% for the RSA *activité*).

Computation of EMTR and EPTR

The conventional method for calculating EMTR and EPTR is to simulate, against a scale, the social welfare benefits and taxes of each household, using a fictional situation in which incomes increase or decrease in relation to an observed situation. This EMTR calculation can be done either with representative agents or with a representative population. However, the analyses of representative agents only gives marginal rates or participation rates according to specific tax profiles and does not therefore give a representative overview of the diversity of family configurations and situations in the labour market: only microsimulation with real data reveals the heterogeneity of the EMTR of individuals with identical incomes. Indeed, in addition to income, the EMTR depends on

14. Redistribution was another reason for their creation.
15. Although they are targeted at the same people: the RSA earned income supplement is more generous than the PPE working tax credit for part-time minimum-wage jobs, almost identical to the minimum wage, and a little less generous beyond that.
16. As the PPE is paid one year after the income considered, the RSA amounts received are known and are therefore deducted.

the characteristics of the people and the composition of their household. The method used is detailed in this section.

Calculation Methodology

The calculation of marginal tax rates and participation rates (EMTR and EPTR) is detailed in Box 1.

Given the relationship between individual earned income and disposable income, it is possible to break an individual's EMTR and EPTR down into a sum of rates associated with different taxes and benefits. This breakdown reveals the contribution made by each group of transfer to the average EMTR and EPTR of a group of individuals.

To estimate the EMTR, the relative or absolute increase in income and its extent must be decided. It was decided to use a 3%[17] relative increase in income declared by people in work, as done by Immervol (2002, 2004) and Immervol *et al.* (2007). This percentage is median in relation to the literature on the subject and corresponds approximately to the average annual increase in pay from one year to the next for the wage earners present both years. The results are similar when considering an increase of 1% or 5% (the main differences are visible at the threshold level).

17. The resulting changes to worked hours, which could affect Fillon tax relief, the CICE and the PPE are not taken into account in this analysis.

Box 1 – **Calculation of EMTR and EPTR**

Disposable income of the household *m* to which the individual *i* belongs is written as:

$$R_m = W_i + W_{-i} - \sum_{j=1}^{n} T^j\left(W_i, W_{-i}, Z_m\right) + \sum_{j=1}^{o} P^j\left(W_i, W_{-i}, Z_m\right) \quad (1)$$

with:

- R_m the disposable income of the household *m*;
- W_i the earned income of *i* (labour cost or gross income);
- W_{-i} the household's income other than the earned income of i (income from other people in the household + capital income);
- T^j (W_i, W_{-i}, Z_m) taxes paid by the household (numbered from $j = 1$ to n) ;
- P^j (W_i, W_{-i}, Z_m) benefits paid to the household (numbered from $j = 1$ to o);
- Z_m the characteristics of the individuals in the household.

Taking the derivative of the equation (1) in relation to W_i, without considering behavioural responses within the household ($\frac{\partial W_{-i}}{\partial W_i} = 0$), we obtain[(a)]:

$$\frac{\partial R_m}{\partial W_i} = 1 - \sum_{j=1}^{n} \frac{\partial T^j\left(W_i, W_{-i}, Z_m\right)}{\partial W_i} + \sum_{j=1}^{o} \frac{\partial P^j\left(W_i, W_{-i}, Z_m\right)}{\partial W_i}$$

The EMTR for the individual *i* is obtained, which measures the proportion of the variation in income captured by the tax-benefit system:

$$\mathrm{EMTR}_i = 1 - \frac{\partial R_m}{\partial W_i} = \sum_{j=1}^{n} \frac{\partial T^j\left(W_i, W_{-i}, Z_m\right)}{\partial W_i} - \sum_{j=1}^{o} \frac{\partial P^j\left(W_i, W_{-i}, Z_m\right)}{\partial W_i} = \sum_{j=1}^{n+o} \mathrm{MTR}_i^{\,j} \quad (2)$$

with $\mathrm{MTR}_i^{\,j}$ the marginal rate of the scheme j.

This EMTR is positive if the variation in income ∂W_i leads to an increase in taxes net of benefits, and is negative in the opposite case (the benefits increase more than taxes)

The EPTR are calculated according as follows:

$$\mathrm{EPTR}_i = 1 - \frac{(R_m - R0_m)}{W_i}$$

with $R0_m$ the household disposable income if $W_i = 0$

$$\mathrm{EPTR}_i = \sum_{j=1}^{n} \frac{T^j\left(W_i, W_{-i}; Z_m\right) - T^j\left(0, W_{-i}, Z_m\right)}{W_i} - \sum_{j=1}^{n} \frac{P^j\left(W_i, W_{-i}, Z_m\right) - P^j\left(0, \boldsymbol{W}_{-i}, Z_m\right)}{W_i}$$

$$\mathrm{EPTR}_i = \sum_{j=1}^{n+o} \mathrm{PTR}_i^{\,j}$$

with $\mathrm{PTR}_i^{\,j}$ the participation tax rate of the scheme *j*.

(a) The same result is found by writing the first-order condition in a labour supply model of choice (in which the utility depends on the household's disposable income and on the various incomes within the household, including the individual income from the individual's work i*).*

The EPTR is calculated by cancelling out the individual's earned income, without simulating unemployment benefits (Box 1).[18] This measures the impact of the resignation or job loss of a person who does not qualify for unemployment benefits and, symmetrically, the return to work of a non-working individual. Unlike a traditional return-to-work indicator,[19] the EPTR calculation makes it possible not to choose which income to attribute to a non-working individual and to give a distribution according to income.

Transfers Taken into Account and Tax Incidence Hypotheses

To choose the initial income and the transfers to be taken into account, it is necessary to hypothesise the incidence of taxes and benefits. In this study, incidence particularly applies for housing benefits and employer contributions for which the official payer/recipient is not necessarily the one who ultimately pays/receives the tax or benefit (tenants or landlords for housing benefit and employees or employers for the employer contributions). Housing benefits were included in the analysis by hypothesising that following a decrease in housing benefit due to an increase in earned income, the landlord does not decrease the rent.

Concerning social security contributions, from a theoretical stance, employer contributions and employee contributions have a perfectly equivalent impact on market equilibrium and ultimately affect employees if elasticity in the labour supply is lower than that of labour demand (Fullerton & Metcalf, 2002), which appears to be borne out by empirical estimates (Blundell & MaCurdy, 1999). However, more recent empirical studies (Saez *et al.*, 2012, in Greece; Lehmann *et al.*, 2013, and Bozio *et al.*, 2017, in France) challenge this finding and show that the employer contributions are mostly borne by the employers in the short term.[20]

For this study, two scenarios were therefore used: the first, in which the incidence of employer contributions falls on the employers and are therefore not taken into account, and the second where they are taken into account. In the first instance, the initial income of interest is gross income, and in the second, the labour cost. The "real" marginal rate for households probably sits between the two as noted by Bourguignon (1998, p. 41).

This study does not to make a distinction between contributions that are contributive or those that give entitlement to a replacement income or otherwise. As such, it is implicitly assumed that agents are short-sighted and perceive employer contributions as a tax and not as a future replacement income (pension) or an insurance (unemployment). This study focuses therefore on short-term incentives, not taking into account long-term incentives (more advantageous pension or unemployment benefits).

Lastly, the tax-benefit transfers considered in this study are all those that go from the labour cost (or gross income depending on the scenario) of the individual to the disposable income published by Insee (see Box 2 for details of the schemes), except for replacement incomes and residence tax (due to the difficulty of simulating it). The national benefits not included in disposable income (childcare support (*Complément Mode de Garde*), universal healthcare coverage (CMUC), grants, etc.), local and extra-legal social benefits (nurseries, canteens, social housing benefits, entitlements associated with RSA, etc.), social tariffs, and wealth taxes were not taken into account.

Lastly, it should be noted that this study is different to previous related studies in France because it takes into account[21] temporary, often sub-annual, fully and partially cumulative minimum income schemes and earned incomes.

Implementing the Calculation based on the Ines Microsimulation Model

We analyse the EMTR and EPTR by microsimulation using the Ines model (Box 3), based on a sample representative of the population (see below). The benefits and taxes of each household are simulated, first in a counterfactual situation, then in a fictional situation[22] in which

18. This imputation is in fact impossible using the ERFS as the work status for the last two years, required to calculate employment benefits, is not known. Alternative PTR calculated by reducing earned income by 40% (the average employment benefit being 60% of net income according to Unedic) for all individuals are presented in Online complement C7: the main conclusions are the same but the shape at the bottom of the distribution is slighly different.

19. A description by microsimulation of the financial gains for individuals who return to work can be found for France in the studies by Legendre et al. *(2003), Laroque and Salanié (1999), Gurgand and Margolis (2008), or compared internationally with reprensentative tax profiles in the study by the OECD (2017).*

20. Due to the rigidity of gross income, in connection with collective bargaining and the minimum wage according to Lehmann et al. *(2013).*

21. Using monthly information on the working time of individuals in the French employment survey.

22. In practice, the wage reported in tax declarations is varied. As social security contributions are simulated, it is possible to obtain, for a 3% variation in declared income, the variation in gross income and labour cost and to deduct from these the marginal tax rate.

incomes were modified, to be able to calculate the EMTR and EPTR.

If several people in a household were working, the EMTR and EPTR are calculated for each working individual (increasing the labour cost of each single person in the household and recalculating the disposable income of the household, in turn). In this respect, this study differs from several other studies which calculate an EMTR at household level alone (Immervol, 2002; Bourguignon, 1998) or for one of the

Box 2 – **Transfers Considered in the Analysis**

The transfers considered in the analysis are as follows:

- Income tax, net of tax credits and flat-rate tax (*prélèvement forfaitaire libératoire*, PFL), but gross of working tax credit (*prime pour l'emploi*, PPE);

- The PPE working tax credit and the RSA *activité* which have been merged and are different to income tax and minimum income benefits respectively due to their aim to improve incentives to work (see below);

- Means-tested family benefits: birth allowance (*prime de naissance*) and the basic allowance provided by the PAJE childcare scheme, family supplement (*complément familial*), the school allowance (*allocation de rentrée scolaire*); and the CLCA stay-at-home supplement (which depends on PAJE payments and therefore indirectly income);

- Housing benefits (for tenant and first-time buyer);

- Minimum income benefits: primarily the basic RSA (income support and Christmas supplement) and adult disability allowance (*allocation adulte handicap*, AAH), supplementary disability allowance (*allocation supplémentaire d'invalidité*, ASI) and pensioners' allowance (*allocation de solidarité aux personnes âgées*, ASPA).

- Social security contributions (CSG, CRDS, the exceptional civil service contribution, and other social contributions on capital income);

- Employee contributions and compulsory self-employed social security contributions (grouped together under the term "employee contributions" for simplicity's sake);

- Net contributions and taxes paid by the employer, composed of:

  • Employer contributions toward unemployment benefits, family, sickness and occupational injuries benefits, basic and top-up pension (including Agirc and Arrco); in the case of civil servants, only actual contributions are taken into account, and not imputed contributions (pensions);

  • Other taxes and subsidies based on the wage bill: *"taxe sur les salaires"*, firms' tax credit (CICE), transport fund tax (*versement transport*), contribution to the national housing fund (*contribution au fond national d'aide au logement)*, invalidity contribution (*taxe de prévoyance*) including the corporate contribution, apprenticeship tax (*taxe d'apprentissage*) and the contribution to apprenticeship development (*contribution au développement de l'apprentissage*), contribution to continuing professional development (*contribution à la formation professionnelle*) and employer participation in construction investments (*participation des employeurs à l'effort de construction*).

Box 3 – **The Ines Microsimulation Model**

The Ines microsimulation model is jointly managed by Insee and Drees and has been made available freely to researchers since June 2016. It can be used to simulate financial benefits and taxes for a population representative of households in mainland France, based on the tax and benefit incomes survey, *enquête Revenus fiscaux et sociaux* (ERFS).

Based on the ERFS for year *N*, the incomes in *N* + 1 and *N* + 2 received by a series of households representative of the population in *N* + 2 are extrapolated based on developments aggregated by categories of income and the socio-demographic structure. By applying the legislation of *N* + 2, the microsimulation model can be used to calculate the taxes they pay that year along with the benefits they receive, in order to calculate the standard of living after redistribution.

The main shortcomings relate to local taxes and benefits as well as the wealth tax (*impôt de solidarité sur la fortune*, ISF). Pensions, unemployment benefits and residence tax are not simulated but are present in the upstream data.

The Ines model gives a relatively good simulation of the benefits and taxes compared to observed values: the vast majority are simulated with less than 10% error, and the most important in terms of quantity with less than 5% (for example, income tax, the CSG and the CRDS, and family welfare benefits). Indeed, beyond the simulation of scales, the Ines model recreates, for each tax or transfer, the appropriate unit for calculating them (individuals, household in the fiscal sense, family according to the CAF family welfare office). Lastly, the model considers different temporalities for the resources.

A detailed description of the model along with the source code are available at https://adullact.net/projects/ineslibre.

people in the household (often the main earner or, for example, the head of family for Duclos *et al.*, 2009).

As is the case in nearly all studies on EMTR, no behavioural response (variation in the individual's labour supply or that of their partner) is taken into account here. Lastly, the calculation of the marginal rates is consolidated and does not take into account the time lag in incomes for certain transfers (for example one year for income tax). This gives the contributions of each transfer for a single year (the legislative year under study).

Method for Comparing the Different Legislative Years

This study seeks to describe the EMTR and EPTR for the year 2014, but can also compare previous years: 1998 and 2008. As such, the approach used by Eidelman *et al.* (2013) is applied with a constant population (that of 2014), in order to comment on the developments in legislation and not on the socio-demographic situation. However, to be able to apply this to the population in 2014, the legislative scales from 1998 and 2008 had to be revised: they are increased in this study according to inflation (because they are generally revised according to inflation-related criteria). It should nevertheless be noted that the simulation becomes less sound the older the legislation period.

Data

The French tax and benefit income survey, the *enquête Revenus fiscaux et sociaux* (ERFS), on which the Ines model is based, compiles socio-demographic information from the labor force survey (LFS), administrative information from the family welfare offices (Cnaf), the pensions offices (Cnav) and the central agricultural social insurance agency (CCMSA) on benefits paid to households, along with details of the income declared to the tax authorities for calculating income tax as provided by the General Directorate of Public Finance (DGFiP). This study used the ERFS 2012 (which included approximately 56,000 households in mainland France and 134,000 individuals), which was aged by two years using the Ines model so as to be representative of the situation in 2014.

This analysis focuses exclusively on individuals receiving positive earned income in 2014, be they employees or self-employed, and regardless of their work time percentage or the length of period they worked over the year. In addition, it is limited to ordinary households (in other words, not collective housing) in mainland France. Lastly, our sample contains 56,712 individuals (28.8 million with weighting) and 35,921 households (18.5 million with weighting).

The median labour cost is 32,800 euro and that of the standard of living 22,300 euro (Table 2). The distribution of incomes of individuals in the sample is slightly further over to the right in relation to that of the entire population, particularly as regards standards of living (median of 22,300 euro in our sample against 20,200 euro, see Argouarc'h and Boiron, 2016). This is linked with the fact that we only took into account working individuals, and their incomes are higher on average than those of pensioners and the unemployed.

Table 2
Distribution of Incomes and Transfers of Individuals in the Sample

(In €)

	Individual labour cost	Gross income	Net income	Contributions	Benefits	Taxes (including PPE)	Standard of living
P10	5,871	4,985	3,726	4,398	0	-454	12,915
Q1	17,407	14,071	11,128	10,862	0	0	17,012
Median	32,794	24,660	20,096	20,026	0	1,171	22,349
Q3	48,119	35,069	28,668	31,502	2,729	3,073	29,594
D90	71,547	50,923	41,451	45,546	6,692	7,334	39,996
Average	38,874	29,011	23,558	23,672	2,132	3,379	25,695

Sources: Insee, survey *Revenus fiscaux et sociaux* 2012 (updated to 2014); Drees and Insee, Ines model.

Results

Analysis of EMTR Over the Year 2014

Distribution of the EMTR

The median effective marginal tax rate for working people is 33% in the first incidence scenario[23] (not taking into account employer contributions) and 57% in the second. The distribution of the EMTR reveals 3 main modes at 21%, 31% and 42% (Figure I), which correspond with the marginal rates of employer contributions and the CSG/CRDS (21%),[24] added to the rate of income tax (at 0%, 10% and 21%).[25] In the second scenario employer contributions, taxes and subsidies needed to be added, which adds two peaks (according to eligibility for Fillon tax relief and the CICE business tax credit) and moves them all to the right: the distribution reveals five modes at 50%, 57%, 59%, 62% and 65%.

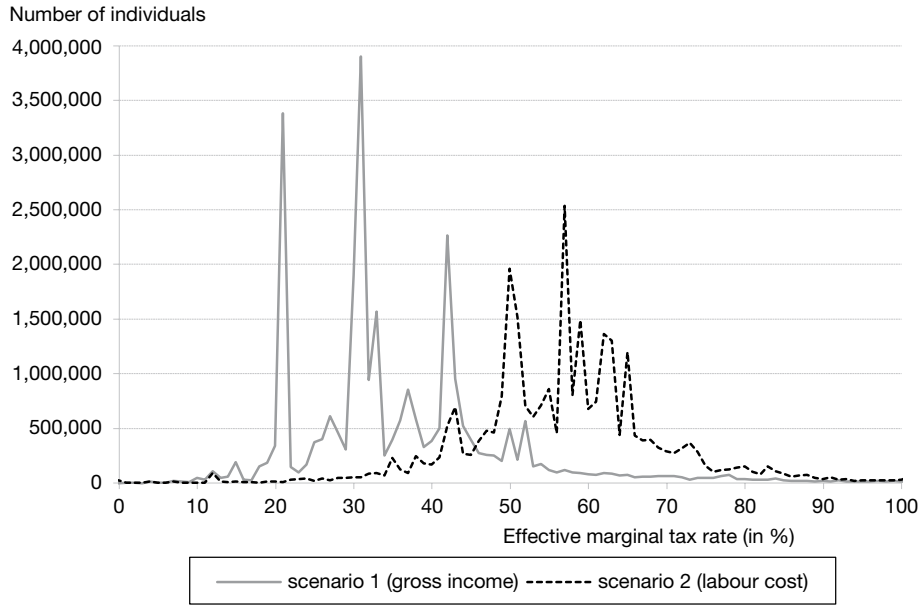
In both scenarios, the gap between the first and the last decile is approximately 30 points (between 22% and 53% and between 44% and 73% respectively) and the distribution has few extreme values: only 1.5% of individuals have rates higher than 100% (the majority between 100% and 120%), and 0.2% have negative rates (of which more than two thirds are between 0% and -20%). These very atypical rates can be explained by the effects of thresholds and the differential benefit schemes presented in Online complement C1.

Variability of the EMTR

Figure II shows several EMTR quantiles according to percentiles of annual individual income. In the two scenarios, the median marginal rate has a wavy shape according to income. In the first scenario, it increases in the first two deciles to reach 42%, then drops as of a third of the distribution, is stable between 1.3 the minimum wage and 2.5 the minimum wage at 32%, then increases. In the second scenario, it is stable below 0.3 the minimum wage at 57%, then gradually increases to just above 1 times the minimum wage to reach 66%, before dropping again to 1.7 the minimum wage, stagnating at 52% and finally increasing again after the annual social security threshold.[26]

23. Leventi and Vujackov (2016) obtained the same median EMTR using the Euromod model.
24. Equal to the sum of the employer contribution rates (between 12 and 14%) and the CSG/CRDS (8%).
25. In relation to the nominal rates of the scale, these modes are off set, because the gross income rate is shown here and not the taxable net income rate. The rate at 14% is translated to around 10%, 21% ("décote" tax relief on the 14% bracket) to 15% (less visible), and that of 30% to 21-22%. There is barely any trace of the 41% and 45% rates, as few households are marginally taxed at these levels.
26. The main difference between the two scenarios is associated with the reductions in employer contributions which increase marginal rates in the bottom of the distribution and decrease them to zero at 1.6 times the minimum wage (see below).

Figure I
Distribution of EMTR



Coverage: Individuals with positive earned income and belonging to an ordinary household in mainland France (28.8 million individuals).
Sources: Insee, survey *Revenus fiscaux et sociaux* 2012 (updated to 2014); Drees and Insee, Ines model.

The median marginal rates stand at between 22% and 51% (or a difference of 29 points) in the first scenario, and between 51% and 66% (or 15 points difference) in the second. This lower heterogeneity in the second scenario is associated with the inclusion of employer contributions which reduce the variability of the EMTR due to their weight (35/40% of

Figure II
Distribution of EMTR per Income Percentile

A – Scenario 1 (gross income)

B – Scenario 2 (labour cost)

Coverage: Individuals with positive earned income and belonging to an ordinary household in mainland France (28.8 million individuals).
Sources: Insee, survey *Revenus fiscaux et sociaux* 2012 (updated to 2014); Drees and Insee, Ines model.

the labour cost) and the relative consistency of the marginal rates associated with the employer contributions.

Variability of the EMTR for a Given Income

EMTR do not depend purely on the level of individual income, but also on the number of dependents, marital status, employment status (legal status of the employer, percentage of work time), rent (for eligibility for housing benefit) and the incomes of the other people in the household. Variability therefore plays a role according to the level of income: it is high at the bottom of the distribution and decreases overall as incomes rise. The interdecile ratios are approximately 3 to 4 points at the bottom of the distribution and 1 to 2 points at the top. For example, at minimum wage level, 80% of individuals have a marginal rate in a 45-point bracket, compared with a 17/15 point bracket (according to the scenarios) at 2 times the minimum wage. The peak of the variability comes in at a little more than one times the minimum wage and corresponds with the entry in the income tax schedule, while the peak at 2.5 times the minimum wage in scenario two corresponds with the ceiling for CICE business tax credit entitlement.

An alternative representation of the marginal rates according to household living standard shows that the heterogeneity at the given income level is lower (see Online complement C5) confirming that it is associated with the fact that the level of transfers often depends on the structure and resources of the household.

Breakdown of the Average EMTR by Category of Transfer

Analysis of the contribution of each category of transfer to the average marginal rate[27] per percentile of annual income helps understand the origin of the wavy curve of the EMTR (Figure III). At the bottom of the income distribution are mostly in-work incentive schemes (RSA *activité* and PPE) which drive the changes in the EMTR: they have a negative contribution at the start of the distribution, then they gradually become positive between 0.3 and 1.2 times the minimum wage in their degressive phase.

The degressiveness of housing benefit beyond a certain income and the progressiveness of income tax accentuate this increase in EMTR between 0 and 1 times the minimum wage, slightly offset, however, by the stop in receipt of minimum income benefits as incomes rise, which gradually cancels out their contribution. Loss of entitlement to PPE, has the effect of decreasing EMTR from 1.2 times the minimum wage. Between 1.2 times the minimum wage and annual social security limit level 1, the increase in income tax contributions is offset by the gradual removal of housing benefits leading to stability in the EMTR. In scenario two, employer contributions contribute to the drop in EMTR at 1.6 times the minimum wage due to loss of entitlement to the "Fillon" tax relief. In the top third of the distribution, the EMTR increases due to the progressivity of income tax; a slight rise offset at the final end of the distribution by the lower social security contribution rate on the share of income exceeding 3 times the annual social security threshold (SST). It should be noted that the measures which decrease the labour cost for companies (aiming to promote employment), increase the level of marginal rates in the degressive phase (between 1 and 1.6 times the minimum wage for the "Fillon" tax relief) or occasionally when exceeding the eligibility threshold (at 2.5 times the minimum wage for the CICE) of these schemes (Figure III.b).

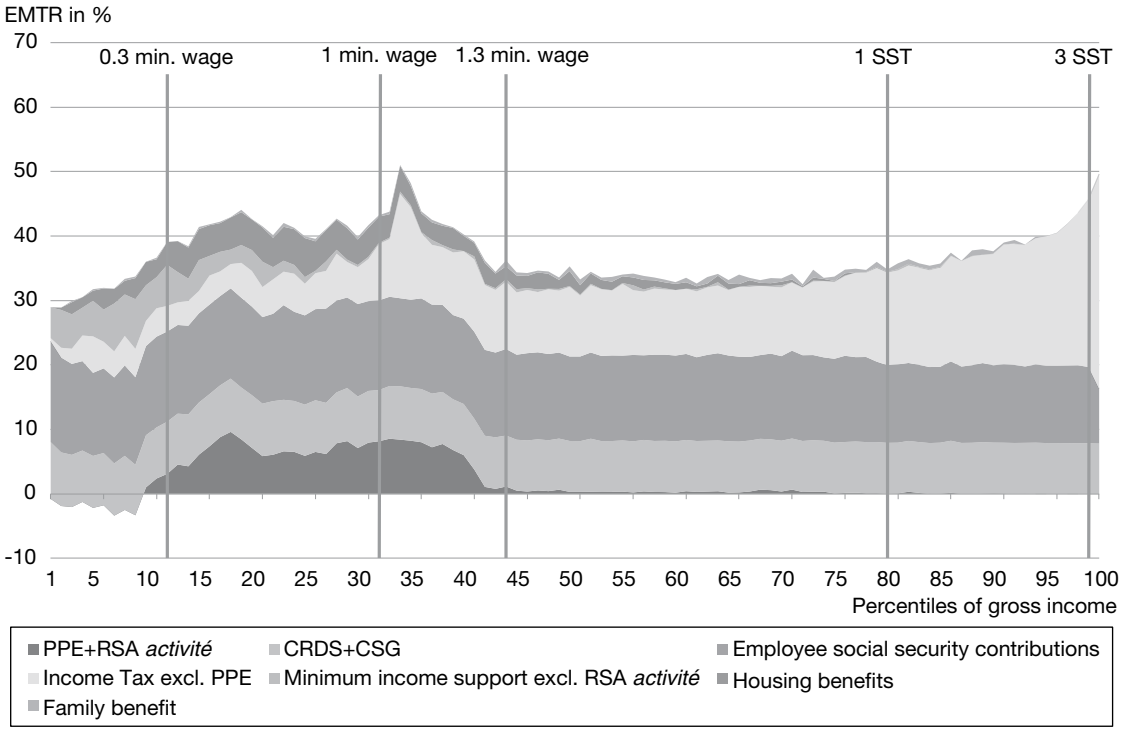
Breakdown by Family Configuration

Family configuration is a key element in determining entitlement to social welfare benefits and the amount of income tax, and especially the EMTR. Average EMTR are relatively similar according to family configuration, varying between 37% and 41% in the first scenario and 57% and 61% in the second. It is for single parents that the average EMTR is the highest (41% in the first scenario and 61% in the second). This is primarily linked with a higher contribution by marginal rates associated with housing benefits and minimum income benefits (11% cumulated against less than 5% in the other configurations see Figure C2-I of Online complement C2). In fact, parents of low-income single-parent families often receive more housing benefits (more favourable scale) and minimum income benefits (higher RSA for single parents); they therefore lose more if their earned income increases. Conversely, the contribution of income tax is lower for single-parent families than for other family configurations because, first, they

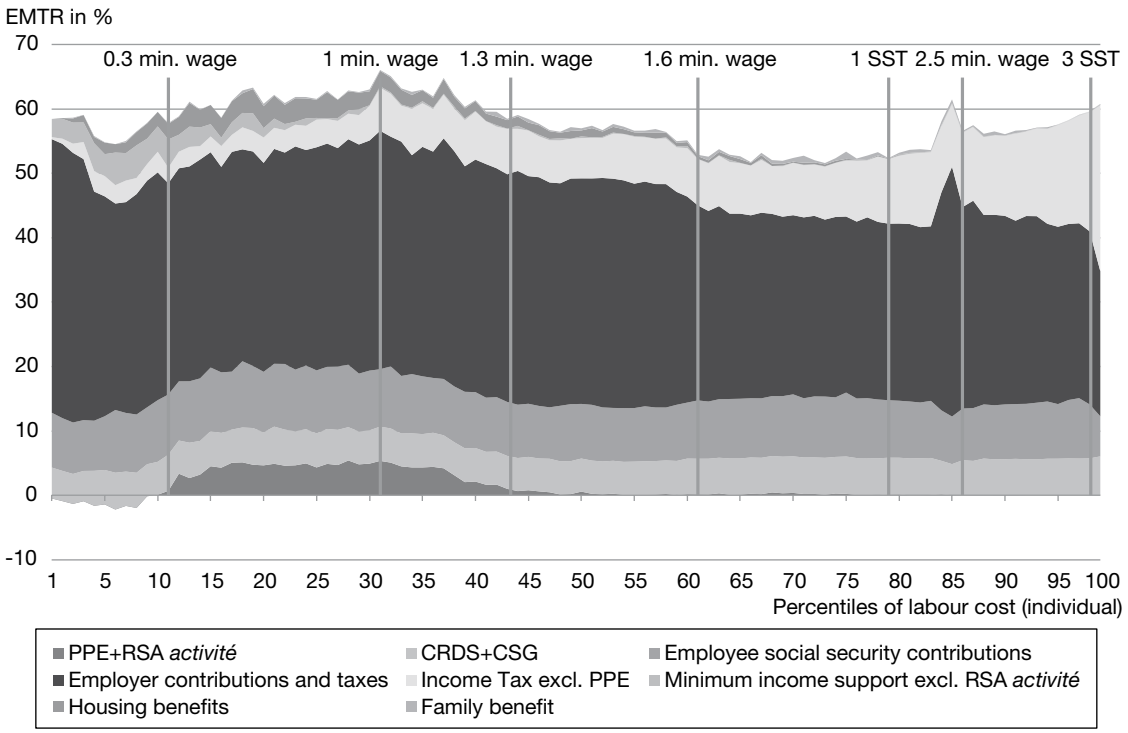
27. Indeed, the equation (2) (cf. Box 2) remains true for any linear operation on the EMTR, in particular the average. Given the sensitivity of the average to extreme values, we have restricted the study to individuals for whom the EMTR is between -20% and 150% (who account for 99.7% of the individuals).

Figure III
Breakdown of the Average EMTR by Type of Transfer

A – Scenario 1



B – Scenario 2



Note: The negative contribution at the start of the distribution is connected with the PPE working tax credit and RSA earned income supplement.
Coverage: Individuals with positive earned income and belonging to an ordinary household in mainland France.
Sources: Insee, survey *Revenus fiscaux et sociaux* 2012 (updated to 2014); Drees and Insee, Ines model.

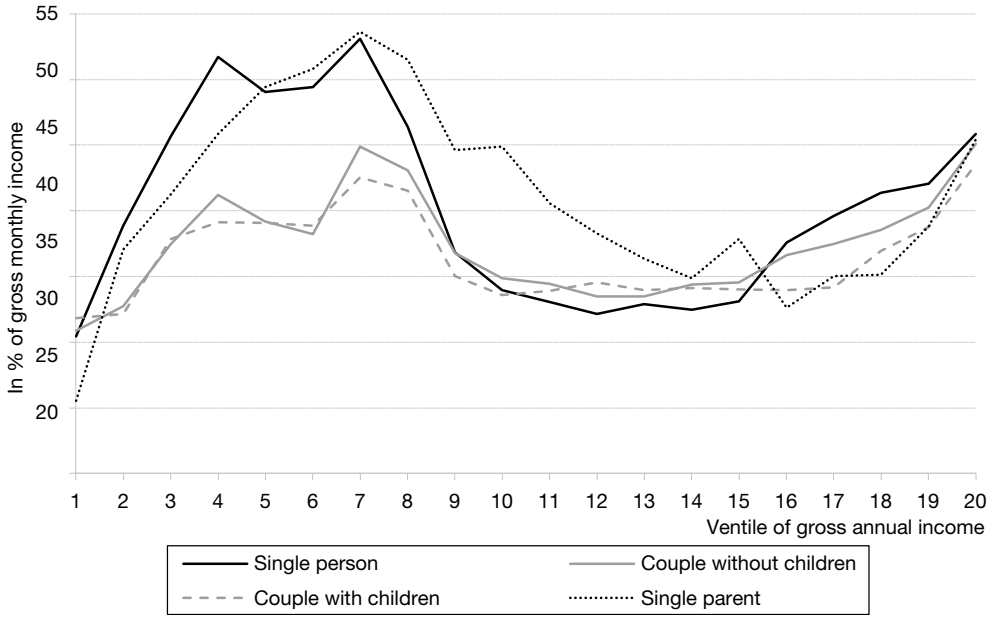
generally have lower incomes and, second, the first dependent child counts as a full part against a half-part for each of two children.

Single people without children have a higher average marginal rate (40% in the first scenario and 60% in the second) than couples with and without children (37% in the first scenario and 57% in the second respectively). Indeed, single people without children quickly lose housing benefits and therefore have a higher housing benefit contribution to the EMTR than couples.

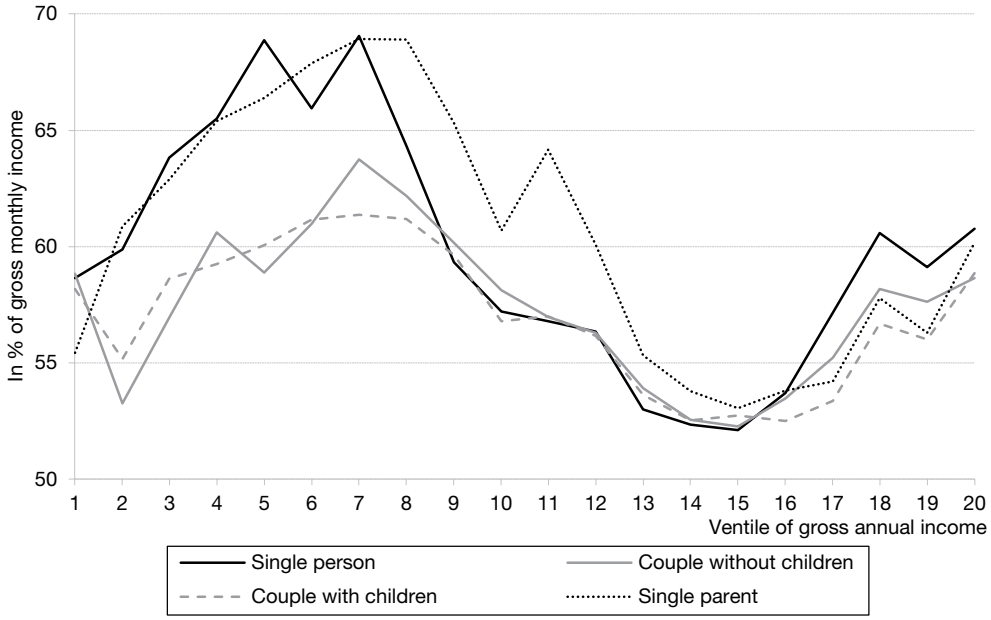
Figure IV presents the average EMTR per vintile of labour cost for the four family configurations. In each instance there is a wavy curve across the entire population, but with two

Figure IV
Average EMTR Depending on the Labour Cost According to Family Configuration

A – Scenario 1



B – Scenario 2



Coverage: Individuals with positive earned income and belonging to an ordinary household in mainland France.
Sources: Insee, survey *Revenus fiscaux et sociaux* 2012 (updated to 2014); Drees and Insee, Ines model.

primary differences: for people with no partner, the increase at the bottom of the distribution then the decrease are more pronounced than for people with partners (and therefore the level is higher in the first half of the distribution). For single-parent families, the level is higher than for single people without children in the middle of the distribution. The steep increase for single people without children is associated with a contribution of the marginal income tax rate which increases more sharply at the entry level of the income tax schedule.

Breakdown by Gender and Marital Status

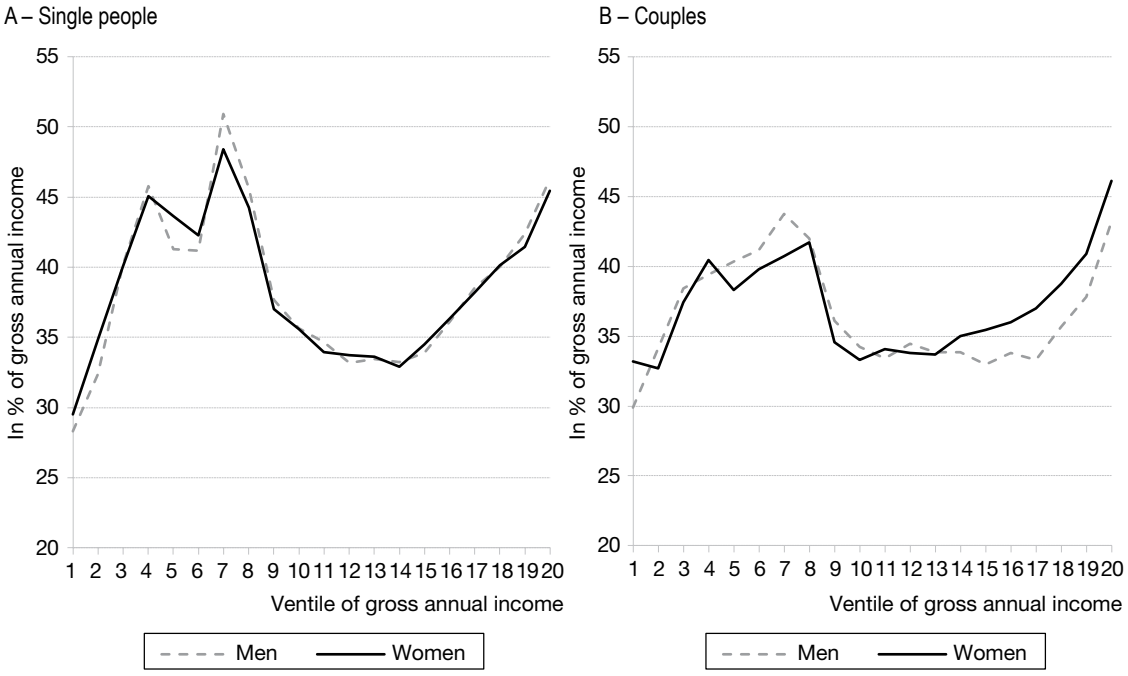
EMTR are slightly higher for women than for men on average (approximately 1 point in both scenarios). They are slightly lower in the middle of the distribution and higher at the top (see Figure C2-II of Online complement C2). This result is consistent with Immervol (2002) who finds for France higher marginal rates for women for the final third of the distribution. This result is more significant for married women or women in a civil union, who have a median marginal rate of 1 to 2 points higher (depending on the scenario) than that of married men or men in a civil union, particularly at the top of the distribution. However, single women and men (single, widowed or divorced) have very similar rates (Figure V). A breakdown of the average EMTR shows that these differences for married or civil union couples are primarily linked with income tax at the top of the distribution (and to a lesser extent the PPE at the bottom of the distribution).

Analysis of EPTR over the Year 2014

This section extends the previous analysis at the intensive margin with the extensive margin by giving information on the effective participation tax rates (EPTR) in 2014. Only the key points and those which stand out from the previous analysis are presented; for further details, see figures in Online complement C3.

The median EPTR are 33% in the first scenario and 50% in the second scenario, with a flat distribution, without peaks. Only 1.2% of individuals have EPTR higher than 100%. The average EPTR according to percentiles of income declines slightly in scenario 1, and is relatively stable and rises slightly at the end of the distribution in scenario 2 (see Figure C3-I). These changes are due to several phenomena that offset one another: the contribution of minimum income benefits is relatively high at the bottom of the distribution and then decreases, whereas

Figure V
Average EMTR According to Gender and Marital Status (scenario 1)



Coverage: Individuals with positive earned income and belonging to an ordinary household in mainland France.
Sources: Insee, survey *Revenus fiscaux et sociaux* 2012 (updated to 2014); Drees and Insee, Ines model.

the contribution of income tax and employer contributions increases (see Figure C3-II). This increase in employer contributions leads to the difference seen between scenarios 1 and 2. It should be noted that unlike the EMTR, the contribution of the PPE and RSA *activité* is still negative (and zero from approximately 1.3 times the minimum wage, at which point the individual is no longer entitled to the schemes) because even in their degressive phase, there is still a gain compared with not working.

Another particularity of the EPTR in relation to the EMTR is that they vary much more according to the family configuration. Couples have much lower EPTR than other configurations, regardless of the number of children (Figure VI). This is due to the fact that social welfare benefits and income tax are means-tested in France: taking into account the income of the partner significantly decreases the amount of benefits an unemployed person receives (and may even leave them unentitled). As such, an unemployed person in a couple with a working partner only loses a small amount of benefits when going back to work, unlike a single person whose benefit from minimum income schemes is cancelled out.

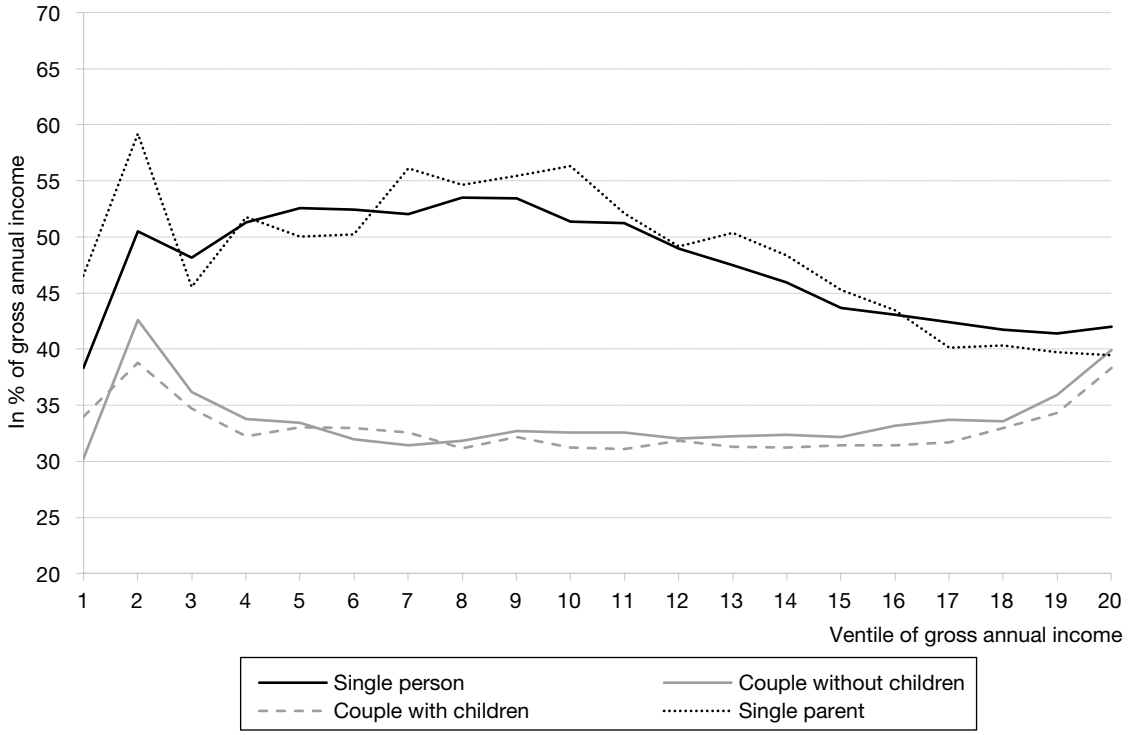
Lastly, the EPTR of men and women are similar. They are slightly higher for men on average, particularly at the bottom of the distribution, whereas they are slightly higher for women at the top of the distribution (see Figure C3-III). This is consistent with Immervol *et al.* (2009) who show that the EPTR of primary earners in France is higher than that of secondary earners (but less significantly than in other countries).

Changes in EMTR and EPTR between 1998, 2008 and 2014

In this section, we assess the effect of legislative changes on EMTR and EPTR between 1998, 2008 and 2014. We particularly focus on the effect of work incentive measures introduced at the start of the 2000s (see Online complement C4 for details).

In 2008, the shape of the EMTR and EPTR curve according to percentiles of income is close to that of 2014, except at the start of the distribution (first tenth of the population): EMTR and EPTR are high but decreasing in 2008 in this portion of the distribution, whereas they are lower but increasing in 2014 (Figure VII). This

Figure VI
Average EPTR by Family Configuration (scenario 1)



Coverage: Individuals with positive earned income and belonging to an ordinary household in mainland France
Sources: Insee, survey *Revenus fiscaux et sociaux* 2012 (updated to 2014); Drees and Insee, Ines model.

change can be explained by the introduction of the RSA *activité*, which decreased the marginal rates of 100% due to the differential part of the RMI, but also by other profit-sharing schemes that were created or bolstered, for the AAH in particular (the contribution of minimum income benefits excluding the RSA *activité* decreased between 2008 and 2014[28]). Across the entire second part of the distribution, the EMTR and EPTR are slightly lower in 2008 than in 2014 but have the same shape.

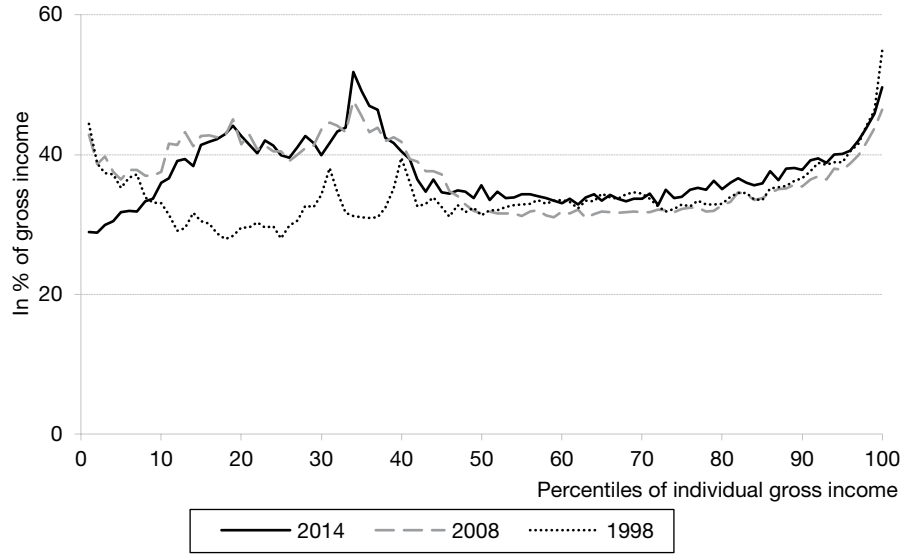
In 1998, the EMTR have a U shape according to gross income, unlike the wavy shape of 2014.[29] As in 2008, the EMTR drop at the start of the distribution but this drop continues after the first decile and the EMTR are significantly lower between the first and fourth deciles in 1998 than in 2008 and 2014. The higher EMTR in 2008 and 2014 across this income bracket are associated

28. It was on average 7 points for the first decile in 2008 compared with 4 points in 2014 (see Online complement C4).

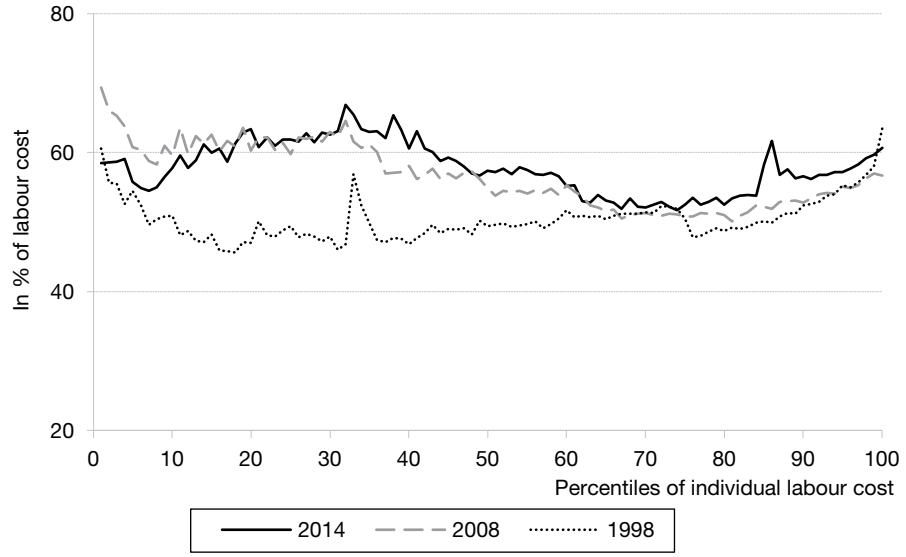
29. Which is consistent with previous studies conducted in this period: Laroque and Salanié (1999) for 1997 and Legendre et al. *(2003) for 2000 find a U-shaped EMTR distribution, whereas Bourguignon (1998) finds a double-U curve. It should be noted that in these studies the EMTR are generally illustrated according to the household's standard of living and must therefore be compared with our graphs in Online complement C5.*

Figure VII
EMTR and EPTR by Legislative Year and Incidence Scenario

A – EMTR - Scenario 1

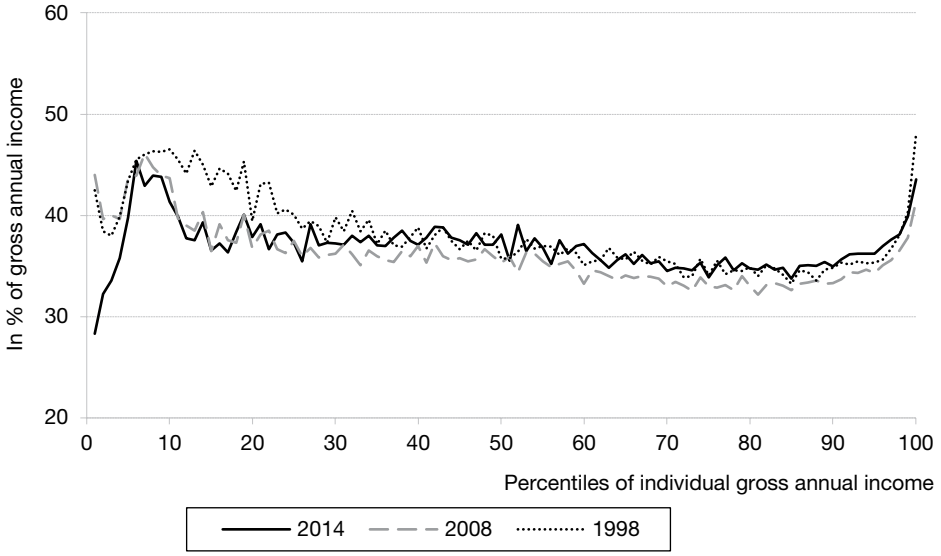


B – EMTR - Scenario 2

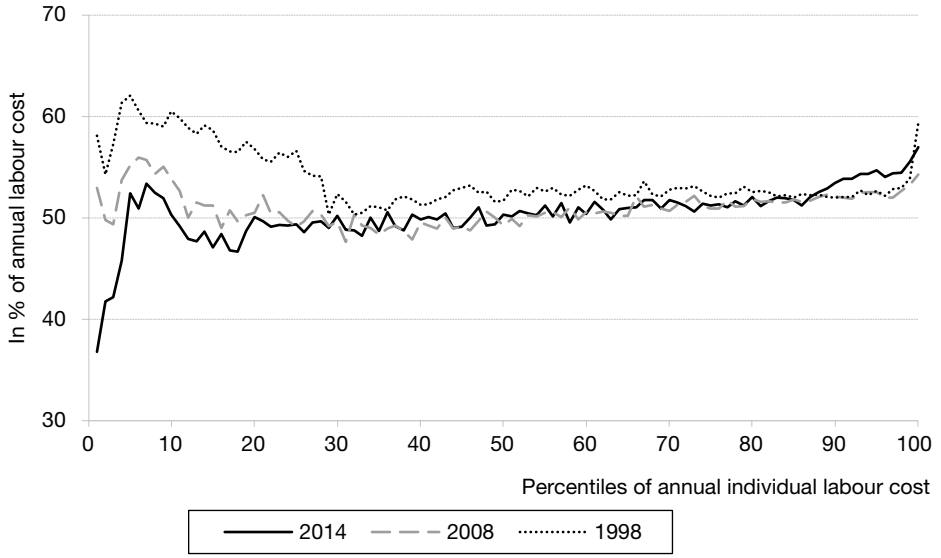


➔

C – EPTR - Scenario 1



D – EPTR - Scenario 2



Coverage: Individuals with positive earned income and belonging to an ordinary household in mainland France.
Sources: Insee, survey *Revenus fiscaux et sociaux* 2012 (updated to 2014); Drees and Insee, Ines model.

with the positive marginal rates of the PPE in its degressive phase (see Online complement C4, Figure C4-II).[30] For the EPTR, the findings are different. They are higher in 1998 across the first third of the distribution in relation to 2014. Indeed, even in the degressive phase of the PPE, this remains a gain in relation to being unemployed and therefore the PPE clearly increases back-to-work gains across the entire start of the distribution (except at the very start, below the PPE entitlement threshold).

Ultimately, the change in the shape of the EMTR (from a U to a tilde shape) and EPTR (drop in level in the first third of the distribution) curves between 1998 and 2014 is primarily due to the introduction of employment incentive schemes and in particular the PPE in 2001. These reforms decreased the very high proportion of EMTR and EPTR in relation to 1998 by approximately half (see tables C4-1 and C4-2 of Online complement C4) This decrease was offset by marginal rates that were on average higher at the upper-middle range of the distribution, as

30. And to a lesser extent, with the increase in the contribution of housing benefits (+3 points over the period) due to the reform of 2001/2002 which decreased very high rates but increased them on average.

shown by the rise in average EMTR between 1998 and 2014,[31] and the increase in the proportion of marginal rates between 60% and 100% (see Table C4-1). Unlike the EMTR, the average levels of EPTR changed little between 1998 and 2014 (see Table C4-2), the effect of work incentive reforms having offset the increase in social security contribution rates.

Discussion

This section discusses a few of our findings on work incentives as regards public policy objectives, normative recommendations of economic theory and international comparisons, before presenting two of the study's limitations.

The study shows that between 1998 and 2014, disincentives to work (EMTR and EPTR above 100%) decreased due to the introduction of employment incentive measures for low-paid workers (RSA *activité* and PPE). These reforms were relatively effective in reducing the welfare trap but were they optimal[32] as regards social justice? To this question, Diamond and Saez (2011) conclude that reforms in developed countries over the last few decades aimed at providing incentives to work are consistent with optimal taxation as this increases redistribution to low-paid workers while encouraging participation in the labour market. Indeed, Saez[33] (2002) shows that a earned income tax credit system (like the PPE) is preferable to a system of negative income tax if responses at the extensive margin are high in relation to those at the intensive margin[34], which has been confirmed by empirical studies (Blundell & MaCurdy, 1999). In a model incorporating the labour market, Immervol *et al.* (2007) showed that in France (and in European countries in general), a in-work incentive reform focused on low-paid workers is much more desirable than a negative income tax-type measure.

This study has shown that the work incentives for women (EMTR and EPTR) are relatively similar to those of men in France at the intensive and extensive margins. Yet, according to a theoretical efficiency criterion (Ramsey rule), women should be taxed less because their labour supply is more elastic.[35] This has sparked much debate within academic research on gender-based taxation (for example Alesina *et al.*, 2011), other authors contesting this differentiated taxation because it could have an impact on decisions to marry and would not meet the criterion of equity between families (Saint-Paul, 2008). In France, the debate is focused on the individualisation of transfers and particularly income tax. Some economists advocate individualisation of the income tax (Landais *et al.*, 2011) which would have the advantage of greater economic efficiency due to better work incentive mechanisms for the lower-earning partner, whose elasticity of participation would be particularly high in France (Carbonnier, 2014).

We have also shown that single people have much lower incentives to work than other family configurations (especially in the first half of the distribution). To assess the efficiency of this situation in light of the Ramsey rule, it is necessary to know the elasticities of labour supply according to family configuration, which are not well known.[36]

Lastly, the median EMTR in France are in the high bracket of EMTR in Europe, and are particularly higher than those in the United Kingdom, Spain and Sweden, but lower than those in Germany, Italy and Belgium (Leventi & Vujackov, 2016), and are distinctive for the significant contribution of welfare benefits (particularly in the first two deciles according to Jara and Tumino, 2013), the reason for their high level. Concerning incentives at the extensive margin, only comparisons of representative agents are available for the recent period. They show that EPTR are within the average of European countries (European Commission, 2013, p. 44).

* *
*

31. Associated also with increases in employer pension contribution rates.
32. Traditional models of optimum taxation show that the optimum marginal rate is a U-shaped curve (Saez, 2001), but these analyses do not sufficiently consider incomplete labour markets at the bottom of the distribution (presence of the minimum wage, part-time work, etc.) and are therefore better compared with our graphs above the minimum wage (which do indeed have a U-shaped curve), without giving any clear indications on the shape at the extreme bottom end of the distribution.
33. Negative tax consists in an income guaranteed by the state along with a marginal rate below 100% (RSA basic income support is close to this in France).
34. It should be noted that this result depends on the weight that the government gives to the different groups of income distribution, and no longer holds when the government only cares about the well-being of individuals with no income (Rawlsian case), or when the government does not seek to redistribute income (Saez, 2002, p. 1050).
35. See Blundell and MaCurdy (1999). This is particularly the case for married women with young children.
36. Estimates by Sicsic (2018) show that single people have higher elasticities in France, which would suggest that the state of incentives to work according to family configuration is not efficient.

The analysis of marginal rates and participation rates has given an overview of incentives to work in France according to level of income, by family configuration and by gender. We have shown that the difference in work incentive between men and women is very low or even zero on average (except at the top of the distribution to the detriment of married women), and that work incentives are much lower for single people than for couples (in the first half of the distribution at the intensive margin and across the entire distribution at the extensive margin). The analysis also highlights the change in the shape of the EMTR by income percentile, from a U to a tilde shape, between 1998 and 2014, and the drop in EPTR in the first third of the distribution, particularly with the introduction of the RSA *activité* and PPE schemes.

Two limitations to this analysis must, however be highlighted. Firstly, there are several schemes that give non-zero marginal rates but are not taken into account in this study, particularly local benefits and taxes. Their inclusion would increase the EMTR in the bottom of the distribution due to entitlements associated with minimum income benefits, partial residence tax relief, social tariffs, grants, canteens, etc. Adding just residence tax (*taxe d'habitation*) to the EMTR and EPTR would however have a relatively low impact for a single person: it would increase the EMTR by 2 to 3 points (according to the scenario) between 0.4 times the minimum wage and 1 times the minimum wage and from 1 to 2 points for the PTR (see representative tax profiles in Online complement C6). According to Anne and L'Horty (2002, 2009), the impact of all local benefits on back-to-work gains (measured by the duration of remaining in a minimum-wage job, in relation to net income[37]) would be more than 50% for certain family configurations. Secondly, work incentives do not depend solely on short-term financial incentives measured by EMTR and EPTR. Dynamic aspects in the medium/long-term labour supply can have an impact on incentives. Indeed, even with high marginal rates, it can be beneficial to work more (in percentage of work time or intensity) in terms of future gains and productivity (promotion, more advantageous pension or unemployment benefits, positive impact on productivity and employability, etc.).

Despite these limitations, it would be desirable to present and disseminate such indicators more frequently and systematically in order to monitor changes in work incentives over time. □

37. This figure would therefore be lower applied to gross income or the labour cost.

BIBLIOGRAPHY

Alesina, A., Ichino, A. & Karabarbounis, L. (2011). Gender-Based Taxation and the Division of Family Chores. *American Economic Journal: Economic Policy,* 3(2), 1–40.
https://doi.org/10.1257/pol.3.2.1

Anne, D. & L'Horty, Y. (2002). Transferts sociaux locaux et retour à l'emploi. *Économie et statistique*, 357-358, 49–78.
https://www.insee.fr/fr/statistiques/fichier/1375832/es357d.pdf

Anne, D. & L'Horty, Y. (2009). Aides sociales locales, revenu de Solidarité active (RSA) et gains du retour à l'emploi. *Économie et statistique*, 429-430, 129–157.
https://www.insee.fr/fr/statistiques/fichier/1377400/es429f.pdf

Argouarc'h, J. & Boiron, A. (2016). Les niveaux de vie en 2014. *Insee Première* N° 1614.
https://www.insee.fr/fr/statistiques/2121597

Bargain, O. & Terraz, I. (2003). Évaluation et mise en perspective des effets incitatifs et redistributifs de la Prime pour l'emploi. *Économie & prévision*, 160-161, 121–147
https://www.persee.fr/doc/ecop_0249-4744_2003_num_160_4_6924

Barnaud, L. & Ricroch, L. (2005). Les taux marginaux d'imposition : quelles évolutions depuis 1998 ? *Diagnostics Prévisions et Analyses Économiques* N° 63.
https://www.tresor.economie.gouv.fr/file/326763

Blundell, R. W. & MaCurdy, T. (1999). Labor supply: a review of alternative approaches. In: Ashenfelter, O. & Card, D. (Eds.), *Handbook of Labor Economics*, vol. 3A, pp. 1559–1695. Amsterdam: North Holland.
https://doi.org/10.1016/S1573-4463(99)03008-4

Bourguignon, F. (1998). Fiscalité et redistribution. *Conseil d'Analyse Économique – Rapport* N° 11. Paris : *La Documentation française*.
www.ladocumentationfrancaise.fr/var/storage/rapports-publics/994000130.pdf

Bozio, A., Breda, T. & Grenet, J. (2017). Incidence of Social Security Contributions: Evidence from France. *Document de travail*.
http://www.parisschoolofeconomics.com/breda-thomas/working_papers/Bozio_Breda_Grenet_2017b.pdf

Bozio, A., Fack, G. & Grenet, J. (Eds.) (2015). Les allocations logement, comment les réformer ? CEPREMAP/IPP, *Opuscule* N° 38.
www.cepremap.fr/depot/opus/OPUS38.pdf

Carbonnier, C. (2014). The influence of taxes on employment of married women, evidence from the French joint income tax system. *LIEPP Working Paper* 23.
https://spire.sciencespo.fr/hdl:/2441/7lfmtcll678th9ldbi6o2t0onk

Chanchole, M. & Lalanne, G. (2012). Photographie du système socio-fiscal et de sa progressivité. *Économie & prévision,* 200-201(2), 19–40.
https://doi.org/10.3406/ecop.2012.8105

Commission européenne (2013). Tax reforms in EU Member States 2013. *Taxation Paper* N° 38.
http://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/gen_info/economic_analysis/tax_papers/taxation_paper_38.pdf

CSERC (1997). *Minima sociaux, entre protection et insertion*. Paris : La Documentation française.
https://www.ladocumentationfrancaise.fr/rapports-publics/024000309/index.shtml

Diamond, P. & Saez, E. (2011). The Case for a Progressive Tax: From Basic Research to Policy Recommendations. *Journal of Economic Perspectives,* 25(4), 165–190.
https://doi.org/10.1257/jep.25.4.165

Duclos, J.-Y., Fortin, B. & Fournier, A.-A. (2009). An Analysis of Effective Marginal Tax Rates in Quebec. *Canadian Public Policy / Analyse de Politiques*, 35(3), 343–371.
https://www.jstor.org/stable/40345328

Eidelman, A., Langumier, F. & Vicard, A. (2013). Prélèvements et transferts aux ménages : des canaux redistributifs différents en 1990 et 2010. *Économie et Statistique,* 459, 5–26.
https://www.insee.fr/fr/statistiques/fichier/1377610/ES459A.pdf

Ferey, A. (2018). Housing Benefits and Monetary Incentives to Work: Simulations for France. *Economie et Statistique / Economics and Statistics,* ce numéro.

Fourcot, J. & Sicsic, M. (2017). Les taux marginaux effectifs de prélèvement pour les personnes en emploi en France en 2014. Insee DSDS, *Document de travail* N° F1701.
https://www.insee.fr/fr/statistiques/fichier/2581807/F1701.pdf

Fullerton, D. & Metcalf, G. E. (2002). Tax incidence. In: Auerbach, A. J. & Feldstein, M. (Eds.), *Handbook of Public Economics,* vol. 4, 1787–1872. Amsterdam, London: North Holland. https://doi.org/10.1016/S1573-4420(02)80005-2

Gurgand, M. & Margolis, D. (2008). Does Work Pay in France? Monetary Incentives, Hours Constraints and the Guaranteed Minimum Income. *Journal of Public Economics*, 92(7), 1669–1697. https://doi.org/10.1016/j.jpubeco.2007.10.008

Hagneré, C. & Trannoy, A. (2001). L'impact conjugué de trois ans de réformes sur les trappes à inactivité. *Économie et statistique*, 346-347, 161–179. https://www.insee.fr/fr/statistiques/fichier/1376083/es346h1.pdf

Immervoll, H. (2002). The distribution of average and marginal effective tax rates in European Union Member States. EUROMOD *Working Papers* N° EM2/02. https://econpapers.repec.org/RePEc:ese:emodwp:em2-02

Immervoll, H. (2004). Average and Marginal Effective Tax Rates Facing Workers in the EU: A Micro-Level Analysis of Levels, Distributions and Driving Factors. *Documents de travail de l'OCDE sur les questions sociales, l'emploi et les migrations* N° 19. https://doi.org/10.1787/652730151886

Immervoll, H., Kleven, H. J., Kreiner, C. T. & Saez, E. (2007). Welfare Reform in European Countries: A Microsimulation Analysis. *The Economic Journal*, 117(516), 1–44. https://doi.org/10.1111/j.1468-0297.2007.02000.x

Immervoll, H., Kleven, H. J., Kreiner, C. T. & Verdelin, N. (2009). An Evaluation of the Tax-Transfer Treatment of Married Couples in European Countries. *IZA Discussion Paper* N° 3965. https://ssrn.com/abstract=1336082

Insee (2018). Fiche Redistribution monétaire. Insee, *France Portrait Social*, édition 2018. https://www.insee.fr/fr/statistiques/fichier/3646132/FPORSOC18m4_F4.4.pdf

Jara, X. & Tumino, A. (2013). Tax-benefit systems, income distribution and work incentives in the European Union. *International journal of microsimulation*, 6(1), 27–62. http://www.microsimulation.org/IJM/V6_1/3_IJM_6_1_Jara_Tumino.pdf

Landais, C., Piketty, T. & Saez E. (2011). Pour une révolution fiscale. Paris : *Seuil / La République des idées*. http://www.seuil.com/ouvrage/pour-une-revolution-fiscale-thomas-piketty/9782021039412

Laroque, G. & Salanié, B. (1999). Prélèvements et transferts sociaux : une analyse descriptive des incitations financières au travail. *Économie et Statistique*, 328, 3–19. http://www.epsilon.insee.fr/jspui/bitstream/1/21630/1/estat_1999_328_1.pdf

Legendre, F., Lorgnet, J.-P. & Thibault, F. (2003). La distribution des incitations financières au travail en France : l'évaluation du modèle Myriade. *Économie & prévision,* 160-161, 23–48. https://www.cairn.info/revue-economie-et-prevision-2003-4-page-23.html

Legendre, F. & Thibault, F. (2007). Les concubins et l'impôt sur le revenu en France. *Économie et Statistique*, 401, 3–21. https://www.insee.fr/fr/statistiques/fichier/1377070/es401a.pdf

Lehmann, E., Marical, F. & Rioux, L. (2013). Labor income responds differently to income-tax and payroll-tax reforms. *Journal of Public Economics,* 99, 66–84. https://doi.org/10.1016/j.jpubeco.2013.01.004

L'Horty, Y. (2007). Fiscalité des bas salaires : La révolution silencieuse. *Regards croisés sur l'économie*, 1(1), 151–156. https://doi.org/10.3917/rce.001.0151

Leventi, C. & Vujackov, S. (2016). Baseline results from the EU28 EUROMOD (2011-2015). *EUROMOD Working Paper* EM 3/16. https://www.euromod.ac.uk/sites/default/files/working-papers/em3-16.pdf

OCDE (1997). *The OECD Jobs Strategy*. *Making Work Pay: Taxation, Benefits, Employment*. Paris : Éditions OCDE.

Pacifico, A. & Trannoy, A. (2015). Abandonner la décote, cette congère fiscale. *IDEP Analyses* N° 7. https://www.idep-fr.org/sites/default/files/idep/idep_analyses_n7.pdf

Pisani-Ferry, J. (2000). Plein emploi. Conseil d'Analyse Économique, Rapport N° 30. Paris : *La Documentation française*. https://www.ladocumentationfrancaise.fr/rapports-publics/014000051/index.shtml

Saez, E. (2001). Using Elasticities to Derive Optimal Income Tax Rates. *Review of Economic Studies*, 68(1), 205–229. https://doi.org/10.1111/1467-937X.00166

Saez, E. (2002). Optimal Income Transfer Programs: Intensive versus Extensive Labor Supply Responses.

The Quarterly Journal of Economics, 117(3), 1039–1073.
https://doi.org/10.1162/003355302760193959

Saez, E., Matsaganis, M. & Tsakloglou, P. (2012). Earnings determination and taxes: Evidence from a cohort-based payroll tax reform in Greece. *The Quarterly Journal of Economics,* 127(1), 493–533.
https://doi.org/10.1093/qje/qjr052

Saez, E., Slemrod, J. & Giertz, S. (2012). The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review. *Journal of Economic Literature*, 50(1), 3–50.
https://doi.org/10.1257/jel.50.1.3

Saint-Paul, G. (2008). Against "Gender-Based Taxation". CEPR Discussion Paper N° DP6582.
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1140512

Sicsic, M. (2018). The elasticity of labor income: evidence from French tax and benefit reforms, 2006-2015. *Mimeo*.
https://www.researchgate.net/publication/325818615_The_elasticity_of_labor_income_evidence_from_French_tax_and_benefit_reforms_2006-2015

Trannoy, A. & Wasmer, E. (2013). La politique du logement locatif. *Note du CAE* N° 10.
http://www.cae-eco.fr/La-politique-du-logement-locatif

Housing Benefits and Monetary Incentives to Work: Simulations for France

Antoine Ferey*

Abstract – This paper characterizes the impact of housing benefits on monetary incentives to work in France both at the intensive and extensive margins. Effective marginal and participation tax rates are estimated using the 2011 *enquête Revenus fiscaux et sociaux* (ERFS, Insee) for employed childless singles with the TAXIPP microsimulation model and decomposed by tax and transfer instruments. Means-testing implies that a 1-euro increase in gross labor earnings reduces housing benefits by 27 cents on average. Combined with reductions in other means-tested transfers (30 cents) and the payment of social contributions (21 cents) this translates into effective marginal tax rates close to 80%. Means-testing also induces a reduction in housing benefits upon taking a job which acts as a participation tax. Its magnitude depends on whether individuals receive unemployment benefits when out-of-work. Unemployment benefits increase overall participation tax rates by providing higher replacement earnings but decrease the participation tax linked to housing benefits by reducing the amounts of housing benefits received.

JEL Classification: H21, H42
Keywords: housing benefits, labor supply incentives, microsimulation

* *CREST, École polytechnique (antoine.ferey@polytechnique.edu)*

I wish to express my gratitude to Antoine Bozio for our numerous and helpful discussions at the early stages of this work. I also wish to thank two anonymous referees, as well as Jérémy Boccanfuso, Pierre Boyer, Étienne Lehmann, Jean-Baptiste Michau, Thomas Piketty, Anasuya Raj, Michael Sicsic, Clémence Tricaud and members of CRED Taxation Seminar for their invaluable comments.

Received on 9 June 2017, accepted after revisions on 26 March 2018

To cite this article: Ferey, A. (2018). Housing Benefits and Monetary Incentives to Work: Simulations for France. *Economie et Statistique / Economics and Statistics*, 503-504, 37–59.
https://doi.org/10.24187/ecostat.2018.503d.1956

Housing benefits schemes aim at helping low-income households cover their housing expenditures. In France, this is primarily achieved through monetary transfers to tenants that are increasing with the rent (benefits-rent linkage) and decreasing with households' earnings (means-testing). Seminal contributions (Laferrère & Le Blanc, 2004; Fack, 2005, 2006) show that the linkage with the rent causes 50 to 80% of housing benefits to be captured by homeowners through rents increase. This finding has prompted reform proposals, most recently by Trannoy and Wasmer (2013), Bozio *et al.* (2015a) and Bargain *et al.* (2017), aiming at the alleviation of this linkage and the induced phenomenon of capture.

Another concern these reform proposals try to address is the potentially large disincentives to work associated with means-tested housing benefits. Indeed, as an increase in labor earnings translates into a decrease in benefits received, means-testing mechanically reduces the monetary gains from work. This may induce individuals to reduce their labor supply[1] and has thus important consequences for the design of means-tested transfer schemes (Saez, 2002; Brewer *et al.*, 2010). A poorly designed housing benefits scheme combining benefits capture by landlords and large disincentives to work for low-income tenants may be conducive to a poverty trap.

This paper aims at informing future reforms of the housing benefits scheme by providing a detailed analysis of monetary incentives to work in France. Following the labor supply literature (e.g. Heckman, 1993), the analysis distinguishes between incentives to increase work intensity when in-work (intensive margin) and incentives to join the workforce when out-of-work (extensive margin). Monetary incentives to work are accordingly measured by effective marginal and participation tax rates.

These measures are estimated at the individual level for a representative sample of employed childless singles aged 25 to 54 from the 2011 *enquête Revenus fiscaux et sociaux* (ERFS). Taxes and transfers are computed using the TAXIPP microsimulation model and include social contributions, the income tax and means-tested transfers. A decomposition of aggregate work incentives in terms of the underlying tax and transfer instruments clarifies the articulation of these instruments. Moreover, it allows to precisely characterize the disincentives to work associated with housing benefits as well as their contribution to the aggregate.

The article begins with a brief review of related research and a discussion of the approach adopted here. The data, microsimulation tool and methodology are then carefully described along with the main features of the French tax and transfer system. The results derived in a baseline scenario show that housing benefits entail important disincentives to work. In particular, their joint withdrawal with other means-tested transfers imposes disincentives to work that are probably too large. These results are then shown to be qualitatively robust to alternative assumptions like treating unemployment and pension contributions as savings rather than taxes or assuming employer contributions are shifted to workers.

Analyzing Monetary Incentives to Work

In France, previous studies have analyzed work incentives either at the intensive margin (Bourguignon, 1998; Chanchole & Lalanne, 2012; Fourcot & Sicsic, 2017) or at the extensive margin (Legendre *et al.*, 2003; Gurgand & Margolis, 2008). Both margins are analyzed in Laroque and Salanié (1999), in Immervoll *et al.* (2007) who carry out a comparative analysis of monetary incentives to work in 15 EU countries and more recently in Sicsic (2018) who studies the evolution of monetary incentives to work in France over time by household composition.

At the intensive margin, past studies have focused on the redistribution operated by the overall tax and transfer system and on associated aggregate disincentives to work. Early results show that the distribution of effective marginal tax rates across earnings levels follows a U-shape pattern (e.g. Chanchole & Lalanne, 2012). In contrast, the present analysis shows that this distribution follows a tilde-shape which is consistent with more recent evidence (Fourcot & Sicsic, 2017) and can be explained by the move towards make-work-pay policies in France (Sicsic, 2018).

---

1. Labor supply responses to monetary incentives to work are an important topic of the labor supply literature. Direct evidence is relatively scarce for France. Existing studies (Laroque & Salanié, 2002; Lehmann et al.*, 2013; Cabannes* et al.*, 2014; Bargain* et al.*, 2014) seem to suggest labor supply elasticities are around 0.05 at the intensive margin and between 0.15 and 0.35 at the extensive margin. These modest elasticities – in comparison to other estimates in the literature (see the reviews of Saez* et al.*, 2012; Meghir & Phillips, 2010) – may nonetheless be attributed to adjustment frictions and the underlying elasticity parameters could well be larger (Chetty, 2012).*

At the extensive margin, Legendre *et al.* (2003) and Gurgand and Margolis (2008) estimate the monetary gains to work of unemployed or inactive individuals using individual characteristics such as education or work experience to simulate plausible transitions to work. They conclude that agents have on average very little incentives to take a job (if any), calling for the move towards make-work-pay policies in France that has been recently observed.

Along with Fourcot and Sicsic (2017) and Sicsic (2018), this paper thus offers an update on monetary incentives to work in France after this important policy change. Beyond the valuable information brought by this exercise, the contribution of this paper to the literature is three-fold.

First, the decomposition of marginal and participation tax rates into the underlying tax and transfer instruments clarifies the role of the different instruments as well as their articulation.[2] In particular, alternating between simulation results for prototypical individuals and simulation results for the representative sample allows to directly connect the schedule of the instruments to monetary incentives to work.

Second, this study is the first to present results at the individual level which allows to better picture and understand heterogeneity in incentives to work. The important sources of heterogeneity between employed childless singles relate to housing statuses (as they determine potential eligibility to housing benefits) and the composition of their incomes (if individuals have other incomes beyond their wage earnings).

Third, to the best of my knowledge, this paper is the first to investigate how monetary incentives to work are affected by: (a) whether individuals receive unemployment benefits when out-of-work, (b) whether the incidence of employer contributions falls on employer or workers, and (c) whether contributory social contributions (unemployment and pension contributions) are treated as taxes or as savings. In practice, the right set of assumptions will likely be individual-specific and lie in between the polar cases analyzed here. Results can thus be interpreted as bounds for *true* effective marginal and participation tax rates.

The restriction to childless singles is admittedly the main limitation of this work given that the schedule of most taxes and transfers tends to vary with household composition. However, this restriction allows to connect the schedule of tax and transfer instruments to work incentives in a transparent way and to understand the heterogeneity in work incentives using graphical representations at the individual level. In addition, the analysis of Sicsic (2018) suggests that the results obtained for childless singles extend, at least qualitatively, to other demographic groups. Hence, one can be confident that the analysis presented here conveys useful information about work incentives in France.

Methodology

Monetary incentives to work are here characterized by the wedge between gross labor earnings and disposable income. The tax and transfer system corresponds to all fiscal instruments that operate between the two.[3] First, the payment of social contributions legally divided between employer and employee contributions determine net labor earnings. Net earnings are then subject to income taxes (see details about contributions and income taxes Box 1). Finally, means-tested transfers and in particular housing benefits may be received if remaining income falls below the thresholds determining eligibility to the schemes.

The schedule of housing benefits consists in a fixed allowance at very low-income levels followed by a phasing-out region in which amounts received are decreasing with income. In that respect, it resembles the schedule of a minimum income support program. Housing benefits are nonetheless different in that they can only be claimed by tenants and that amounts received vary by geographical location to reflect local variations in rents (see details about housing benefits and other means-tested transfers in Box 2).

Simulation of Taxes and Transfers Using TAXIPP Microsimulation Tool

Taxes and transfers are here simulated at the individual level using TAXIPP microsimulation model. TAXIPP is the static microsimulation model of the *Institut des Politiques*

2. A related decomposition also appears in Fourcot & Sicsic (2017), and Sicsic (2018).
3. Note that consumption taxes, local taxes and transfers in kind are here assumed away for the sake of simplicity.

Box 1 – **Social Security Contributions and Income Taxes in France**

Employer and Employee Contributions

Employer and employee contributions can be decomposed between contributions to contributory schemes (social insurance programs that open rights to future benefits) and contributions to non-contributory schemes (pure taxes). Following the classification of Landais *et al.* (2011) unemployment and pension contributions are treated as contributions to contributory schemes while health contributions, family contributions and all remaining contributions are treated as contributions to non-contributory schemes (see details in Online complement C1). Although standard, this decomposition between insurance and redistribution can be challenged as instruments may in practice respond to both motives.

Health contributions fall under the category of non-contributory components because they hold a substantial redistributive role (Rochet, 1996) but a small share of health contributions is also used to finance sick leaves which is a pure insurance scheme. Similarly, the French pension system responds primarily to an insurance motive but has also been shown to hold a moderate redistributive role (Dubois & Marino, 2015).

The schedule of employer and employee contributions can then be expressed as rates of contributions that apply to gross labor earnings, here defined as nominal posted earnings (*revenus bruts*). Statutory rates of contributions depend on several factors like the hourly wage rate, the status of the employee (executive/non-executive) or the size of the firm. Assuming individuals work in firms of 20 to 249 employees, do not qualify as executives and have an hourly wage rate below the 2011 Social Security Threshold (SST) of 22 euros per hour at which contributions are capped, rates of contributions can then be simply summarized (Table A).

Table A
Statutory Rates of Contributions (0 to 1 SST Wage Bracket)

Contributions type	Employer rate (in %)	Employee rate (in %)
Contributory schemes	20.0	13.0
Unemployment scheme	4.4	2.4
Pension scheme	15.6	10.6
Non-contributory schemes	24.5	8.6
Total	44.5	21.6

Reading note: Employee rate of contribution to non-contributory schemes is 8.6% of gross labor earnings.
Scope: On-executive workers with wage below SST and employed in medium-size firms (20 to 249 employees).
Sources: *Barèmes* IPP, *LégiSocial* (2011 legislation).

Effective rates of employer contributions are nonetheless substantially lower than these statutory rates for low-wage workers because of reduction schemes aiming at reducing labor cost. The 2011 general reduction scheme (*réduction Fillon*) exonerates employers from remitting certain contributions for wage rates below 1.6 minimum wage rate (see details in Online complement C1). The effective rate of employer contributions falls down to approximately 18% at the minimum wage rate, 30% at 1.2 times the minimum wage rate and 38% at 1.4 times the minimum wage rate. Hence, effective rates of employer contributions are progressive and in practice equal to their statutory rates only for workers with wage rates higher than 1.6 times the minimum wage rate.

Income Tax

The income tax schedule in France is highly complex as it features several reduction and exemption mechanisms. Assuming labor is the only source of income and ignoring non-standard reductions, a relatively simple formula may be derived for childless singles:

$$T_{IR} = \phi_{IR}\left(0.9\left[y_{gross} - deductible\,contributions\right]\right) - D_{IR} \geq 0$$

Indeed, with only labor income, net taxable income is equal to gross labor earnings y_{gross} net of deductible contributions with a standard abatement of 10 percent. Additional earnings like financial income or unemployment benefits would increase net taxable income and thus the final amount of income tax paid. The main step in the computation of the income tax then lies in the application of the function Φ_{IR} which is the known schedule of marginal tax rates by income tax brackets. In the 2011 legislation, there exists five income tax brackets described below (Table B).

Table B
Income Tax Brackets and Associated Marginal Tax Rates

Bracket (in euros)	0 - 5,963	5,963 - 11,896	11,896 - 26,420	26,420 - 70,830	+70,830
Marginal tax rate (in %)	0	5.5	14	30	41

Reading note: Households with taxable income in the 5,963 - 11,896 bracket face a marginal tax rate of 5.5%.
Sources: *Barèmes* IPP, *LégiFiscal* (2012 legislation on 2011 earnings).

➔

Box 1 (contd.)

This generally yields net income tax, i.e. what is effectively paid by the household. An important exception relates to households who benefit from the *décote* system which provides partial or full exemption to households with low income tax. For 2011, the deductible amount D_{IR} and the net income tax T_{IR} are given by

$$D_{IR} = \left(439 - \frac{1}{2} T_{IR}^{gross}\right) \mathbb{I}\left\{T_{IR}^{gross} \leq 2^{*}\ 439\right\}$$

$$T_{IR} = max\left[T_{IR}^{gross} - D_{IR}\,;\, 0\right]$$

In words, the scheme provides a total exemption for households with a gross income tax below 293 euros and a partial exemption for fiscal households with gross income tax between 293 and 878 euros. Consequently, the *décote* simultaneously reduces the income tax burden of low-income households and increases effective marginal tax rates above statutory ones. The global progressivity of the income tax schedule is thereby non-monotonic.

Publiques. It aims at simulating the entire French tax and benefit system and is composed of several modules simulating different parts of the legislation. Bozio *et al.* (2015b) offer a general presentation of the model with a description of the "social contributions" and "income tax" modules; a description of the "means-tested transfers" module can be found in Bozio *et al.* (2012).

As it is standard in the literature on monetary incentives to work, simulations abstract from the problems of fraud and take-up. It is thus assumed that individuals who are eligible to a transfer scheme do receive the benefits they are eligible to, while non-eligible individuals do not. The perfect take-up assumption seems acceptable for housing benefits and the make-work pay policy of *prime pour l'emploi* (PPE) for which take-up rates are close to 100%, but may be problematic for the minimum income support scheme called *revenu de solidarité active* (RSA) as its take-up rate is somewhat lower (Lalanne, 2011). Furthermore, as entitlements

Box 2 – **Housing benefits and other means-tested transfers**

In the 2011 legislation, prime age childless singles are potentially eligible to the following means-tested transfer schemes: a minimum income support scheme named *Revenu de solidarité active* (RSA), an earned income tax credit called *prime pour l'emploi* (PPE) and housing benefits or *allocation logement* (AL).

The scheme of housing benefits in France is very complex and this description focuses on its main features with an emphasis on the relevant aspects for the analysis of work incentives. Childless singles eligibility to housing benefits is determined solely by housing status and earnings. Although the general scheme is divided into several sub-schemes specific to particular housing statuses the analysis focuses on the schedule for recipients who rent a home as they correspond to 85% of housing benefits recipients (*Minima sociaux et prestations sociales*, DREES 2015).

Renting a home thus determines *potential eligibility* to the scheme of housing benefits and individuals become *eligible* to the scheme if their earnings pass the means-test. This is the case if their entitlement to housing benefits, *AL*, turns out to be positive. Formally, *AL* is given by:

$$AL = \min\left[L\,;\, L_0\right] - T_p \max\left[y_h - y_0\,;\, 0\right] \geq 0$$

where L is the rent, L_0 is a reference value that depends on geographical location to reflect prices of the local housing market and on household composition. The benefit-rent linkage relates to this first term as a one-euro increase in a rent below L_0 is matched by a one-euro increase in benefits. However, 87% of rents are in practice higher than L_0 (ref) meaning that the amount received does not depend on the rent. Housing benefits are thus akin to a means-tested transfer scheme conditional on geographical location. Means-testing relates to the second term with T_p = 33.23% a parameter (see *Eléments de calcul des aides personnelles au logement*, Ministère du Logement, 2012) that governs the speed at which the amount of transfer decreases when net taxable income y_h increases above the reference income y_0.

The schedule of other means-tested transfers can be summarized as follows: RSA guarantees a minimum monthly income, which is withdrawn at a 38% rate with net earnings. The earned income tax credit (PPE) kicks in at higher earnings, phases-in slowly at a 7.7% rate and is phased-out at a 19.9% rate. More details are provided in Online complement C2.

Finally, other transfer schemes are either targeted towards households with dependent children (*allocations familiales*) and typically not means-tested or targeted towards very specific categories like the handicapped (*allocation aux adultes handicapés*) or the elderly (*minimum vieillesse*).

to PPE strongly depend on amounts of RSA received, they are treated as a unified transfer scheme throughout the analysis[4] although PPE is a negative income tax and thus means-tested using another earnings concept.

Some simplifying assumptions are also made regarding the timing of taxes and transfers. In particular, although housing benefits are means-tested against two-year-lagged income, they are here means-tested against current income.[5] This assumption is suitable when earnings are relatively smooth over the years and, if there are sharp changes, it reflects the legislation which states that a contemporaneous evaluation of resources should in that case be made. Also, with annual data, it is not possible to follow individuals on a monthly basis. This implies that amounts of transfers are here simulated on the basis of average monthly earnings which may lead to averaging errors due to the non-linearity of the schemes – for instance, RSA is evaluated on rolling 3-months windows.

Another important source of non-linearity in the schedule of housing benefits is a peculiar rounding rule that imposes household income to be rounded up to the nearest hundred. To give a concrete example, a household with an income of 1,002 euros and another with an income of 1,098 euros will be imputed with the exact same value y_h = 1100 euros in the computation (Box 2). To focus on structural incentives to work and to ease the interpretation of the results, this rounding rule is here assumed away.

Since this paper focuses on monetary incentives to work, housing characteristics (housing status, rent, geographical location) are taken as given. Therefore, the incidence of a change in the amount of housing benefits stemming from a variation in labor earnings is supposed to be borne by the household and not by the landlord. This last assumption may seem contradictory with Fack (2005, 2006) who shows that housing benefits are captured by landlords through rents increases. However, this inflationary effect operates through market prices which are arguably orthogonal to the labor earnings of a specific individual. In other words, it is assumed that changes in housing benefits induced by changes in labor earnings will not be matched by a subsequent change in the rent and are thus effectively borne by households.

A Representative Sample of Employed Childless Singles

This paper uses ERFS (*enquête Revenus Fiscaux et Sociaux,* Insee) data which is a match between the Labor Force Survey and administrative income tax records. It provides all the variables required for the simulation of taxes and transfers, in particular detailed information on income (wage labor income, non-wage labor income, replacement income, capital and financial income) and hours worked on a yearly basis. ERFS data does not include rents but since 87% of rents are above the reference threshold of the housing benefits scheme (Bozio *et al.*, 2015a), they do not affect the amount of housing benefits received in practice and are thus not necessary for this analysis. Another potential concern with the use of ERFS data to study the bottom of the income distribution is that very low-income households have been shown to be underrepresented in the survey (Lalanne, 2011). This typically poses a problem for recovering the budget devoted to means-tested transfers at an aggregate level, as underrepresentation leads to the underestimation of the number of recipients. However, it should not affect the analysis of monetary incentives to work at the individual level.

Simulations are based upon the 2011 wave of the ERFS – the latest version available when starting this project – and taxes and transfers are accordingly simulated using the 2011 tax code. Given the relative stability of the income distribution in France, the use of more recent data should not particularly affect the results. In contrast, the French tax code tends to be much more volatile and simulation results presented here accurately capture monetary incentives to work for the 2009-2015 period while recent reforms suggest they can be seen as illustrative for posterior years.[6]

---

4. This convention is also in-line with the recent 2016 reform that introduced a unique make-work-pay transfer scheme named prime d'activité as a replacement for PPE and the make-work-pay component of RSA (see Appendix).

5. The notion of earnings used for housing benefits means-testing corresponds to net taxable income in year N-2 *except in a handful of cases described in the Appendix of Bozio* et al. *(2015a). In particular, job loss induces earnings means-testing in year* N *and grants individuals a 30% abatement on unemployment benefits. Similarly, although the income tax is in practice paid with a one-year lag, it is here assumed to be paid during the current year.*

6. On the transfer side, an important reform of means-tested transfers occurred in 2009 with the introduction of RSA schemes. Also, in 2016 the make-work-pay part of RSA called RSA activité *and PPE were merged into a unified scheme called* prime d'activité *while maintaining the minimum income support part of RSA called RSA* socle*. On the tax side, reforms of the income tax schedule were implemented in 2012 (addition of a bracket at the top) and 2015 (deletion of the first bracket and changes in entry thresholds). In addition, employer social contributions were further reduced for low-wage workers in 2013 with the introduction of CICE (-4%) and its expansion in 2014 (-6%) and 2017 (-7%).*

Sampling weights in ERFS data are defined at the household level and used throughout the analysis. The initial sample comprises 56,486 observations representative of the 28 million households living in France in 2011. The analysis focuses on a homogeneous demographic group: childless singles aged 25-54. This restriction simplifies the analysis and allows connecting the schedule of tax and transfer instruments to monetary incentives to work as well as understanding the sources of heterogeneity in work incentives that are unrelated to household composition. The sample is further restricted to employed individuals, defined using two conditions on labor earnings:

– Annual gross labor earnings exceed 1,365 euros (this corresponding to one-month full-time minimum wage earnings);

– Annual gross labor earnings times the replacement rate of 60% exceed the amount of gross unemployment benefits received.[7]

In other words, individuals are considered employed if they have a minimum amount of labor earnings during the year and, for those receiving unemployment benefits, if they spent at least more time employed than unemployed. With this definition, the employment rate among childless singles aged 25-54 in France is 81.1%.[8] Finally, public sector employees (public sector variable) and self-employed workers (defined by non-wage labor income higher than wage labor income), two categories subject to specific social contributions schemes, are further excluded from the sample. In addition, compared to private sector employees, the self-employed have stronger work incentives and are less protected (no unemployment insurance and potentially large income variations) while public sector employees tend to have weaker work incentives and to be more protected (job security for civil servants and public sector pay scales). The final sample of analysis comprises 3,745 observations representing the 2.2 million childless single households in France.

While the study of monetary incentives to work at the intensive margin (increasing work intensity when in-work) requires using a sample of employed individuals, the analysis of work incentives at the extensive margin (joining the workforce when out-of-work) involves making a choice: one can either use data on employed individuals and simulate their counterfactual situation if they were not employed as in Immervoll *et al.* (2007) or Sicsic (2018), or use data on individuals who are not employed and simulate their counterfactual situation if they were employed as in Gurgand and Margolis (2008). We follow the first route in order to characterize incentives to work at both margins for the same sample of individuals.

Descriptive statistics (Table 1) show that labor is the major source of earnings for all individuals in the sample.[9] Nonetheless, some individuals do receive additional incomes which will turn out to be a main source of heterogeneity in monetary incentives to work. The other main source of heterogeneity relates to housing status determining potential eligibility to housing benefits. More than 80% of individuals are potentially eligible to housing benefits in the first income quartile and more than 70% in the second. The

7. This is a proxy for the rules of unemployment insurance in France. Precise simulation of unemployment benefits would require information on past labor earnings which is not available in the data.
8. The 2011 employment rate among all individuals aged 25-54 in France is 81.4% (Insee).
9. The distribution of annual gross labor earnings in the sample of analysis is reported in Appendix.

Table 1
Descriptive Statistics for the Whole Sample and by Quartiles of Labor Earnings

Means	Sample	Q1	Q2	Q3	Q4
Gross labor earnings (euros / year)	28,173	11,846	21,252	27,776	51,842
Hours worked (hours / year)	1,855	1,516	1,877	1,902	2,130
Unemployment benefits (euros / year)	374	883	228	197	173
Financial income (euros / year)	1,298	413	682	857	3,219
Gender (% of men)	61.7	52.2	60.9	65.9	68.1
Age (in years)	38.9	38.7	38.5	38.9	39.7
Potential eligibility to housing benefits (%)	65.8	81.4	72.3	58.1	50.8

Reading note: On average, individuals in the first income quartile work 1,516 hours per year.
Coverage: Sample of employed prime age childless singles.
Sources: Insee, *ERFS* 2011; author's computation.

schedule of housing benefits thus affects the work incentives of a large fraction of low-income individuals and is thereby important to take into account when analyzing incentives to work.

Definition and Estimation of Effective Marginal and Participation Tax Rates

Monetary incentives to work are captured in the wedge between labor income y and disposable income c. Given the relationship $c = y - T(y)$, the characterization of incentives to work thus falls down to a characterization of taxes and transfers $T(y)$. In order to reflect the dichotomy between labor supply decisions at the intensive margin and at the extensive margin (Heckman, 1993) this characterization is made through the estimation of marginal and participation tax rates.

This estimation requires precise definitions of income y and the components of the tax function $T(y)$. As a benchmark, let's first consider a baseline scenario in which the real incidence of taxes coincides with their legal incidence. In that case, employer contributions are effectively paid by employers meaning that workers' labor earnings correspond to gross labor earnings (*salaires bruts*) and not to labor cost. The tax function then corresponds to employee contributions $T_W(y)$ and income taxes $T_{IR}(y)$ net of transfer benefits $B(y)$:

$$T(y) = T_W(y) + T_{IR}(y) - B(y)$$

In this baseline scenario, let's also consider pension and unemployment contributions as taxes. This is the relevant assumption for agents who do not internalize the future expected benefits derived from pension and unemployment contributions in their labor supply decisions. It also provides what can be interpreted as an upper bound for disincentives to work.[10]

Incentives to work at the intensive margin are incentives to increase work intensity (e.g. hours worked) when employed. The standard measure associated with labor supply incentives at the intensive margin is the marginal tax rate defined as $dT(y)/dy$. Following a marginal increase in labor earnings, the marginal tax rate measures the fraction of additional earnings that will be paid in taxes. In other words, the marginal tax rate measures how much of a one-euro increase in labor earnings is taxed away.

Its empirical counterpart, the effective marginal tax rate (EMTR), is computed in TAXIPP using a 2% increase[11] in gross labor earnings y, simulating $T(y)$ for the new earnings level and computing the effective differences $\Delta T(y)$ and Δy. To be consistent with the literature, this increase in labor earnings is associated to an increase in hours worked rather than to an increase in the hourly wage rate.[12] An exception is overtime hours that, following the legislation, are assumed to be paid at an hourly wage rate 25% higher than standard hours.[13] Also, effective marginal tax rates are decomposed by tax and transfer instruments for the purpose of the analysis:

$$\mathrm{EMTR}(y) = \frac{\Delta T(y)}{\Delta y} = \frac{\Delta T_W(y)}{\Delta y} + \frac{\Delta T_{IR}(y)}{\Delta y} + \frac{\Delta\left[-B(y)\right]}{\Delta y}$$

$$\mathrm{EMTR}(y) = \mathrm{EMTR}_W(y) + \mathrm{EMTR}_{IR}(y) + \mathrm{EMTR}_B(y)$$

Incentives to work at the extensive margin are incentives to join the workforce when not employed. The standard measure associated with labor supply incentives at the extensive margin is the participation tax rate defined as $[T(y) - T(0)]/y$. Upon taking a job, individuals jump from zero labor earnings to labor earnings $y > 0$ and the effective participation tax rate measures the change in taxes net of transfers as a fraction of y. Importantly, this measure captures the resulting reduction in means-tested transfers which acts as a "participation tax" and reduces monetary incentives to participate in the workforce.

The computation of effective participation tax rates (EPTR) thus requires information on earnings and taxes net of transfers when employed (respectively y and $T(y)$) and transfers received when not employed $T(0)$. Earnings y are taken from the data and taxes and transfers $T(y)$ are simulated with TAXIPP microsimulation model. Last, $T(0)$ is imputed as the amount of transfers received had individuals been out-of-work.

---

10. These two assumptions and their impact on monetary incentives to work are analysed in the next Section.

11. Increases of earnings by 1% to 5% are common in the literature. Different values do not affect the results except at the entry and exit thresholds of tax and transfer schemes, where smaller increases in earnings tend to magnify the discontinuities associated to these thresholds (if any).

12. This choice does not affect the results in the baseline scenario as it only impacts rates of employer contributions through the indexation of reduction schemes on hourly wage rates.

13. 25% is the legal overtime rate unless a specific agreement is in place in the firm. Since this information is not in the data, this rate is applied to all individuals.

The imputation procedure for $T(0) = -B(0)$ differs depending on whether individuals are assumed to receive unemployment benefits when out-of-work. Under the assumption that individuals do not receive unemployment benefits, transfers are simulated setting labor earnings to zero and holding all other individual characteristics constant. A similar imputation procedure is used by Laroque and Salanié (1999) and Sicsic (2018), who interpret their results as reflecting long-term incentives to join the workforce in the sense that individuals may receive unemployment benefits only for a limited period of time. Under the assumption that individuals receive unemployment benefits, the imputation is done in three steps: (1) assign gross unemployment benefits equal to 60% of observed annual gross labor earnings;[14] (2) set labor earnings to zero; (3) simulate transfers. A similar procedure is used by Immervoll *et al.* (2007) and results can be interpreted as reflecting short-term incentives to join the workforce upon losing a job.

The computation of effective participation tax rates is then straightforward; for the purpose of this analysis they are decomposed by tax and transfer instruments:

$$\mathrm{EPTR}(y) = \frac{T(y) - T(0)}{y} = \frac{T_W(y)}{y} + \frac{T_{IR}(y)}{y} + \frac{-\left[B(y) - B(0)\right]}{y}$$

$$\mathrm{EPTR}(y) = \mathrm{EPTR}_W(y) + \mathrm{EPTR}_{IR}(y) + \mathrm{EPTR}_B(y)$$

Incentives to Work in the Baseline Scenario

This section characterizes monetary incentives to work in the baseline scenario with a focus on the role played by housing benefits. The budget set of childless singles is first depicted to get a sense of the importance of housing benefits in low-income workers' budget. Simulation results for effective marginal and participation tax rates are then presented, both for fictitious prototypical individuals (assumed to derive earnings only from labor) and for individuals from the representative sample. Alternating between simulation results for fictitious prototypical individuals and for individuals from the representative sample allows to directly connect the schedule of the instruments to monetary incentives to work and helps understand the heterogeneity in incentives to work.

The Importance of Housing Benefits in the Budget of Low-income Workers

The budget set of childless single workers (Figure I) reveals that housing benefits can be an important fraction of the budget of low-income workers. For instance, individuals working a half of a full-time job paid at the minimum wage rate earn 6,432 euros net per year, receive 3,548 euros in RSA and an additional 2,515 euros in housing benefits. Housing benefits thus account for 20% of total disposable income which is 12,495 euros per year. In contrast, an individual not eligible to housing benefits would only benefit from RSA and have a total disposable income of 9,980 euros.

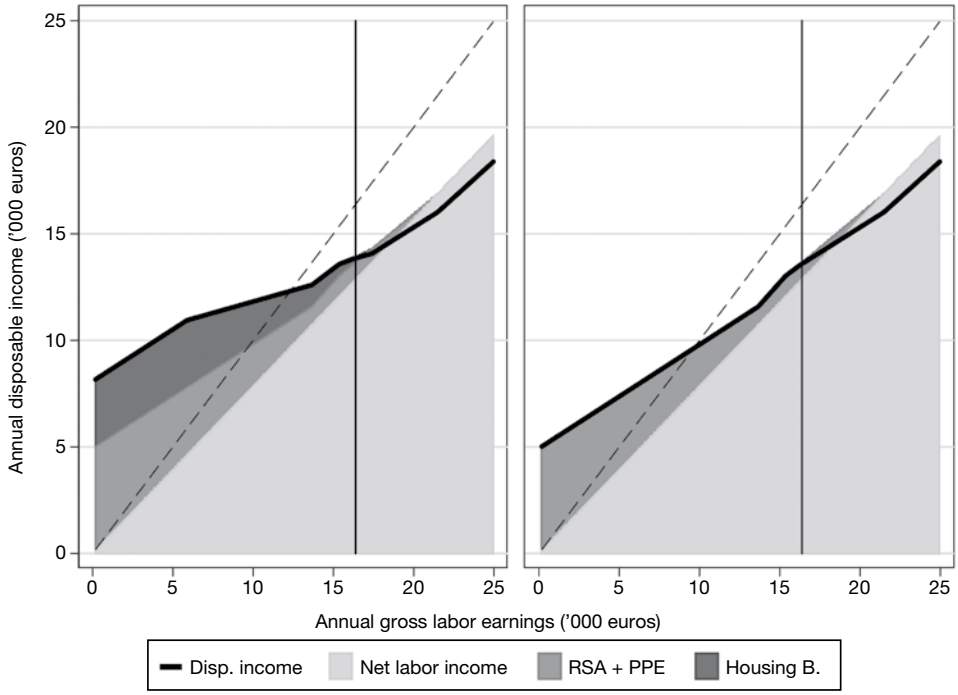
Housing benefits have thus two effects on incentives to work: first, means-testing induces disincentives to work for individuals eligible to the scheme. Second, housing benefits create substantial heterogeneity in incentives to work between individuals who are eligible to the scheme and those who are not.

Phasing-Out and Incentives at the Intensive Margin

At the intensive margin, housing benefits entail strong disincentives to work in the phasing-out region of the scheme. For a childless single who receives housing benefits, the phasing-out is such that a 1-euro increase in gross labor earnings reduces the amount of housing benefits by 27 cents on average (left panel of Figure II). Combined with the reduction in the amount of RSA-PPE received (30 cents) and the payment of employee contributions (21 cents), individuals thus face an extreme marginal tax rate of 78%. In other words, a 1-euro increase in labor earnings translates in a 22-cents increase in disposable income. In contrast, individuals not eligible to the scheme face a marginal tax rate of 51% in the same income region, meaning that a 1-euro increase in labor earnings yields a 49-cents increase in disposable income (right panel of Figure II).

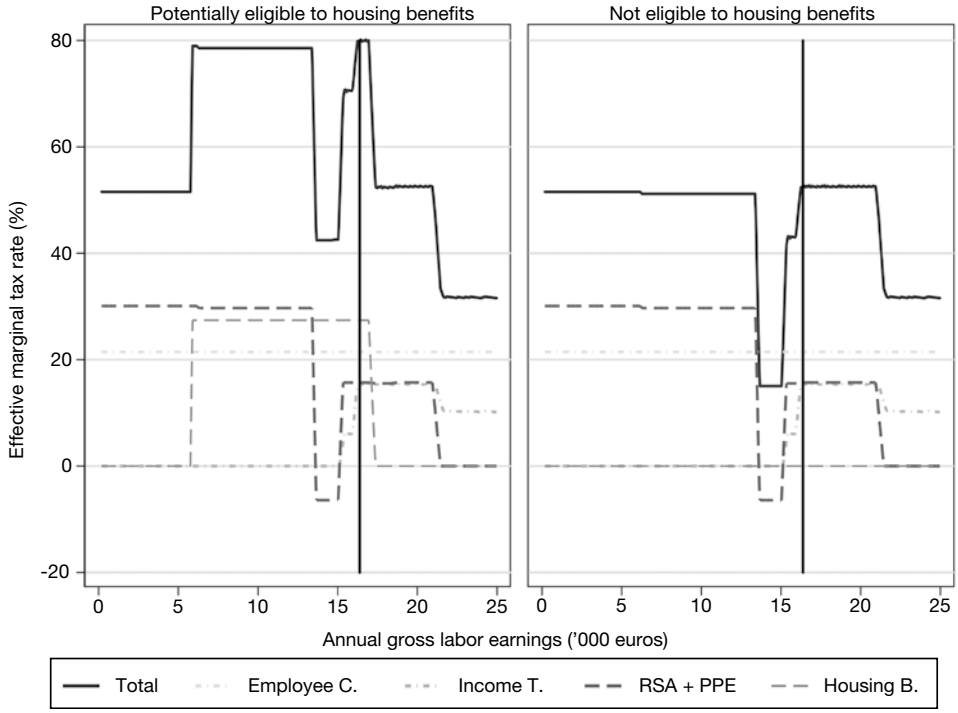
14. This is a proxy for the rules of unemployment insurance in France. Precise simulation of unemployment benefits requires detailed information on past labor earnings which is not in the data.

Figure I
Budget Sets of Low-income Workers



Note: Individuals in the left and right panel only differ with respect to their eligibility to housing benefits (schedule of zone II). Baseline treats social insurance contributions as taxes and assumes employer contributions are paid by employers. The vertical line signals a full-time job paid at the minimum wage rate.
Scope: Simulations for fictitious childless singles assuming labor is the only source of earnings under the 2011 legislation.
Sources: TAXIPP microsimulation model; author's computation.

Figure II
Housing Benefits and Marginal Tax Rates



Note: Individuals in the left and right panel only differ with respect to their eligibility to housing benefits (schedule of zone II). Baseline treats social insurance contributions as taxes and assumes employer contributions are paid by employers. The vertical line signals a full-time job paid at the minimum wage rate.
Scope: Simulations for fictitious childless singles assuming labor is the only source of earnings under the 2011 legislation.
Sources: TAXIPP microsimulation model; author's computation.

Such extreme values for marginal tax rates are to be contrasted with the average estimated marginal tax rate of 43% for individuals in the representative sample. Simulation results on the representative sample show that such rates correspond to the top of the distribution of effective marginal tax rates across earnings levels (Figure III). Indeed, the distribution of local average marginal tax rates with earnings (dashed curve) follows a distinctive tilde-shape pattern with the top of the tilde located in the phasing-out region of housing benefits.[15] This finding is consistent with those of Sicsic (2018) and reflects the recent policy move towards make-work-pay policies (RSA *activité*, PPE).[16]

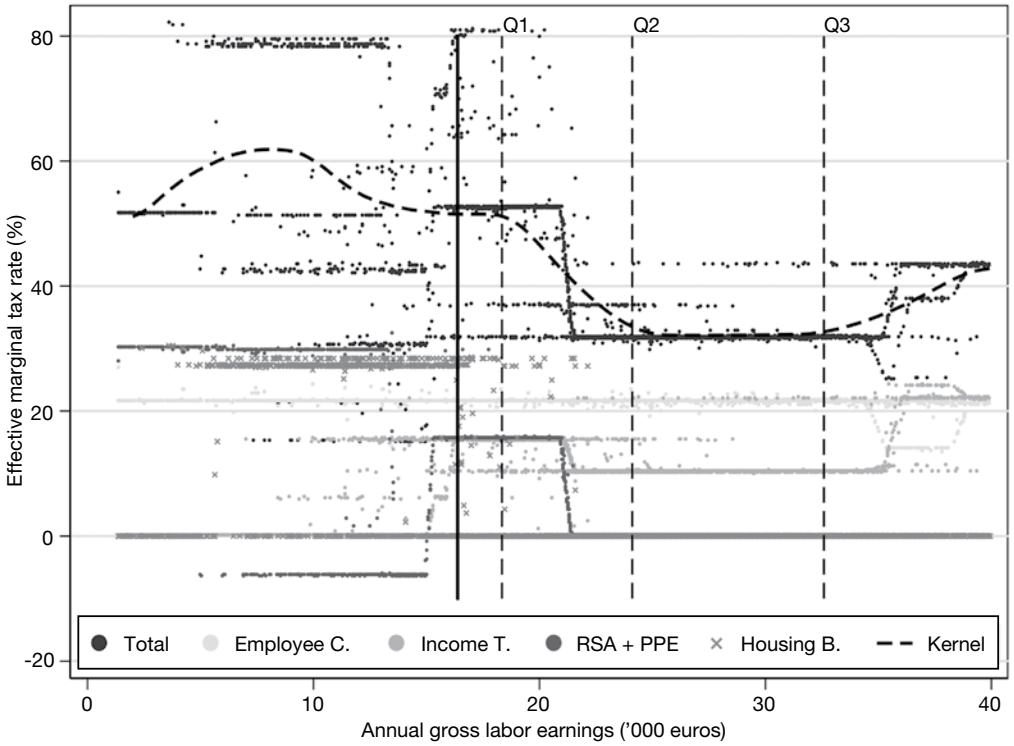
The mechanisms behind this tilde-shape pattern are transparent from the decomposition. Marginal tax rates rise at the bottom of the earnings distribution due to the phasing-out of transfers. Marginal tax rates are then minimal around median earnings and increase with earnings afterwards as individuals fall into higher income tax brackets. Employee contributions have a uniform impact across the board, which reflects their flat schedule among the general working population.

Nonetheless, this tilde-shape pattern masks the important heterogeneity between individuals with similar labor earnings. Eligibility to the scheme of housing benefits is an important driver of heterogeneity together with differences in additional incomes (e.g. unemployment benefits, financial income). For instance, individuals with the lowest marginal tax rates in the first income quartile are those who are not eligible to housing benefits and not entitled to RSA after accounting for earnings other than labor.

15. The three different marginal tax rates associated with the phasing-out of housing benefits corresponds to the geographical zoning into three zones and their specific schedules.

16. Immervoll et al. *(2007) also show that the distribution of marginal tax rates is tilde-shaped, although their study precedes the introduction of make-work-pay policies. However, their sample includes households with different demographic characteristics and they explain that the hump in their quasi-U-shape pattern is driven by high marginal tax rates imposed on secondary earners in couples.*

Figure III
Distribution of Effective Marginal Tax Rates



Note: Baseline treats social insurance contributions as taxes and assumes employer contributions are paid by employers. The dashed curve represents a kernel estimation of the local average EMTR (bandwidth of 4,000 euros). The vertical line signals a full-time job paid at the minimum wage rate and the dashed vertical lines indicate the quartiles of the earnings distribution.
Coverage: Employed prime age childless singles.
Sources: Insee, *ERFS* 2011; TAXIPP microsimulation model; author's computation.

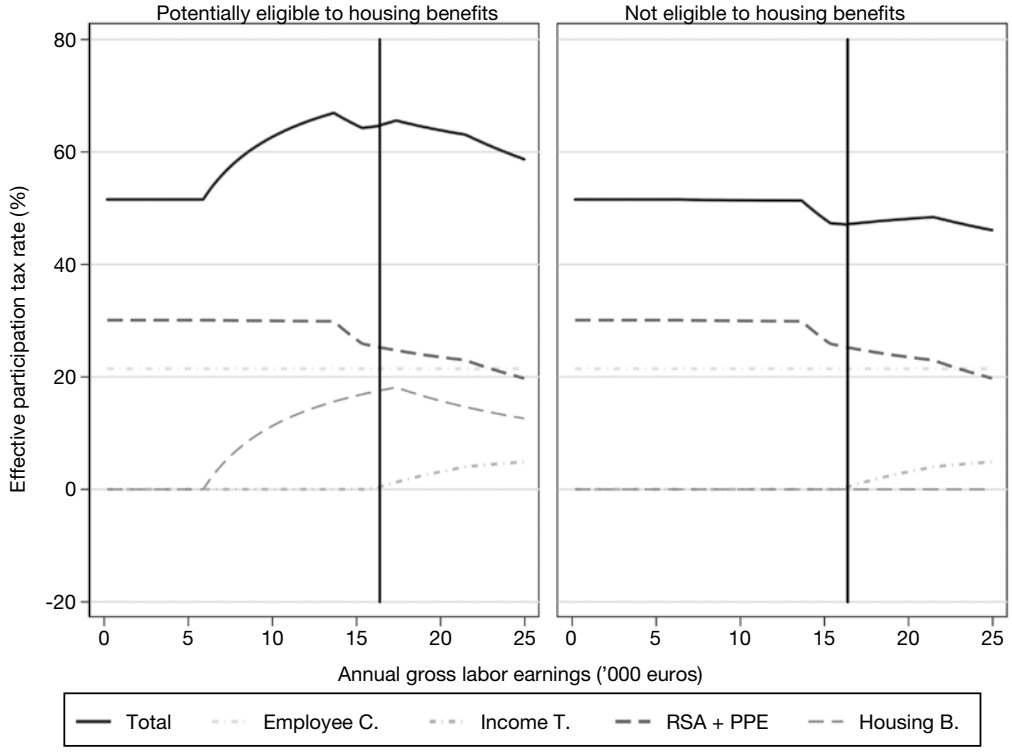
Means-Testing and Incentives at the Extensive Margin

First assume individuals do not to receive unemployment benefits when out-of-work as in Laroque and Salanié (1999) and Sicsic (2018). This may be interpreted as a long-term perspective in the sense that it captures the incentives to work of long-term unemployed whose rights to unemployment insurance have expired. It also captures the work incentives of individuals who are not entitled to unemployment benefits (e.g. first entry on the labor market, job resignation).

Upon taking a job, housing benefits means-testing implies that the amount of housing benefits received decreases for individuals eligible to the scheme. The loss of housing benefits thus acts as a participation tax that can go up to 18% upon taking a full-time job paid at the minimum wage rate (left panel of Figure IV). The total participation tax then corresponds to 64% of labor earnings for individuals eligible to the scheme whereas it is 46% for non-eligible individuals (right panel of Figure IV). Moreover, eligibility to housing benefits generates a profile of participation tax rates that is increasing with earnings given the extreme marginal tax rates imposed in the phasing-out region of housing benefits.

Given the large fraction of individuals potentially eligible to the scheme of housing benefits, the distribution of participation tax rates estimated using the representative sample more closely resembles that of eligible individuals (Figure V). The average participation tax rate is 51% and local average participation tax rates are broadly increasing with earnings at low income levels and decreasing with earnings at higher income levels. The initial increase in participation tax rates reflects the increase in amounts of transfers lost through means-testing upon taking a job. The subsequent decrease reflects the diminishing importance of this loss as labor earnings on-the-job grow.

Figure IV
Housing Benefits and Participation Tax Rates (No Unemployment Benefits)



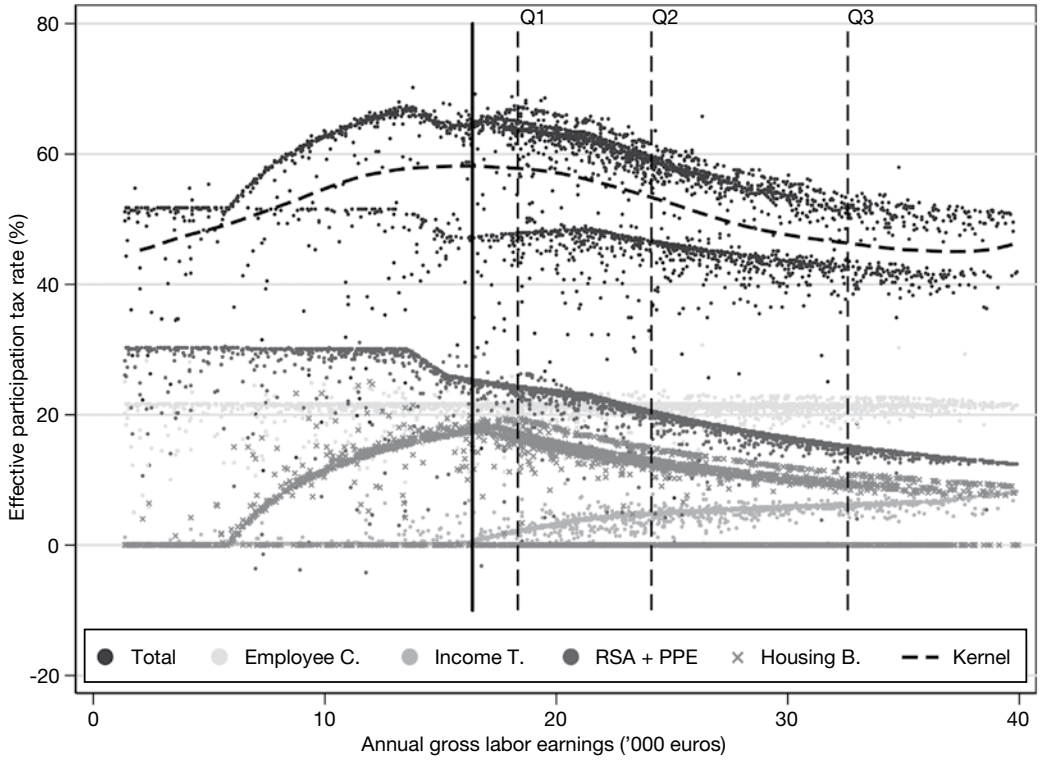
Notes: Individuals in the left and right panel only differ with respect to their eligibility to housing benefits (schedule of zone II). Baseline treats social insurance contributions as taxes and assumes employer contributions are paid by employers. It is here assumed that individuals do not receive unemployment benefits when out-of-work. The vertical line signals a full-time job paid at the minimum wage rate.
Scope: Simulations for fictitious childless singles assuming labor is the only source of earnings under the 2011 legislation.
Sources: TAXIPP microsimulation model; author's computation.

These results are considerably impacted when unemployment benefits are included into the picture. Assuming individuals receive unemployment benefits when out-of-work as in Immervoll *et al.* (2007) may be interpreted as a short-term perspective in the sense that unemployment benefits entitlements are limited in time. Unemployment benefits have two effects on disposable income when not employed. First, disposable income increases as unemployment benefits are a new source of income. Second, as unemployment benefits enter means-testing, entitlements to means-tested transfers decrease: unemployment benefits and means-tested transfers are substitutes. Hence, beyond the overall increase in disposable income, the composition of disposable income when out-of-work drastically changes.

The impact of housing benefits on incentives to take up a job is thus strongly mitigated by the presence of unemployment benefits (Figure VI). Since unemployment benefits increase with labor earnings, higher labor earnings on-the-job imply higher unemployment benefits when not employed and by the substitution effect, lower entitlements to housing benefits. As a result, an increase in labor earnings decreases entitlements to housing benefits when in-work but also decreases entitlements to housing benefits when out-of-work. Hence, the participation tax associated to the loss of housing benefits is reduced and features an 8% *plateau*.

Furthermore, the presence of unemployment benefits overturns the impact of other means-tested transfers on incentives to join the workforce. Absent unemployment benefits, RSA and PPE scheme-specific participation tax is large and positive (around 30% at low earnings) as means-tested transfers decrease upon taking a job. With unemployment benefits, the RSA and PPE scheme-specific participation tax is still large but negative (around -27% at low earnings). Indeed, in-work

Figure V
Distribution of Effective Participation Tax Tates (No Unemployment Benefits)



Notes: Baseline treats social insurance contributions as taxes and assumes employer contributions are paid by employers. It is here assumed that individuals do not receive unemployment benefits when out-of-work. The dashed curve represents a kernel estimation of the local average EPTR (bandwidth of 4,000 euros). The vertical line signals a full-time job paid at the minimum wage rate and the dashed vertical lines indicate the quartiles of the earnings distribution.
Coverage: Employed prime age childless singles.
Sources: Insee, *ERFS* 2011; TAXIPP microsimulation model; author's computation.

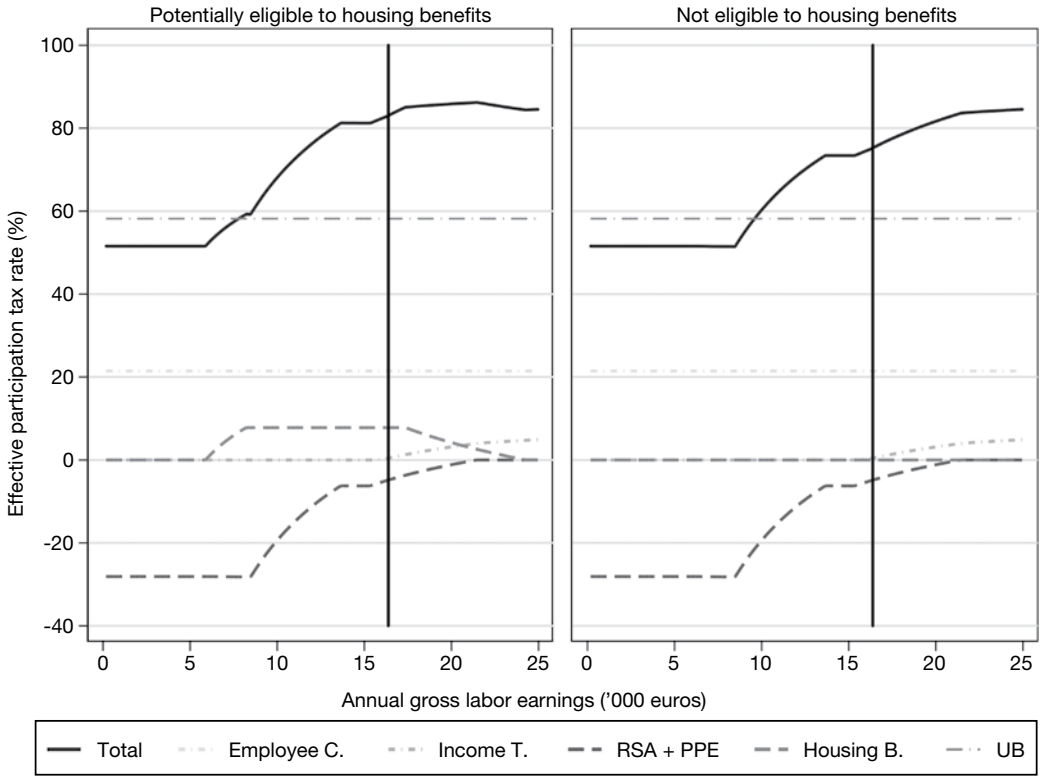
transfers (*RSA activité* and *prime pour l'emploi*) are now larger than out-of-work transfers (*RSA socle*): make-work-pay schemes literally make work pay.

Looking at the distribution of participation tax rates (Figure VII), unemployment benefits increase the average participation tax rate in the sample to 77%. This increase in participation tax rates reflects the increase in the total amount of transfers received when not employed. Also, the loss of unemployment benefits upon taking a job becomes the main driver of participation tax rates.

The distribution of effective participation tax rates is now strongly increasing with earnings at low income levels and moderately increasing at higher income levels. This strong increase at the bottom is jointly driven by make-work-pay schemes and by the substitution effect between unemployment benefits and means-tested transfers. Indeed, as noted before, these two features imply that the amount of means-tested transfers received when in-work is higher than the amount received when out-of-work. This translates into negative participation tax rates attached to the RSA and PPE schemes. The strong increase in participation tax rates as earnings grow can thus be explained by the phasing-out of make-work-pay subsidies on-the-job. In contrast, moderately increasing participation tax rates at higher income levels are related to the increase of the income tax with earnings.

These findings are difficult to compare with previous findings in the literature, as Legendre *et al.* (2003) and Gurgand and Margolis (2008) do not report the distribution of participation tax rates with respect to earnings on-the-job. The only point of comparison is Immervoll *et al.* (2007), who obtain a distribution of participation tax rates that is increasing with earnings at low income levels and decreasing with earnings at higher income levels. They find an average participation tax rate close to 70%. However, in

Figure VI
Housing Benefits and Participation Tax Rates (With Unemployment Benefits)



Notes: Individuals in the left and right panel only differ with respect to their eligibility to housing benefits (schedule of zone II). Baseline treats social insurance contributions as taxes and assumes employer contributions are paid by employers. It is here assumed that individuals receive unemployment benefits when out-of-work. The vertical line signals a full-time job paid at the minimum wage rate.
Scope: Simulations for fictitious childless singles assuming labor is the only source of earnings under the 2011 legislation.
Sources: TAXIPP microsimulation model; author's computation.

addition to childless singles, their sample features couples and families with children whose tax treatments are different. Moreover, they randomly assign unemployment benefits to a part of their sample to reflect the fact that some but not all individuals receive unemployment benefits when out-of-work. Last, their study precedes the introduction of make-work-pay policies in France. Therefore, comparisons between the two sets of results involve too many differences to be truly informative.

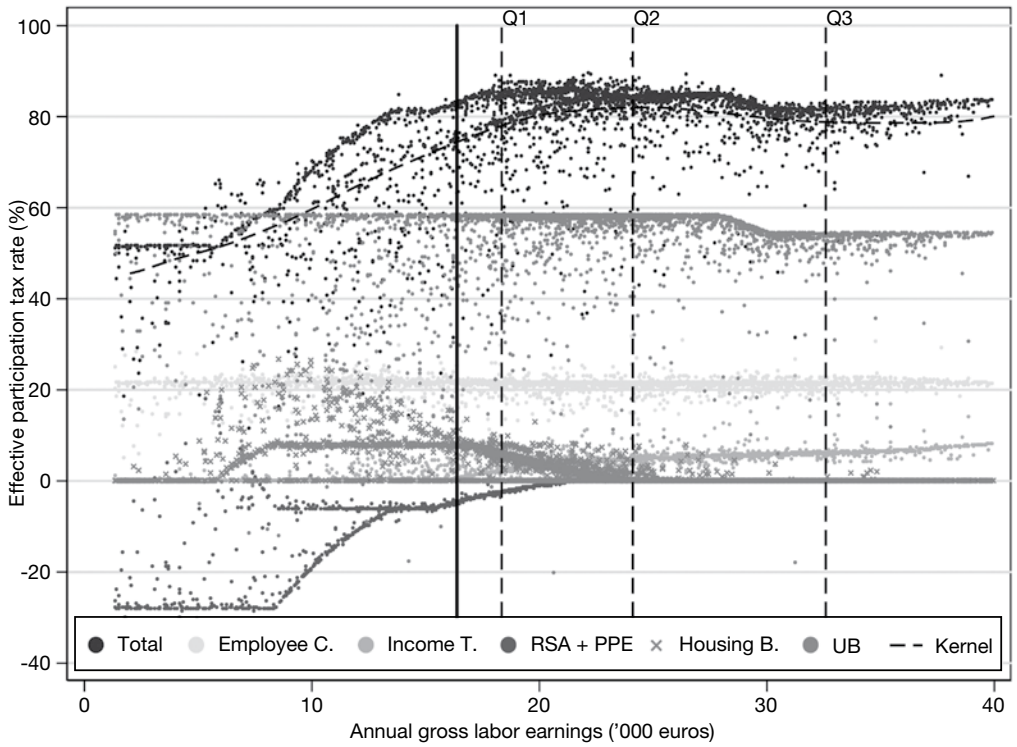
Incentives to Work in Alternative Scenarios

The previous characterization of monetary incentives to work has been obtained under the assumption that employer contributions are effectively paid by employers and that contributions to social insurance programs (pension and unemployment contributions) are taxes although they primarily relate to an insurance motive and might thus be interpreted as savings rather than taxes.

Incidence of Employer Contributions on Workers

Assuming that the real incidence of taxes coincide with their legal incidence is a standard simplifying assumption commonly used as a benchmark (e.g. OECD data on labor wedges). Also, recent studies show that the legal incidence of taxes may distort their real incidence towards the legal taxpayer (Chetty *et al.*, 2009). However, there is in principle no reason for the real and the legal incidence of taxes to coincide. A standard result in economic theory due to Harberger (1964) states that the burden of a tax in a market is shared by both demand and supply sides in relative proportions that depend on the ratio of the respective elasticities. The more elastic one side of the market is, the more the

Figure VII
Distribution of Effective Participation Tax Rates (With Unemployment Benefits)



Notes: Baseline treats social insurance contributions as taxes and assumes employer contributions are paid by employers. It is here assumed that individuals receive unemployment benefits when out-of-work. The dashed curve represents a kernel estimation of the local average EPTR (bandwidth of 4,000 euros). The vertical line signals a full-time job paid at the minimum wage rate and the dashed vertical lines indicate the quartiles of the earnings distribution.
Coverage: Employed prime age childless singles.
Sources: Insee, *ERFS* 2011; TAXIPP microsimulation model; author's computation.

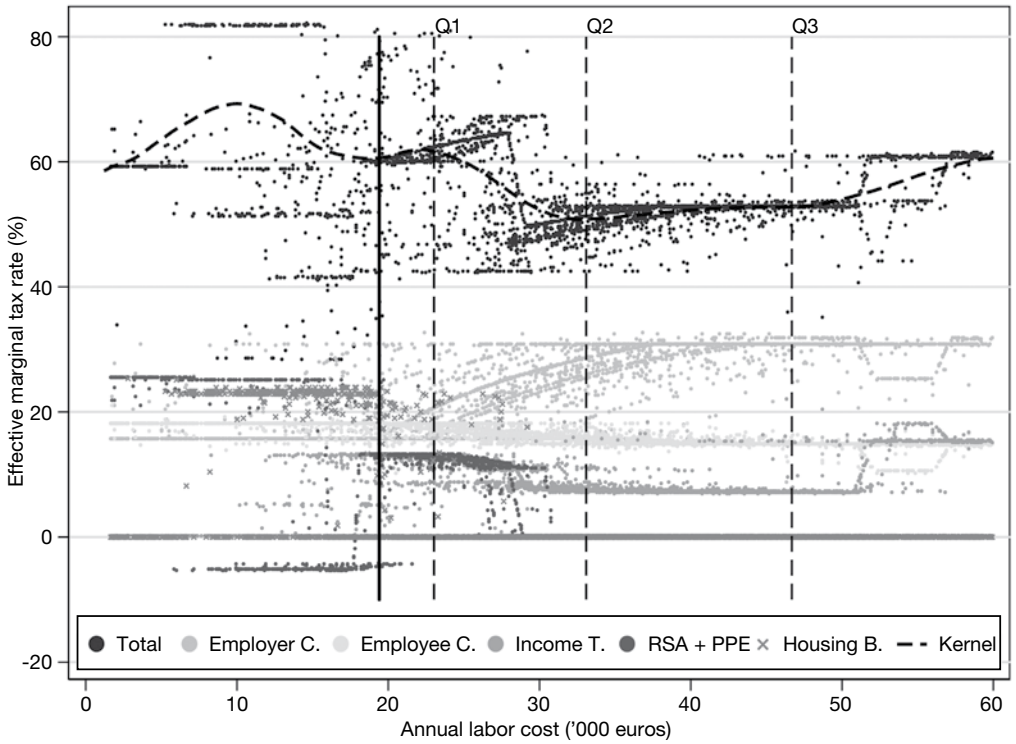
burden of the tax is shifted to the other side of the market.

Empirical evidence on this question is mixed. In the short-run, Lehmann *et al.* (2013) show that wages are rigid and that an increase in employer contributions is borne by employers. Studying the medium-run effects of social security contributions reforms in France, Bozio *et al.* (2017) identify a partial shifting of employer contributions to workers.[17] However, an important rigidity in the wage adjustment process in France is the existence of a relatively high minimum wage.[18] This rigidity strongly suggests that, at least for wages close to the minimum wage, the real incidence of employer contributions should fall on employers. Hence, the baseline scenario seems relevant for the study of monetary incentives to work of low-wage individuals who are the major recipients of housing benefits. It is nonetheless interesting to understand how monetary incentives to work are affected when employer contributions are assumed shifted to workers. In this scenario, workers labor earnings y correspond to the labor cost, and taxes and transfers $T(y)$ include employer contributions.

At the intensive margin, the average marginal tax rate increases to 57%, against 43% in the baseline. Moreover, assuming employer contributions are shifted to workers compresses the distribution of effective marginal tax rates towards a flat rate compared to the baseline (Figure VIII). Indeed, the progressivity of employer contributions stemming from the reduction schemes for low wage workers significantly increases marginal tax rates in the middle of the earnings distribution and at the top. As a result, the tilde-shape pattern of marginal tax rates is largely attenuated. The impact of housing benefits on incentives to work is qualitatively the same as in the baseline. The only

17. Bozio et al. *(2017) provide micro-evidence for employed individuals. They argue that adjustments could also take place through other channels (e.g. job creation and destruction) that need to be further investigated.*
18. This rigidity seems well understood by policy makers as reductions in employer contributions tend to be concentrated around the minimum wage in order to obtain the largest effect on employment (Lehmann & L'Horty, 2014).

Figure VIII
Distribution of Effective Marginal Tax Rates (Incidence on Workers)



Note: Social insurance contributions are treated as taxes while the incidence of employer contributions is assumed to fall on workers. The dashed curve represents a kernel estimation of the local average EMTR (bandwidth of 4,000 euros). The vertical line signals a full-time job paid at the minimum wage rate and the dashed vertical lines indicate the quartiles of the earnings distribution.
Coverage: Employed prime age childless singles.
Sources: Insee, *ERFS* 2011; TAXIPP microsimulation model; author's computation.

change is that housing benefits are phased-out at a 23% rate with respect to labor cost, against a 27% rate with respect to gross labor earnings.

At the extensive margin, assuming employer contributions are shifted to workers increases participation tax rates. Absent unemployment benefits, the average participation tax rates is 63%, against 51% in the baseline scenario. With unemployment benefits, the average participation tax rates climbs to 82%, against 77% in the baseline. However, this increase in participation tax rates does not strongly affect the pattern of participation tax rates (Figure not reported). The intuitive reason is that the incidence of employer contributions does not affect the amount of welfare benefits received when out-of-work but only taxes paid when in-work. Accordingly, housing benefits have once again the same qualitative impact on incentives to work while their magnitude is slightly reduced.

Social Insurance Contributions as Savings

Contributions to social insurance programs (pension and unemployment contributions), have so far been treated as taxes. However, these contributions are not pure taxes as they respond to an insurance motive: they aim at transferring resources from an individual currently employed to the same individual later in life, when either unemployed or retired. Hence, the tax hypothesis made in the baseline scenario corresponds to individuals who do not internalize future expected benefits in their labor supply decisions (e.g. myopic agents) or who anticipate that they will not benefit from unemployment insurance (e.g. no unemployment spell) or the pension system (e.g. early death).

In all generality, disincentives to work associated with social insurance contributions are equal to contributions costs net of future expected benefits (Disney *et al.*, 2004). As future expected benefits have so far been assumed away (tax hypothesis), previous marginal and participation tax rates can be interpreted as upper bounds for their true values. Evaluating future expected benefits stemming from pension or unemployment contributions is beyond the scope of this work. Instead, it is assumed here that future expected benefits are exactly equal to contributions paid (savings hypothesis). This corresponds to the case in which social insurance programs are perfectly fair actuarially and operate no redistribution across individuals. In other words, pension and unemployment contributions are akin to savings and perceived as such.[19]

While little evidence seems available on the redistribution operated by the French unemployment insurance system, a small literature characterizes the redistribution operated by the French pension system distinguishing between (1) redistribution within generations and (2) redistribution across generations. Paul-Delvaux (2015) shows that, within generations, the rate of return on general pension contributions is slightly decreasing with earnings. In other words, future expected benefits are relatively subsidized at low earnings levels and taxed at high earnings levels. Dubois and Marino (2015) characterize redistribution across generations and show that the rate of return on pension contributions is steadily decreasing across cohorts. This finding reflects the impact of global ageing on a pay-as-you-go pension system and tends to suggest that current workers are taxed to finance the pensions of retired individuals. Building on these contributions, redistribution within and across generations work in opposite directions for low-wage workers, meaning that marginal and participation tax rates derived under the savings hypothesis could be close to their true values. In contrast, they work in the same directions for high-wage workers, suggesting that marginal and participation tax rates derived under the savings hypothesis should rather be interpreted as lower bounds.

Under the savings hypothesis, assuming employer contributions are paid by employers, workers labor earnings y is gross labor earnings, while taxes and transfers $T(y)$ no longer include worker pension and unemployment contributions.[20] At the intensive margin, treating pension and unemployment as savings decreases marginal tax rates by 13 percentage points across the board (Figure IX). The average marginal tax rate is then equal to 30%, against 43% in the baseline scenario. The impact of housing benefits on monetary incentives to work is not affected.

At the extensive margin, the impact of the savings hypothesis greatly depends on the treatment

19. Using survey data, Dominitz et al. *(2003) elicit Americans' expected returns on their pension contributions and show there exists substantial heterogeneity in perceptions. At the two extremes, some individuals do not expect the pension system to survive, while others tend to overestimate their future benefits.*

20. Assuming simultaneously that employer contributions are paid by workers and treating pension and unemployment contributions as savings generates hard-to-interpret results because reductions in employer contributions reduce the rates of contributions without reducing future benefits. Hence, future expected benefits are larger than contributions, which is not consistent with the savings hypothesis.

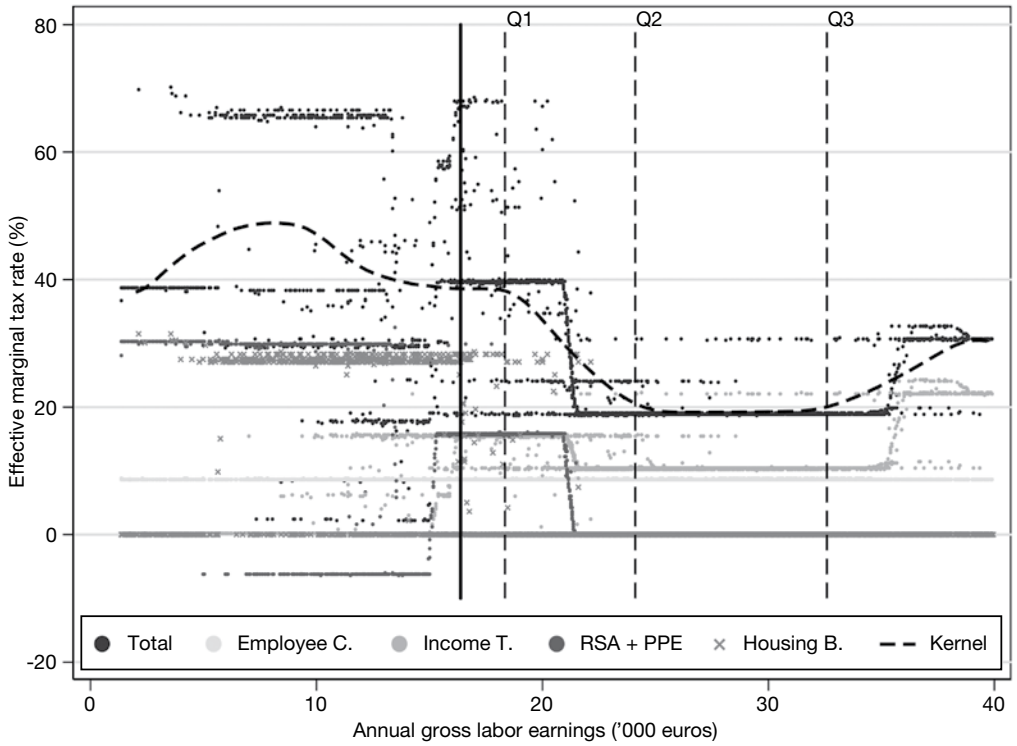
of unemployment benefits when out-of-work. When non-employed individuals do not receive unemployment benefits, effective participation tax rates decrease following the increase of disposable income on-the-job (Figure not reported). The average participation tax rate is then equal to 39%, against 51% in the baseline scenario. In contrast, when non-employed individuals receive unemployment benefits (short-term perspective), the savings hypothesis has a more drastic impact on participation tax rates. Indeed, if unemployment contributions are treated as savings, unemployment benefits are the depletion of past savings. Hence, unemployment benefits should not be treated as transfers. As a result, effective participation tax rates fall to unrealistically low values that contradict casual empiricism on monetary incentives to work in France (Figure X).

Such extremely low values do not only reflect the importance of unemployment benefits in disposable income when out-of-work, they once again highlight the important substitution effect between unemployment benefits and means-tested transfers. Indeed, effective participation tax rates are close to zero because means-tested transfers when out-of-work are substantially reduced in the presence of unemployment benefits. Hence, excluding unemployment benefits from means-tested transfers is misleading for the analysis of incentives to take up a job because unemployment benefits precisely replace means-tested transfers. In other words, the savings hypothesis seems of limited relevance for the analysis of incentives to work, at least in the kind of static framework considered here.

* *
*

This paper has analyzed monetary incentives to work in France and proposed a decomposition in terms of the underlying tax and transfer instruments. The decomposition reveals the interactions at play and allows to identify the impact of

Figure IX
Distribution of Effective Marginal Tax Rates (Savings Hypothesis)



Notes: The savings hypothesis treats social insurance contributions as savings while employer contributions are again assumed paid by employers. The dashed curve represents a kernel estimation of the local average EMTR (bandwidth of 4,000 euros). The vertical line signals a full-time job paid at the minimum wage rate and the dashed vertical lines indicate the quartiles of the earnings distribution.
Coverage: Employed prime age childless singles.
Sources: Insee, *ERFS* 2011; TAXIPP microsimulation model; author's computation.

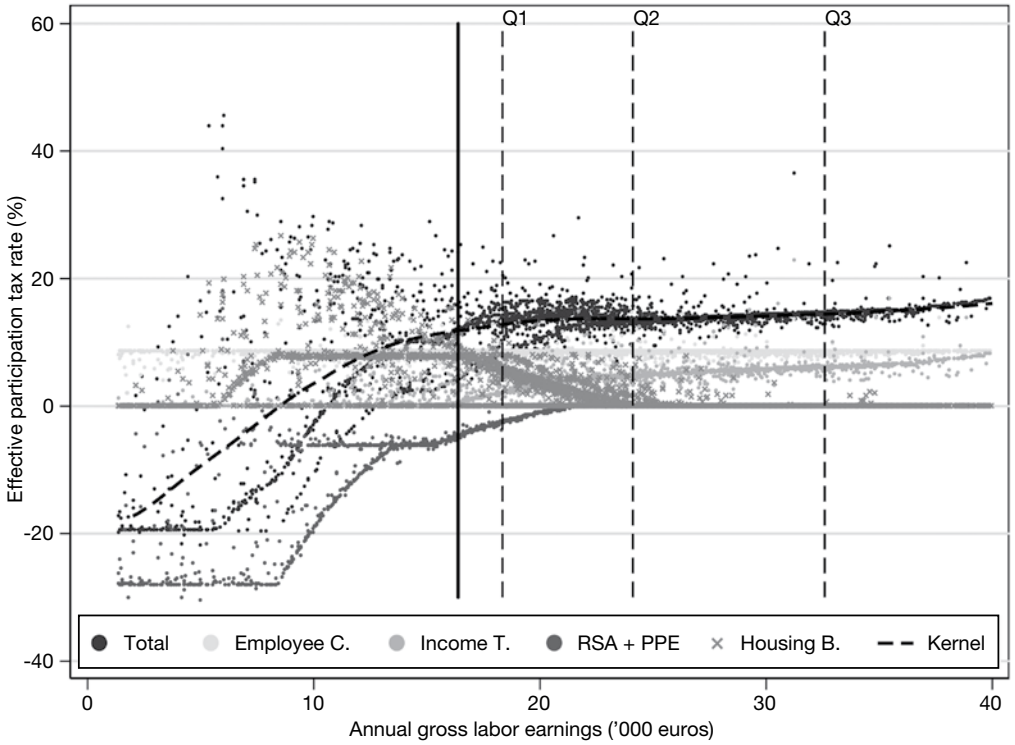
each instrument on incentives to work. Housing benefits entail substantial adverse effects on monetary incentives to work for individuals in the first income quartile.

At the intensive margin, a 1-euro increase in gross labor earnings reduces housing benefits by 27 cents on average in the phasing-out region of the scheme. The phasing-out of other means-tested transfers (30 cents) together with the payment of social contributions (21 cents) imply that in this region a 1 euro increase in gross labor earnings only translates into a 22 cents increase in disposable income. This corresponds to a marginal tax rate of nearly 80% and to the top of the tilde-shape distribution of marginal tax rates across earnings. In comparison, the average marginal tax rate is 43%.

At the extensive margin, monetary incentives to work greatly depend on whether individuals receive unemployment benefits when out-of-work. In the absence of unemployment benefits, the amount of housing benefits lost upon getting a job may represent up to 18 % of gross labor earnings on the job. Associated with the loss of other means-tested transfers (30%) and the payment of social contributions on the job (21%), transfers loss and tax payments may represent up to 70% of gross labor earnings. These top participation tax rates are attained upon taking a full-time job paid at the minimum wage rate and can be compared to the average participation tax rate of 51%. With unemployment benefits, the average participation tax rate shoots up to 77% as monetary gains to join the workforce decrease. However, because unemployment benefits and means-tested transfers act as partial substitutes, the amount of housing benefits received when out-of-work becomes rather small and the participation tax associated to the loss of housing benefits does not exceed 8%.

The identified substitutability of unemployment benefits (insurance) and means-tested transfers (redistribution) may bear substantial implications for the articulation of these

Figure X
Distribution of Effective Participation Tax Rates (Savings Hypothesis)



Notes: The savings hypothesis treats social insurance contributions as savings while employer contributions are again assumed paid by employers. Individuals are here assumed to receive unemployment benefits when out-of-work, however unemployment benefits are now the depletion of past savings and thus not treated as a transfer scheme. The dashed curve represents a kernel estimation of the local average EPTR (bandwidth of 4,000 euros). The vertical line signals a full-time job paid at the minimum wage rate and the dashed vertical lines indicate the quartiles of the earnings distribution.
Coverage: Employed prime age childless singles.
Sources: Insee, *ERFS* 2011; TAXIPP microsimulation model; author's computation.

schemes. Surprisingly, although standard in modern welfare systems, this interaction between social insurance and redistribution instruments has received little attention in the normative literature.

These baseline results are derived under the assumptions that workers' social insurance contributions are treated as taxes and paid by workers while employer social contributions are paid by employers. Treating workers' pension and unemployment contributions as savings rather than taxes decreases marginal (-13 percentage points) and participation tax rates (-12 percentage points) across the board. In contrast, assuming employer contributions are being shifted to workers increases marginal and participation tax rates in a non-uniform way and compresses the tilde-shape pattern of marginal tax rates towards a flat rate because of the progressivity of employer contributions. The impact of housing benefits on monetary incentives to work is robust to these changes.

Last, housing benefits generate heterogeneity in incentives to work based on housing statuses which determine potential eligibility to the scheme. While the tilde-shape distribution of local average marginal tax rates across earnings seems broadly consistent with policy recommendations of the optimal taxation literature (Saez, 2002), it seems likely that top marginal tax rates faced by individuals eligible to housing benefits are too high to be optimal.

Overall, housing benefits adverse effects on labor supply incentives are to be put into perspective with the phenomenon of capture identified in the literature. Since housing benefits are captured by home-owners through increases in rents (Laferrère & Le Blanc, 2004; Fack, 2005; 2006), low-income individuals may not effectively receive these benefits even when they effectively face reduced incentives to work. Housing benefits may thus contribute to generating a poverty trap. A structural reform of the scheme – for instance through its integration with other means-tested transfers as proposed by Bozio *et al.* (2015a) and Bargain *et al.* (2017) – could then be highly beneficial both for low-income individuals and for the French economy. □

BIBLIOGRAPHY

Bargain, O., Orsini, K. & Peichl, A. (2014). Comparing Labor Supply Elasticities in Europe and the United States: New results. *Journal of Human Resources*, 49(3), 723–838.
https://doi.org/10.3368/jhr.49.3.723

Bargain, O., Carcillo, S., Lehmann, É. & L'Horty, Y. (2017). Mieux lutter contre la pauvreté par des aides monétaires. *Notes du Conseil d'analyse économique,* (5), 1-12.
https://doi.org/10.3917/ncae.041.0001

Bourguignon, F. (1998). Fiscalité et redistribution. *Conseil d'Analyse Économique*. Paris : La Documentation française.
http://www.ladocumentationfrancaise.fr/var/storage/rapports-publics/994000130.pdf

Bozio, A., Breda, T. & Grenet, J. (2017). Incidence of Social Security Contributions: Evidence from France. *PSE Working paper*.
http://www.parisschoolofeconomics.com/breda-thomas/working_papers/Bozio_Breda_Grenet_2017b.pdf

Bozio, A., Fack, G., Grenet, J. (2015a). Les allocations logement, comment les réformer? *Opuscule CEPREMAP/IPP*, 38. Paris : Éditions Rue d'Ulm / Presses de l'École normale supérieure.
http://www.cepremap.fr/depot/opus/OPUS38.pdf

Bozio, A., Guillot, M. & Lafféter, Q. (2015b). Portée et limites du modèle TAXIPP pour l'analyse redistributive des prélèvements obligatoires. *Economie et statistique*, 481-482, 31–52.
https://www.insee.fr/fr/statistiques/1305189?sommaire=1305205

Bozio, A., Guillot, M., Lafféter, Q. & Tenand, M. (2012). Le modèle de micro-simulation TAXIPP – Version 0.3. *Guide méthodologique IPP*.
https://www.ipp.eu/wp-content/uploads/2012/01/guide-methodIPP-avril2014-taxipp03.pdf

Brewer, M., Saez, E. & Shephard, A. (2010). Means-testing and tax rates on earnings. In: Mirrlees, J., Adam, S., Besley, T., Blundell, R., Bond, S., Chote, R., Gammie, M., Johnson, P., Myles, G. & Poterba,

J. (Eds.), *Dimensions of Tax Design: the Mirrlees Review*, pp. 90–173. Oxford: Oxford University Press.

Cabannes, P.-Y., Houdré, C. & Landais, C. (2014). Comment le revenu imposable des ménages réagit-il à sa taxation ? Une estimation sur la période 1997-2004. *Économie et Statistique*, 467-468, 141–162. https://www.insee.fr/fr/statistiques/2122577?sommaire=1377956

Chanchole, M. & Lalanne, G. (2012). Photographie du système socio-fiscal et de sa progressivité. *Economie & prévision*, 200-201, 19–40. https://www.cairn.info/revue-economie-et-prevision-2012-2-page-19.htm

Chetty, R. (2012). Bounds on Elasticities With Optimization Frictions: A Synthesis of Micro and Macro Evidence on Labor Supply. *Econometrica*, 80(3), 969–1018. https://doi.org/10.3982/ECTA9043

Chetty, R., Looney, A. & Kroft, K. (2009). Salience and Taxation: Theory and Evidence. *American Economic Review*, 99(4), 1145–1177. https://doi.org/10.1257/aer.99.4.1145

Disney, R., Boeri, T. & Jappelli, T. (2004). Are Contributions to Public Pension Programmes a Tax on Employment? *Economic Policy*, 19(39), 269–311. https://www.jstor.org/stable/1344637

Dominitz, J., Manski, C. F. & Heinz, J. (2003). "Will Social Security Be There For You?" How Americans Perceive Their Benefits. National Bureau of Economic Research, *Working Paper* 9798. https://doi.org/10.3386/w9798

Dubois, Y. & Marino, A. (2015). Le taux de rendement interne du système de retraite français: quelle redistribution au sein d'une génération et quelle évolution entre générations? *Economie et Statistique*, 481(1), 77–95. https://doi.org/10.3406/estat.2015.10630

Fack, G. (2005). Pourquoi les ménages pauvres paient-ils des loyers de plus en plus élevés ? *Économie et Statistique*, 381-382, 17–40. https://www.insee.fr/fr/statistiques/1376573?sommaire=1376587

Fack, G. (2006). Are housing benefit an effective way to redistribute income? Evidence from a natural experiment in France. *Labour Economics*, 13(6), 747–771. https://doi.org/10.1016/j.labeco.2006.01.001

Fourcot, J. & Sicsic, M. (2017). Les taux marginaux effectifs de prélèvement pour les personnes en emploi en France en 2014. Insee, *Document de travail* N° F1701. https://www.insee.fr/fr/statistiques/2581807

Gurgand, M. & Margolis, D. N. (2008). Does Work Pay in France? Monetary Incentives, Hours Constraints, and the Guaranteed Minimum Income. *Journal of Public Economics*, 92(7), 1669–1697. https://doi.org/10.1016/j.jpubeco.2007.10.008

Harberger, A. C. (1964). The Measurement of Waste. *American Economic Review*, 54(3), 58–76. http://www.jstor.org/stable/1818490

Heckman, J. J. (1993). What Has Been Learned About Labor Supply in the Past Twenty Years? *American Economic Review*, 83(2), 116–121. https://www.jstor.org/stable/2117650

Immervoll, H., Kleven, H. J., Kreiner, C. T. & Saez, E. (2007). Welfare reform in European countries: a microsimulation analysis. *Economic Journal*, 117(516), 1–44. https://doi.org/10.1111/j.1468-0297.2007.02000.x

Laferrère, A. & Le Blanc, D. (2004). How do housing allowances affect rents? An empirical analysis of the French case. *Journal of Housing Economics*, 13(1), 36-67. https://doi.org/10.1016/j.jhe.2004.02.001

Lalanne, G. (2011). Le non-recours au rSa : effet sur le revenu disponible des ménages modestes. *Comité national d'évaluation du rSa*. https://solidarites-sante.gouv.fr/IMG/pdf/3_Le_non-recours_au_rSa_effet_sur_le_revenu_disponible_des_menages_modestes.pdf

Landais, C., Piketty, T. & Saez, E. (2011). *Pour une révolution fiscale. Un impôt sur le revenu pour le XXI^e siècle.* Paris : Le Seuil - La République des idées.

Laroque, G., & Salanié, B. (1999). Prélèvements et transferts sociaux: une analyse descriptive des incitations financières au travail. *Economie et statistique*, 328, 3–19. https://doi.org/10.3406/estat.1999.6341

Laroque, G. & Salanié, B. (2002). Labour market institutions and employment in France. *Journal of Applied Econometrics*, 17(1), 25–48. https://doi.org/10.1002/jae.656

Legendre, F., Lorgnet, J.-P. & Thibault, F. (2003). La distribution des incitations financières au travail en France : l'évaluation du modèle *Myriade*. *Economie & prévision*, (4), 23–48. https://doi.org/10.3406/ecop.2003.6920

Lehmann, E., & L'Horty, Y. (2014). Renforcer la progressivité des prélèvements sociaux. *Revue française d'économie*, 29(1), 25–61. https://doi.org/10.3917/rfe.141.0025

Lehmann, E., Marical, F. & Rioux, L. (2013). Labor income responds differently to income-tax and payroll-tax reforms. *Journal of Public Economics*, 99, 66–84.
https://doi.org/10.1016/j.jpubeco.2013.01.004

Meghir, C. & Phillips, D. (2010). Labour supply and taxes. In: Mirrlees, J., Adam, S., Besley, T., Blundell, R., Bond, S., Chote, R., Gammie, M., Johnson, P., Myles, G. & Poterba, J. (Eds.), *Dimensions of Tax Design: the Mirrlees Review*, pp. 202–274. Oxford: Oxford University Press.

Paul-Delvaux, L. (2015). Marginal return on pension contributions: The case of French pension public schemes. *PSE Master Thesis*.

Rochet, J.-C. (1996). Les atouts et les limites des systèmes publics d'assurance-maladie. *Revue française d'économie*, 11(1), 183–189.
https://www.persee.fr/doc/rfeco_0769-0479_1996_num_11_1_1000

Saez, E. (2002). Optimal income transfer programs: Intensive versus extensive labor supply responses. *The Quarterly Journal of Economics*, 117(3), 1039–1073.
https://doi.org/10.1162/003355302760193959

Saez, E., Slemrod, J. & Giertz, S. H. (2012). The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review. *Journal of economic literature*, 50(1), 3–50.
https://doi.org/10.1257/jel.50.1.3

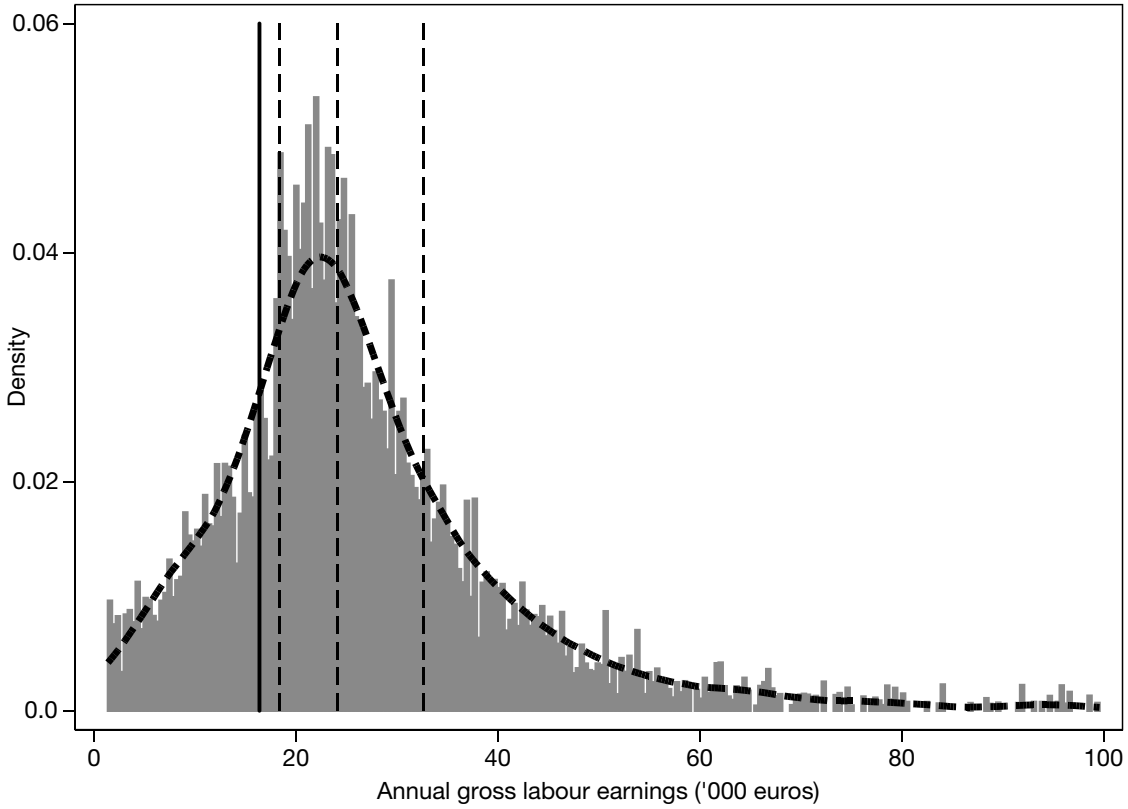
Sicsic, M. (2018). Les incitations monétaires au travail en France entre 1998 et 2014. *Economie et Statistique / Economics and Statistics* (this issue), 13–35.

Trannoy, A. & Wasmer, E. (2013). La politique du logement locatif. *Notes du conseil d'analyse économique*, (10), 1–12.
https://doi.org/10.3917/ncae.010.0001

APPENDIX

EARNINGS DISTRIBUTION IN THE SAMPLE

Figure A-I
Distribution of Labor Earnings Among Employed Prime Age Childless Singles



Note: The vertical line signals a full-time job paid at the minimum wage rate and the dashed vertical lines indicate the quartiles of the earnings distribution.
Coverage: Employed prime age childless singles.
Sources: Insee, *ERFS* 2011; author's computation.

Expiry of Unemployment Benefits: What Impact on Post-Unemployment Job Satisfaction?

Damien Euzénat*

Abstract – This paper provides statistical information on job-seekers' satisfaction with jobs found either side of a period of unemployment. Based on an *ad hoc* survey on the paths of unemployed people on benefit (*Parcours des demandeurs d'emploi indemnisés*, 2013) – it examines whether job satisfaction differs when a job is found just before or after the expiry of benefit entitlements. The analysis first shows that elements other than remuneration and stability contribute to satisfaction with a job, and particularly its intrinsic value. Secondly, job-seekers finding a job after the expiry of entitlements are less satisfied than those who find one in the period near before the expiry of entitlements (during the month-and-a-half preceding it). Lastly, for job-seekers who had significantly reduced their consumption expenditure during their period of unemployment, satisfaction with jobs found nearing the expiry of entitlements tends to be lower than with those found well before this period.

JEL Classification: J64, J65
Keywords: unemployment benefits, expiry of entitlement, employment, quality of employment, economics of happiness

* *DGFiP (damien.euzenat@dgfip.finances.gouv.fr)*

The author was working at Pôle emploi *(the French Employment agency) when writing this paper. He would like to thank Yaëlle Bouaziz, Thomas Le Barbanchon, Nicolas Prokovas, the participants in "*Journées du Longitudinal*" 2014, organized by Céreq, and two anonymous reviewers. He remains solely responsible for any remaining errors.*

Received on 18 July 2016, approved after revisions on 5 July 2018
Translated from the original version: "L'extinction des droits à l'indemnisation chômage : quelle incidence sur la satisfaction pour les emplois retrouvés ?"

To quote this article: Euzénat, D. (2018). Expiry of Unemployment Benefits: What Impact on Post-Unemployment Job Satisfaction? *Economie et Statistique / Economics and Statistics*, 503-504, 61–78.
https://doi.org/10.24187/ecostat.2018.503d.1957

According to various empirical studies, the rate at which job-seekers find employment rises around the end of their benefits entitlement period (Meyer, 1990; Dormont *et al*., 2001). This paper provides statistical information regarding this topic. In particular, it exploits the fact that the expiry of unemployment benefits entitlement causes a discontinuity in the unemployment period (Box 1 briefly describes the unemployment benefits system in France). In fact, job-seekers who find work just before or just after the end of their entitlements have similar durations of unemployment, but are not affected by the end of their entitlements in the same ways. This paper attempts to compare the satisfaction of former job-seekers with the job they find, depending on whether the job was found just before or just after the end of their benefits entitlement.

This analysis is based on a survey carried out in 2013 by *Pôle emploi,* (the French employment agency) aimed at comparing job-seekers' levels of satisfaction (using several criteria) with jobs found either side of their period of unemployment. Satisfaction is measured using objective elements (remuneration and stability of the job found), and also subjective elements. For example, did the job-seeker find the job they were looking for or, conversely, did they accept a job as they could not find anything else? Do they like it (according to multiple criteria) or not? Is it more satisfying, in their opinion, than the job they had before the period of unemployment? This approach is in line with the prolific field of the economics of happiness (Frey & Stutzer, 2002, and, for application to the labour market, D'Addio *et al.*, 2007).

What Do We Know About the Link Between Unemployment Benefits and Unemployment Duration? A Brief Review of Theoretical and Empirical Literature

Unemployment benefits generally aim to insure people against an involuntary loss of

Box 1 – The Unemployment Insurance System in France

In 2013, the unemployment benefits scheme was governed by two rationales:

- One of insurance, which compensates, from the obligatory contributions made by employers and salaried workers, involuntarily unemployed workers who have worked, and therefore contributed, for long enough to benefit from these entitlements. The "return to work" benefit (*Allocation de retour à l'emploi, ARE*) is the main benefit paid under this system;

- A solidarity support system, which takes over from the insurance system once it has been exhausted and which is funded by the State and paid to job-seekers as long as their resources (personal or household) fall below a certain threshold. The "solidarity" benefit (*Allocation de solidarité spécifique, ASS*) is the main benefit paid by this system.

An employee is affiliated to the unemployment insurance system if he/she has worked for at least 4 months during the previous 28 months (or the last 36 months if the employee is 50 or over). In the event of loss of employment, he/she may then claim ARE for a period equal to that worked ("one day worked = one day of benefits"), and this within a limit of 24 consecutive months (36 months if the job-seeker is 50 or older). The amount of the ARE ranges between 57% and 75% of the daily reference wage (salary restated from compensation received during the employment period) and remains constant throughout the benefits period. To illustrate this, an unemployed person who received 1,500 Euros gross per month during their previous job, could claim 950 Euros gross per month under the ARE.

Unemployment insurance also allows unemployed persons taking short-term professional work (known as "reduced activity") to combine, under certain conditions, both a wage and supplementary ARE payments. The new ARE amount is then the amount of the gross monthly allowance less 70% of the gross salary of the job (the amount being capped by the previous gross salary).

Exhaustion of ARE entitlements results in a significant decrease in the financial resources of the unemployed person, since ASS payments (which are paid only when income falls below a low threshold) are significantly lower than ARE. For example, in 2013, a couple whose monthly gross incomes were less than 1,200 Euros, would receive 470 Euros for ASS.

The French unemployment insurance system has undergone many changes since its creation. For instance, between 1986 and 2001, the unemployment benefit (called *Allocation Unique Dégressive*) was degressive (i.e. it was reduced as the period of unemployment increased, Dormont *et al.*, 2001).

Unemployment insurance in France is fairly generous compared to other advanced economies, both in terms of the amount of the benefits and the duration of entitlements, and also the conditions of eligibility (Cahuc & Carcillo, 2014).

employment. However, since its creation it has been suspected to dissuade people from returning to work. Microeconomic job search models (Pissarides, 2000) handle unemployment as a problem of matching the supply of labour with demand (due to the cost of collecting information about the nature and quality of jobs offered and the candidates, the geographical distances between jobs offered and sought, etc.). They show that unemployed persons are looking for jobs as long as the wage offered is lower than their reservation wage, the minimum wage below which they will refuse an offer of employment.

In these models, unemployment benefits have a dual effect on the duration of unemployment and the quality of jobs found. Firstly, they give job-seekers the means to better explore the labour market, and they improve the match between supply and demand, e.g. by giving job-seekers time to find the job they prefer and in which they would be most productive, which in turn benefits the community (Marimon & Zilibotti, 1999). However, they also raise reservation wages, and all the more so when they are generous, creating a moral hazard which is likely to induce job-seekers to delay their return to work for increased leisure consumption (Lalive *et al.*, 2011). Furthermore, by extending the duration of benefits, they can have adverse effects and even hamper the chances of job-seekers finding a job, by reducing their human capital and sending negative signals to employers regarding their employability. These models account for the rise in the unemployment exit rate around the expiry of entitlements, which sharply lowers the reservation wage (Mortensen, 1986).

The empirical literature includes a number of elements describing the existence of a surge in job-seekers finding jobs as they come towards the end of their benefit entitlements. Such peaks have been observed, for example, in the United States (Meyer, 1990), in Europe (Røed & Zhang, 2003) and in France (Dormont *et al.*, 2001, who study the effect of the degressive benefits that were in use at the time on the duration of unemployment, based on administrative data which is also used in this study). These peaks are undoubtedly overestimated when based on administrative data, as many job-seekers appear to unsubscribe from lists when their benefits entitlement ends, because they effectively become inactive (they no longer actively search for a job), or because they see no point in staying registered (Card *et al.*, 2007b). These types of peaks are sometimes interpreted as evidence that job-seekers increase the intensity of their search in the run-up to the end of their entitlements. They may also be a sign that job-seekers are resigning themselves to accepting jobs they would not have accepted when they were receiving benefits.

Furthermore, Le Barbanchon *et al.* (2017), based on administrative data, conclude that an increase in the maximum duration of benefits does not increase the reservation wage, i.e. it does not lead job-seekers to demand better paid jobs, contrary to what the theory predicts. Moreover, many empirical studies conclude that extending the duration of unemployment benefits or raising them increases the duration of unemployment, especially for women and seniors (for example, Lalive *et al.*, 2006, and Lalive, 2008, in Austria, Kyyrä & Ollikainen, 2008, in Finland, and Røed & Zhang, 2003, in Norway).

However, the conclusions of the empirical literature on the existence of a disincentivising effect of unemployment benefits on returning to work are more ambiguous (Le Barbanchon 2016; Schmieder *et al.*, 2016). Two parameters of unemployment benefits were particularly thoroughly studied: the maximum duration of entitlements and the amount of the benefits.

Tatsiramos (2009) concluded in a study on Europe that, while a long maximum benefits entitlement period prolongs the length of unemployment, it has a positive effect on the duration and stability of the job found after the period of unemployment. In the same vein, Caliendo *et al.* (2013), exploiting an age-related discontinuity in the duration of benefits in Germany, observed that jobs found just after the expiry of entitlements were less stable when job-seekers had shorter periods of benefits entitlement. They concluded that jobs found around the end of benefit entitlements were often taken for lack of finding a better job. Centeno and Novo (2006), using quantile regression, found that more generous unemployment benefits tend to favour better wages and the length of employment found. Nekoei and Weber (2017), exploiting an age-related discontinuity in Austria, noted that increasing the maximum duration of unemployment benefits increases the wages of the subsequent job. But it also tends to reduce wages by prolonging the duration of unemployment, meaning that

the effect of the maximum duration of benefits entitlement on wage levels is indeterminate.

A contrario, many empirical studies have failed to establish a positive effect of the duration of benefits entitlement on the duration or remuneration of employment found after the period of unemployment. For Addison and Blackburn (2000), the increase in unemployment benefits in the United States had very little effect on the pay of the subsequent job. Belzil (2001), based on duration models in Canada, and Card *et al.* (2007a), using a discontinuity in the duration of benefits entitlement in Austria, found modest and even negative effects of increased benefits on the stability of subsequent employment. Similarly, van Ours and Vodopivec (2006, 2008) concluded from natural experiments in Slovenia that when the duration of benefits entitlement is reduced, return to work is faster without any deterioration in the duration or the remuneration of the subsequent job. Le Barbanchon (2016), using a discontinuity in the duration of benefits entitlement in France, observed that the duration of unemployment increased with the duration of benefits, without the stability of the subsequent job being improved.

However, these studies look at the quality of the subsequent job only by its duration (type of employment contract) and the salary level at the time of hiring, which is reductive. Other considerations are involved when choosing a job, such as one's interest in it, its career prospects, the sector, the commute distance and the working conditions. Akerlof *et al.* (1988) conclude that nonpecuniary rewards are just as important as remuneration for job satisfaction. The criteria used here to assess jobs are broad and both objective (duration of employment and wage) and subjective (interest in the job, feelings of downgrading, opinion on working conditions, etc.).

Descriptive Statistics

The Less-Skilled Unemployed Tend More Often to Leave Unemployment Near the End of Their Benefits Entitlement

The survey on the paths of unemployed people on benefit (*Parcours des demandeurs d'emploi indemnisés*, 2013) includes 4,057 unemployed who finally reported finding a job since the beginning of their unemployment period, i.e. nearly ¾ of the sample, and 1,443 who were still unemployed (see *infra*, Table A, Box 2; the data are described in Box 2). In the rest of the paper, we focused on the 4,057 surveyed job-seekers who found a job, unless otherwise stated. 812 job-seekers became self-employed (independent status), i.e. 20% of the respondents who found a job.[1] More than half of the unemployed in the survey had 2 years of benefits entitlement (730 days, the maximum for

1. This figure is most likely overestimated due to the use of the quota method for sampling, which implies that the descriptive statistics do not completely accurately describe the population under study.

Box 2 – **The Survey on the Paths of Unemployed People on Benefit (*Parcours des demandeurs d'emploi indemnisés*)**

Survey sampling

The study is based on the survey *Parcours des demandeurs d'emploi indemnisés*, conducted by *Pôle emploi* in October 2013, among job-seekers claiming benefits (see Online complement C1). The study population includes all job-seekers in categories A, B or C[(a)] in France, registered with *Pôle emploi* between July 2012 and February 2013, and having worked at least 6 months during the 28 months preceding their registration for unemployment. They have all received ARE benefits. It excludes:

- Job-seekers aged 50 or over who have a maximum benefit period one year longer than other job-seekers;

- Job-seekers affiliated with specific benefits schemes, in particular artists (intermittent entertainers) and temporary workers;

- Job-seekers who worked less than 6 months before registering with *Pôle emploi*: on the one hand, it seemed to us that an objective judgement on the quality of a job could hardly be established over a period of less than 6 months; on the other hand, job-seekers who have worked less than 4 months before registering with *Pôle emploi* are not eligible for unemployment benefits, and therefore not eligible for our study.

The survey was conducted among 5,500 job-seekers. The sampling system was designed in such a way that it over-represents job-seekers exiting for work near the

(a) Job-seekers who had to search for a job pro-actively and were unemployed (Category A), or who engaged in short-term work ("reduced activity") for less than 78 hours (Category B) or for 78 hours or more (Category C), during the month in question.

➔

Box 2 – (contd.)

end of their entitlements, of which there were few in the population studied (only 2.5%). Unless otherwise stated the period nearing the end of entitlements is, by convention in this study, the one-and-a-half month period prior to the end date.

The survey population is the FNA (Fichier national des allocataires), a database collected by *Pôle emploi* listing all benefits payment periods for each job-seeker registered with *Pôle emploi*. This database provides a wealth of information on the socio-demographic characteristics of the unemployed: age, sex, education level, nationality, amount and maximum possible duration of benefits etc. The FNA probably covers almost all eligible job-seekers, who have a financial interest in registering with *Pôle emploi*. However, it does not include accurate information about the dates of resumption of employment, because job-seekers often forget to update their applications. Exiting (*respectively* staying on) the *Pôle emploi* lists does not necessarily imply that the job-seeker has found a job (*respectively* or is still unemployed). However, as a first approximation it would seem credible to assume that unemployed people who exit the lists of *Pôle emploi* for a given period of time when they could have claimed benefits, have probably and to a large extent returned to paid work during that time. Furthermore, our sampling strategy is based on the assumption that unemployed people receiving benefits who exit the lists of *Pôle emploi*, by convention, for a period of at least 45 days when they could be claiming ARE, have usually returned to work. Sampling is based on this hypothesis, which has been empirically validated (Table A).

The survey included:

- 3,000 eligible job-seekers who had been delisted (for at least 45 days), at the latest one-and-a-half months prior to the theoretical end date of their entitlement to benefits ("well before the end of entitlement");

- 1,000 eligible job-seekers who had been delisted (for at least 45 days) during the one-and-a-half months prior to the end date ("nearing the end of their entitlements"), and;

- 1,500 still on the lists when their entitlements expired.

The sample was obtained using the quota method in each of the three groups of job-seekers, applying quotas by crossing the age group, sex and management or non-management status.

Table A
Sampling of the Survey *Parcours des demandeurs d'emploi indemnisés*

Number of job-seekers interviewed who…	Situation regarding *Pôle emploi*			Total
	First delisting (for at least 45 days)…		Not delisted before the end of entitlements	
	… well before the end of entitlements	… nearing the end of entitlements		
... found a job	2,549	770	738	4,057
... did not find a job	451	230	762	1,443
Proportion not finding a job (%)	15.0	23.0	50.8	26.2
Total	3,000	1,000	1,500	5,500

NB: Nearing the end of entitlements is defined as a month-and-a-half before the end of entitlements at the earliest.
Reading note: the survey asked 3,000 job-seekers registered with *Pôle emploi* but who had been delisted for at least 45 days (while being eligible for ARE at the time), at the latest a month-and-a-half before the end of their unemployment benefit entitlements. Of these, 2,549 found a job and 451 (15%) did not.
Coverage: All respondents (whether or not they found a job), 5,500 observations.
Sources: *Pôle emploi*, survey *Parcours des demandeurs d'emploi indemnisés* and the database *Fichier national des allocataires* (FNA).

Then during the survey, job-seekers were specifically asked whether or not they had returned to work (excluding "reduced activity"[(b)]), and if so on what date, or if they had not found a job. By combining this information with the FNA, we could determine whether job-seekers found a job either before, just before, or after their entitlements expired, or if they were still looking for work or no longer looking for work.

The Questions Asked to the Respondents

The survey was conducted by telephone and included around forty questions, mostly qualitative, on the job search behaviour adopted, on finding employment and, if applicable, on the nature of the job found, etc. (see online complement). For example, respondents were asked whether or not the job they found was the one they were looking for, or if they just took it because nothing else was available. Each respondent who found a job was also asked to specify whether their satisfaction with the job was greater / equal to or less than with the job they had before the period of unemployment according to several satisfaction criteria (professional expectations, interest in the job, working conditions, commute time, level of remuneration, under-qualification, addressed by three questions relating to the number of years of education, the qualifications and the work experience required for the job). Furthermore, two specific questions in the survey asked each respondent to give a score, on a scale of 1 to 10, for the job found after unemployment, and then for the job they had before their period of unemployment.

(b) Job-seekers may indeed have paid work while being registered with Pôle emploi *("reduced activity").*

unemployed persons under the age of 50). There are also local maxima in the duration of benefits entitlement at 6, 12 and 18 months (about 5%).

The surveyed population is fairly young (one-third under twenty-five) and the education level is fairly low (one third hold a diploma below or equal to the level of a professional or vocational certificate). In almost half the cases, unemployment registration followed the end of a fixed-term contract. In the survey, the period of unemployment is more often a short-lived step. One third of the job-seekers were registered for less than 6 months. The peaks in the duration of unemployment at 6, 12 and especially 24 months (Figure C2-I, Online complement C2) can be explained in part by the sampling method. Indeed, the survey overestimates the number of job-seekers leaving unemployment towards the end of their entitlement, and the majority of job-seekers registered with *Pôle emploi* were entitled to a maximum of 6, 12 or 24 months of benefits.

Job-seekers who returned to employment nearing or after the end of their entitlements were more likely to be low-skilled people, women with children, residents of sensitive urban areas (ZUS), people with short entitlement periods and often on so called "reduced activity" – a situation combining some employment and unemployment benefits (Table C2-1, Online complement C2). They are less often young or unemployed due to the end of a fixed-term contract. When found after the expiry of entitlements, jobs tended to be more often fixed-term and/or part-time jobs

The Rate of Return to Work Rises Around the End of Entitlements

Figure I shows the unemployment survival function estimated using the Kaplan-Meier method.[2] The survival function shows a rise in the unemployment exit rate for jobs found after the expiry of entitlements (the exit rate tends to increase 24 months after registration of unemployment, i.e. on expiry of the maximum benefits period of more than half of the job-seekers in the sample). This effect is even more pronounced if one restricts oneself only to job-seekers with 2 years of entitlements, whereas it is not observed for those with entitlement periods strictly less than 2 years.

The magnitude of the peak is overestimated due to the sampling method, which over-represents

2. Non-parametric estimation of a survival function to account for censored data.

Figure I
Unemployment Survival Function Estimated Using the Kaplan-Meier Method

Reading note: After 6 months of unemployment, 67% of job-seekers in the survey are still unemployed.
Coverage: All respondents (whether or not they found a job), 5,500 observations.
Sources: *Pôle emploi*, survey *Parcours des demandeurs d'emploi indemnisés*.

job-seekers who have returned to work in the run-up to the end of their entitlements. However, we still observe a peak when we replicate the analysis using a more appropriate source on exits from unemployment (the *Sortants du chômage* survey), conducted by the Dares and *Pôle emploi* (Figure C2-II, Online complement C2).

The peak of the survival function is more pronounced for women with one or more children, job-seekers who admit to having taken a job by default, and job-seekers reporting a decrease in wages. It is also stronger for those who rate the post-unemployment job lower than their pre-unemployment job, and it is much weaker when job-seekers report that they did not decrease their consumption expenditure while unemployed. All this suggests that a return to work on the expiry of entitlements produces low job satisfaction and is motivated by financial reasons.

Opinions on post-unemployment jobs

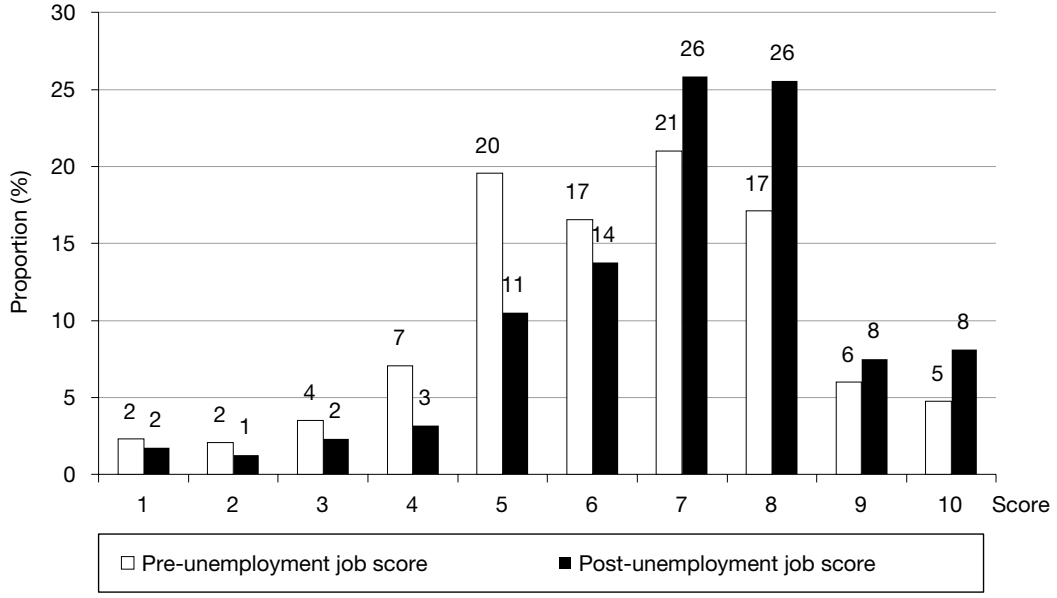
On a scale of 1 to 10, the most commonly assigned score for employment in general is 7 (Figure II). Respondents gave pre-unemployment jobs an average score of 6.29 and a median score of 6. For post-unemployment jobs, the average score was 6.95, median 7.

On average, job-seekers gave higher scores to jobs found after unemployment than to the ones they had before (difference in scores is +0.7, Table 1). Half of the job-seekers gave a higher score to the post-unemployment job than to the one they had before. However, scores are higher when the job is found well before the expiry of entitlements (+0.9), lower (+0.6) when it is found near the expiry of entitlements, and null when found afterwards.

On average, 24% of jobs found well before the expiry of entitlements were given a lower score than the previous job, compared to 37% of jobs found after the expiry of entitlements (Table 2). Jobs found after the expiry of entitlements were often less well paid (compared to pre-unemployment jobs) than those found before the expiry of entitlements. A third were taken for lack of other possible jobs, compared to 13% when the job was found well before the expiry of entitlements.

Table 2 suggests that the nearer we get to the expiry of entitlements, the less valued the job is, the more often it is taken by default, and the less well paid it is than the pre-unemployment job, and the more often the job-seekers declare that they have sharply reduced their consumption expenditure while unemployed.

Figure II
Histogram of Scores Given to Jobs Before and After Unemployment (%)



Reading note: a score of 7 was given to pre-unemployment jobs by 21% of the job-seekers, and to post-unemployment jobs by 26%.
Coverage: Job-seekers having found a job, 4,057 observations.
Sources: *Pôle emploi*, survey *Parcours des demandeurs d'emploi indemnisés*.

Table 1
Appraisal of Jobs After and Before Unemployment

Comparison between job after and job before the unemployment period	Return to employment in relation to the expiry of entitlements…			Total
	… well before	… nearing	… after	
Average difference in scores for post and pre-unemployment jobs	+0.86	+0.63	+0.02	+0.66
Proportion of post-unemployment jobs with a lower score (%)	24.2	26.0	37.1	26.9
Proportion of post-unemployment jobs with a higher score (%)	55.0	51.2	42.3	51.9
Proportion of post-unemployment jobs with the same score (%)	20.8	22.9	20.6	21.1
Proportion of post-unemployment jobs (%)...				
... which match expectations less well	18.2	26.0	33.5	22.4
... are less interesting	17.3	20.4	29.4	20.1
... with lower working conditions	14.6	18.3	21.7	16.6
... farther away	37.1	38.8	39.4	37.9
... less well paid	39.1	42.6	56.5	42.9
... under-qualified (education)	17.7	20.4	28.2	20.1
... under-qualified (qualifications)	20.5	25.2	32.0	23.5
... under-qualified (experience)	21.1	29.4	33.5	24.9
... taken by default	13.0	20.5	31.7	17.8
Number of job-seekers	2,549	770	738	4,057
Proportion of job-seekers (%)	62.8	19.0	18.2	100.0

Note: Nearing the expiry of entitlements is defined as a month-and-a-half before the end of entitlements at the earliest.
Reading note: on average, the difference in job scores after and before unemployment is +0.86 when the job is found well before the end of entitlements, +0.63 nearing the end of entitlements and 0.02 after the end of entitlements.
Coverage: Job-seekers finding a job, 4,057 observations.
Sources: *Pôle emploi*, survey *Parcours des demandeurs d'emploi indemnisé*.

Table 2
Post-Unemployment Job Satisfaction Depending on the Period in Relation to the Expiry of Entitlements

Return to employment in relation to the expiry of entitlements	Average of the difference in scores	Job taken due to lack of alternatives (%)	Wage drop (%)	Consumption down sharply (%)	Number of respondents
After	+0.02	31.6	57.7	56.5	738
During the 15 days before	+0.45	23.3	48.8	44.7	322
Between 16 days and 1 month before	+0.74	17.6	52.5	41.6	238
Between 1 and 2 months before	+0.78	19.7	46.0	39.3	239
Between 3 and 6 months before	+0.66	19.0	40.3	36.3	347
Between 7 and 12 months before	+0.88	13.3	38.4	34.4	503
Between 13 and 18 months before	+0.93	13.6	40.6	40.4	463
Between 19 and 21 months before	+0.69	12.0	38.2	39.0	498
Between 22 and 24 months before	+1.00	9.7	32.2	43.4	709
Total	+0.66	17.8	43.3	42.9	4,057

Note: The period before the expiry of entitlements is expressed in the number of days of compensation, and not of unemployment, the concepts being slightly different.
Reading note: on average, the difference in scores between jobs after and before unemployment is +0.02 when the job is found after the expiry of entitlements. In 31.6% of cases, this job is resumed in the absence of others, and in 57.7% of cases it is less well paid than the job held before unemployment. 56.5% of the 738 unemployed people reported having significantly reduced their consumption levels during their period of unemployment.
Coverage: Job-seekers finding a job, 4,057 observations.
Sources: *Pôle emploi*, survey *Parcours des demandeurs d'emploi indemnisés*.

The Econometric Model

Fixed Effects Model

In this paper, the job satisfaction survey is based on a linear fixed effects panel data model, the linear *within* model (Box 3).

The model includes fixed effects, which enable us to correct the estimation of parameters with potential endogeneity biases arising from heterogeneity fixed over time (here, during the period of unemployment), unobserved (or even unobservable) and correlated with the explanatory variables, including the date of return to work. For example, job-seekers with the lowest motivation may be less likely to give the job they hold a high score[3] and may also stay on benefits a longer length of time, delaying their return to work to enjoy family life or leisure. If this hypothesis is true, jobs found around the expiry of entitlements may be less favourably rated than the others, not because they were found at this time in particular, but because the individuals concerned tend to view work itself less favourably than the others.

3. The survey included a question about the job search period. 5% of respondents said that they had started looking for a job only at the end of their unemployed period, and these job-seekers gave lower scores to pre-unemployment jobs than the other job-seekers, on average.

Box 3 – **The *Within* Linear Model**

We are looking to explain the evolution of a resulting variable y_{it} (score, salary, stability and job satisfaction) for individual i in period t (t = 0 for the period before the unemployment, t = 1 for the period after unemployment). When the result variable y_{it} is the score for the job held during period t, it takes a unit value of between 1 and 10; when yit is a qualitative salary variable, it takes the value 0 in period 0, and 1 / 0 / -1 in period 1, depending on whether the job found in period 1 was better, as well or less well paid than the one in period 0; lastly, when y_{it} is a variable showing the stability of the job held in period t, it takes the value 1 for a permanent contract and 0 for a fixed-term contract.

The explanatory variables are divided into two groups. Most of them are observed both for jobs before and after unemployment. However, six explanatory variables (those describing the period of unemployment) are observed only for the period of unemployment preceding employment in t = 1, and not for the period of unemployment preceding employment in t = 0, mostly because, for more than half of the respondents, the unemployment period considered in the survey is the only period of unemployment they experienced. These variables are: the daily amount of benefits, the maximum duration of benefits, the duration of unemployment, the reason for registration for benefits, the period left in regards to the end of entitlement, the quarter in which employment was resumed.

The variable y_{it} is modelled by the equation:

$$E(y_{it} / x_{i0}, x_{i1}, w_{i0}, w_{i1}, \lambda_i) = \lambda_i + x_{it}'\beta + w_{it}'\gamma \quad i = 1...n, t \in \{0,1\}$$

x_{it} denotes the vector of k explanatory variables, the value of which is known for individual i in period t, β denotes the vector of k parameters. w_{it} denotes the vector of the six explanatory variables, the value of which is only known for individual i in period 1. They take the value 0 for the pre-unemployment job (period 0) and take their observed value for the post-unemployment job (period 1).

They act as "treatment" variables to study the effects of unemployment on the differences in satisfaction with jobs either side of a period of unemployment. γ represents the vector of the parameters associated with these six explanatory variables. λ_i is a "fixed effect" specific to individual i, a term denoting an unobserved individual heterogeneity that is not expected to change over time and potentially correlated with the explanatory variables x_{it} and w_{it}.

In this formulation, periods 0 and 1 do not correspond to successive calendar dates, but refer to the employment episodes each side of the period of unemployment: 0 for the pre-unemployment period and 1 for the post-unemployment period.

The fixed effect is removed by subtraction (Wooldridge, 2002):

$$E(y_{i1} - y_{i0} / x_{i0}, x_{i1}, w_{i0}, w_{i1}, \lambda_i) = \left(x_{i1}' - x_{i0}'\right)\beta + w_{i1}'\gamma \quad i = 1...n.$$

The model is estimated by linear regression of the difference in the values of y_i for the two jobs on the difference between x_i and w_i for the two jobs. It can be shown that estimation of the parameters is based solely on individuals who experienced a change in the related variable between the two dates of the survey. Furthermore, the model can only estimate the effect of explanatory variables that evolve over time. In this paper, the inference of the model is based on White's variance-covariance matrix (White, 1980), which is robust to heteroscedasticity.

The parameter β_j is interpreted as the average variation in the score attributed to the job due to the fact that it has the characteristic x_j (or following a 1% increase in x_j, when x_j is expressed in logarithm) relative to the reference category, the other explanatory variables remaining constant.

To be more precise, the model presented here is a *first difference* panel data model. The *within* model consists in conducting an Ordinary Least Squares regression of $y_{it} - \bar{y}_i$ over $x_{it} - \bar{x}_i$ (Wooldridge, 2002). When there are two periods, the *within* and *first difference* estimators are identical (but the estimation of standard deviations differs).

The fixed effects model overcomes this kind of bias. If a job-seeker has a low appetite for work, this individual characteristic may show up in his assessment of both the pre-unemployment job and the post-unemployment job, but not in the difference between the two.

Choosing the *Within* Model

The *within* estimator is more suitable for continuous dependent variables, which is not the case for our dependent variable, the score assigned to a job, which takes integer values between 1 and 10. A fixed effects ordered *logit* model (Baetschmann *et al*., 2015, Online complement C3) is theoretically more suitable. However, we have chosen to base our empirical analysis on the *within* model. There are three arguments in support of this choice: 1) the *within* model appears more robust because it is based on less stringent assumptions than the the *logit* model (which postulates that the error term follows a logistic distribution); 2) the interpretation of the β parameters is easy; 3) the results of a *within* model are very similar to those of a fixed effects ordered *logit* model (see Table 3). Using Monte Carlo methods, Riedl and Geishecker (2014) concluded that the *within* model leads to relative estimates of parameters (estimated parameter ratios) which are very close to those of the fixed effects *logit* model, which backs up this choice. To facilitate comparisons between the models, we always prefer estimations using a *within* model, even when the dependent variable only takes two or three different integer values.

Moreover, the *within* model implicitly postulates a strong hypothesis of cardinal scale, since it takes into account the difference between scores, whereas the fixed effects *logit* model is only based on the less demanding hypothesis of the ordinal scale (it only takes into account the ranking of the scores, i.e. the order on the value scale, and not the differences between them). However, the results remain more or less the same if we apply the *within* model to the dependent variable which takes the value 1 (respectively 0, -1) if the score of the job found is strictly higher (respectively equal, strictly lower) than that of the pre-unemployment job, a dependent variable which is now based only on a rank.

However, Our Empirical Strategy Fails to Establish Causal Relationships

Many endogeneity biases still remain, that cannot be corrected by the *within* model. Firstly, the model does not take into account individual heterogeneity that varies over time and is correlated with duration of unemployment (such as the loss of human capital caused by long periods of unemployment). Furthermore, the proximity of the end of the entitlement period is probably correlated with unobservable determinants of the difference in satisfaction between the pre and post-unemployment jobs. For example, an unemployed person, previously employed in a technological sector specific to a given activity and a given enterprise, will have both difficulties in finding a job (she will be more likely to return to employment around the end of his entitlements) and will probably be less satisfied with his new job (because the new job is unlikely to be as well qualified as the previous one).

Lastly, the panel was constituted retrospectively, collecting the opinions of the respondents on satisfaction with present and past jobs at the same time. This method has the advantage, compared to repeated interrogation (e.g. every year), of making satisfaction easier to interpret, as it encourages the respondents to judge their new job by comparing it with the old one. It postulates that respondents are able to rank, in terms of interest, the jobs they have held (ordinal satisfaction). Repeated measures of satisfaction may be more difficult to interpret as the psychological motivations for evaluating a job "absolutely" (without necessarily comparing it to any other) are probably very heterogeneous. However, the main problem with retrospective information is that it imperfectly measures opinions regarding a job, firstly due to poor memory of past jobs, and secondly because an opinion about a past job corresponds to an average satisfaction level assessed *a posteriori*, while an opinion on a current job will reflect the satisfaction level at the start of the period of employment.

All these remaining biases preclude a causal interpretation of the results. In particular, this study is not able to infer causal relationships between the maximum duration of unemployment benefits and satisfaction with the jobs held.

Job-seekers Who Find a Job After the End of Their Entitlements Are Less Satisfied of It Than Those Who Find One Just Before Expiry of Entitlements

The results of the estimation of the different models are shown in Table 3. The 2nd and

5th columns correspond to the explanatory models of the score given to the job (*within* model in the 2nd, fixed effects ordered *logit* model (Baetschmann *et al.*, 2015) in the 5th). The 3rd column corresponds to a *within* model for the type of employment contract associated with the job (a dummy variable equal to 1 if the job held in period *t* is permanent, 0 if it is fixed-term). The 4th column shows the results of the *within* model regressing a dummy equal to 0 in period 0, and 1 (respectively 0, -1) in period 1, depending on whether the job found is better (respectively equally, worse) paid than the pre-unemployment job.

Since the job search theory emphasises the duration in days preceding the expiry of entitlements, during which the job-seeker is supposed to modify his/her job-seeking behaviour, we have chosen to model the duration of unemployment benefits in terms of the number of days of benefits consumed. This differs slightly from the number of days of unemployment[4].

Job Satisfaction Does Not Depend Solely on Wage

We first investigated whether job satisfaction was only influenced by its pecuniary rewards (pay, stability), or whether other factors could be involved. In other words, is the share of the score not explained by these characteristics only "noise", or can it indicate something else as well? To investigate this, we then considered the share of the score not explained by the pecuniary and objective characteristics of the job (measured by the residual of the regression of the score on these characteristics). This residual was then regressed on the other satisfaction variables of a job in the survey. We can then conclude that finding a job that matches expectations, that is considered interesting and to have good working conditions, significantly increases the score given to a job, with the pecuniary and objective characteristics remaining the same. The time of the commute required to get to work does not affect the score.

This result suggests that the way in which jobs are assessed is not influenced solely in terms of pecuniary rewards. This would appear to back up our strategy of assessing job satisfaction using a numerical score and qualitative questions, and not only security and pecuniary rewards.

Determinants of Satisfaction With the Subsequent Job

Here we will focus on the regression of the score given to the job (Table 3). Since the results obtained by the *within* model are very close to those obtained using the fixed effects ordered *logit* model, we will only comment on the results of the *within* model.

The intercept (interpreted as a time effect for the period after unemployment) is equal to 3.1, which shows that post-unemployment jobs are, on average, more valued by the "reference" individual (for whom all variables are equal to the reference terms) than those occupied before unemployment. Firstly, returning to work may have boosted the respondent's morale (Krueger & Mueller, 2012), which may skew the score in favour of the job found, and all the more so when the period of unemployment was a long one. Secondly, the young, accounting for the majority in our sample, often start their professional careers with temporary, under-qualified and un-fulfilling jobs (Nauze-Fichet & Tomasini, 2002).

To capture the impact of the economic conditions, the model includes, as an explanatory variable, the unemployment rate (ILO methodology) at the beginning and at the end of the period of unemployment. We can observe that a higher unemployment rate at the end of the unemployed period than at the beginning significantly increases the job's score.

Job satisfaction is also found to increase when the job-seeker becomes a self-employed, starting his own business. The job's score increases in average by 1.7 point, consistent with the results of Benz and Frey (2008). It also increases when the job found is better paid than the previous one (increase in the score of 0.6) and when it is a permanent job (results also found by Davoine & Erhel, 2008, and D'Addio *et al.*, 2007). Jobs in administration are better scored (increase of 0.4 in the score), especially among women (consistent with D'Addio *et al.*, 2007), while jobs in establishments with 10 to 49 employees are perceived as being less fulfilling (drop of the score of 0.2).

The higher the amount of unemployment benefits, and therefore the higher the wage of the

4. For example, benefits payments usually begin after a period of 7 days of unemployment.

Table 3
Estimation of the Models for the Job's Score, Type of Contract and Wage

Explanatory variables	Score (*within*)		Permanent contract (*within*)		Wage (*within*)		Score (fixed effects ordered *logit* model)	
	Estimation	Standard error	Estimation	Standard error	Estimation	Standard error	Estimation	Standard error
Intercept (after unemployment)	3.143***	1.073	-0.656***	0.187	0.729**	0.338	3.417***	1.275
Quarter employment was resumed								
1st quarter	-0.121	0.101	-0.013	0.019	0.023	0.034	-0.134	0.131
2th quarter	0.062	0.287	0.04	0.051	0.066	0.095	-0.231	0.327
3th quarter	0.011	0.109	-0.003	0.019	-0.015	0.035	-0.010	0.139
4th quarter	Ref.		Ref.		Ref.		Ref.	
Unemployment rate	0.624**	0.273	0.004	0.048	-0.053	0.087	0.659	0.344
Independent	1.73***	0.126	-	-	-0.201***	0.043	2.304***	0.193
Permanent contract	0.223**	0.097	-	-	0.155***	0.031	0.301***	0.115
Fixed-term contract	Ref.		-	-	Ref.		Ref.	
Part-time job	-0.264***	0.098	-	-	-0.3***	0.030	-0.262**	0.116
End of Fixed-term Contract	-0.091	0.176	0.899	0.031	0.197***	0.057	-0.085	0.226
Conventional termination	0.775***	0.159	-0.051	0.030	0.113**	0.050	0.899***	0.202
Other termination	0.376***	0.162	0.049	0.030	0.121**	0.050	0.323	0.198
Economic redundancy	Ref.		Ref.		Ref.		Ref.	
Duration of employment (in days, logs)	0.135***	0.031	-	-	0.028***	0.010	0.164***	0.039
Agriculture	0.183	0.252	-0.067	0.035	0.076	0.070	0.213	0.275
Construction and public works	-0.058	0.138	0.02	0.025	0.083	0.045	-0.15	0.175
Industry	-0.111	0.124	0.048**	0.021	0.097**	0.038	-0.045	0.137
Retail	-0.34***	0.086	0.028	0.016	-0.005	0.027	-0.288***	0.100
Administration	0.363***	0.113	-0.064***	0.019	0.05	0.036	0.414***	0.125
Other services	Ref.		Ref.		Ref.		Ref.	
Size of establishment								
1 to 9 employees	-0.039	0.089	-0.109***	0.016	-0.144***	0.029	-0.018	0.103
10 to 49 employees	-0.2**	0.088	0.000	0.016	-0.095***	0.028	-0.183	0.101
50 to 199 employees	-0.083	0.093	0.005	0.018	-0.113***	0.031	-0.036	0.109
200 or more employees	Ref.		Ref.		Ref.		Ref.	
Higher wage	0.587***	0.050	-	-	-	-	0.702***	0.058
Unemployment benefit per day (in Euros, logs)	-0.293***	0.076	0.053***	0.014	-0.308***	0.024	-0.272***	0.102
Maximum duration of benefits (in days, logs)	-0.317	0.165	-0.051	0.028	0.077	0.053	-0.374	0.196
Duration of unemployment (in days, logs)	0.09	0.079	0.052***	0.013	0.012	0.027	0.121	0.106
Exit to work in relation to the end of entitlements								
after	-1.144***	0.301	-0.278***	0.053	-0.295***	0.098	-1.24***	0.369
1 month before	-0.693**	0.286	-0.022	0.052	-0.162	0.095	-0.795**	0.363
between 2 and 3 months before	-0.615**	0.308	-0.067	0.055	-0.072	0.098	-0.824**	0.375
between 4 and 6 months before	-0.425	0.300	-0.139***	0.054	-0.1	0.099	-0.529	0.360
between 7 and 12 months before	-0.416	0.216	0.018	0.042	-0.038	0.073	-0.419	0.290
between 13 and 18 months before	-0.231	0.191	0.044	0.038	-0.103	0.067	-0.217	0.249
between 19 and 22 months before	-0.252	0.157	0.033	0.031	-0.008	0.055	-0.345	0.203
between 23 and 24 months before	Ref.		Ref.		Ref.		Ref.	
Adjusted R^2	0.17		0.52		0.17		0.20(a)	
Number of observations	3,197		1,860		3,363		8,320	

(a) McFadden's R^2.

Note: ** significant at 5 %, *** at 1 %. The 2nd, 3rd and 4th columns show the *within* regression of the score given to jobs (2nd column), whether or not the job found is a permanent contract (3rd column) and the fact that a job found after unemployment is better paid than the job before unemployment (4th column). The 5th column shows the results of the fixed effects ordered *logit* regression (Baetschmann *et al.*, 2015) for the job scores. The variables associated with employment contracts, part-time work, the duration of employment and wage are not included in the permanent contract model as they are potentially endogenous. Standard errors are estimated using White's method (using the cluster-robust variance method for the fixed effects ordered *logit* model). The period before the expiry of benefits is expressed in the number of days of benefit and not of unemployment, the concepts being slightly different. The observations used to estimate the models are those for which the dependent variable is different for jobs found before and after benefits have expired.

Reading note: Compared to a job found 23 or 24 eligible months before the expiry of entitlements, a job found after the expiry of entitlements is given a score, all else being equal, 1.144 points lower (within model). Similarly, the probability of finding a permanent job is reduced by 27.8% and the probability of obtaining a better paid job is 29.5% lower.

Coverage: Job-seekers finding a job, 4,057 observations.

Sources: *Pôle emploi*, survey *Parcours des demandeurs d'emploi indemnisés* ; Insee, *Labour Force Survey* for the unemployment rate.

previous job, the lower post-unemployment jobs are valued. This result can no doubt be explained only by a scarcity of available jobs as one progresses up the scale of values. Job-seekers with the best job experience have previously held the most interesting jobs, are more demanding, and therefore probably have a lower chance of finding a more satisfying job (in their eyes).

The Effect of Returning to Employment Nearing the Expiry of Entitlements

Table 4 confirms that personal satisfaction with post-unemployment jobs deteriorates as job seekers experience longer periods of unemployment. Dissatisfaction is statistically significant and of great magnitude when jobs are taken just before and, above all, after the entitlements have expired. Compared to jobs found between 23 and 24 months before the expiry of entitlements, the drop in score averages between 0.6 and 0.7 when a job is found during the 3 months preceding the expiry of entitlements, and 1.1 when it is found after the entitlements have expired (dissatisfaction is then nearly twice as strong as for a drop in wages). Furthermore, jobs found after the expiry of entitlements are more often fixed-term contracts and lower-paid, *ceteris paribus*.

These results remain valid all other things equal, and especially wage and type of work contract. The negative opinions on jobs found around the expiry of entitlements are not only due to their precarious nature. Jobs found after the expiry of entitlements are, in fact, judged to correspond less to the job-seekers' job expectations, are less interesting and more likely to entail poorer working conditions than those found before entitlements end (see Table 4). They are also more often taken for lack of another alternative, especially for financial reasons. While 50% of job-seekers taking a job which did not meet their expectations well before the end of their entitlements stated that the reason was money problems, 59% invoked this reason when they resumed employment towards the end of their entitlements, and 75% after their entitlements have expired. However, we should again clarify that these results do not enable us to state that increases in the duration of benefits improve satisfaction with jobs found around the expiry of entitlements.

In order to study professional de-skilling, it is preferable to remove the wage from the analysis, because wages partly depend on the jobs' qualification. We notice that jobs found after the end of entitlements are more often under-qualified (in terms of education level, professional experience and qualifications), which would suggest that wage drops of jobs found after the expiry of entitlements are due to the fact that they are under-qualified for the individual.

We also observe that job-seekers leaving unemployment after the expiry of their entitlements accumulate several types of problems. Despite receiving unemployment benefits, they declare more often significant drops in their consumption expenditure (Table 4). Likewise, they state more frequently that their job applications are often rejected,[5] a result which is not observed when leaving unemployment near the expiry of entitlements.

However, these results may be partly explained, on the one hand, by the unemployed unequal job search effort during their period of unemployment and, on the other hand, by a drop in human capital or negative employability signalling (signal theory) caused by increasingly longer periods of unemployment. Longer periods of unemployment are likely to lead to a loss of skills, preventing the job-seeker from applying for a job at the same quality as the one they had before. Empirical methods have recently validated this theory in the United States (Kroft *et al.*, 2013).

But, these results remain valid if the model includes (together or separately) the job-seeker's opinion as to whether the period of unemployment made him lose, at least in part:

- Know-how and working methods (including knowledge of computer tools);

- Work habits (respect for schedules, management, contacts within the world of work, etc.);

- Or if the job-seeker considers that his or her duration of unemployment has reduced their chances of finding a job. In the survey, these 3 variables are assessed using 3 levels: yes a lot (coded 2 in the model), yes a little (coded 1), not at all (coded 0). Nevertheless, these variables are likely to be endogenous (job-seekers

5. The application rejection frequency variable is endogenous (recursive causality with the duration of unemployment and, therefore, leaving unemployment after the expiry of entitlements). The regression in Table 5 is therefore only indicative.

Table 4
Job Satisfaction and Unemployment Exit to Work in Relation to the Expiry of Entitlements

Dependent variables	Explanatory variables				
	Exit to work in relation to the end of entitlements …				
	… well before	… in the month-and-a-half before		… after	
		Estimation	Standard error	Estimation	Standard error
Within model					
Score	Ref.	-0.180	0.135	-0.646***	0.161
Matches expectations	Ref.	-0.096**	0.04	-0.176***	0.045
Interest	Ref.	-0.011	0.039	-0.145***	0.045
Working conditions	Ref.	-0.08**	0.038	-0.116***	0.044
Commute time	Ref.	-0.048	0.043	0.032	0.05
Matches skills (education)[(a)]	Ref.	-0.011	0.035	-0.11***	0.04
Matches skills (qualifications)[(a)]	Ref.	-0.049	0.039	-0.112**	0.044
Matches skills (experience)[(a)]	Ref.	-0.069	0.04	-0.11**	0.045
Matches skills[(a)]	Ref.	-0.123	0.096	-0.332***	0.107
Increase in wage[(a)]	Ref.	-0.098**	0.044	-0.235***	0.049
Logit model[(b)]					
Job taken as nothing else available	Ref.	0.338**	0.17	0.802***	0.176
Decrease in consumption	Ref.	0.088	0.099	0.291***	0.108
Application often rejected	Ref.	0.162	0.109	0.494***	0.118
Steps to change jobs	Ref.	0.176	0.109	0.406***	0.117

(a) The wage is not included in the corresponding model.
(b) Polytomic ordered *logit* for the first three variables of the sub-array, which take three different values depending on the intensity of the response (not at all, a little, a lot), dichotomous *logit* for the fourth.
Note: ** significant at 5 %, *** at 1 %. *Within* and *logit* models regressing each of the explanatory variables considered on leaving the unemployment, with respect to the expiry of entitlements, and the explanatory variables (not shown in the table). A job matches the skill set if it requires the same level of education, the same qualifications or the same work experience to be performed, as the job held before unemployment. Standard errors are estimated using White's method.
Reading note: all else being equal, the score given to the job is 0.18 lower (difference not significantly different from 0) when it is found during the month-and-a-half preceding the expiry of entitlements, and by 0.646 when is found after the expiry of entitlements, rather than a month and a half before the expiry of entitlements at the latest.
Coverage: Job-seekers finding a job, 4,057 observations.
Sources: *Pôle emploi*, survey *Parcours des demandeurs d'emploi indemnisés*.

with job they dislike may be more inclined to consider that their period of unemployment has made them lose some of their human capital, or has induced negative employability signalling).

Satisfaction With Jobs Found Around the Expiry of Entitlements Seems to Depend on the Financial Resources of the Job-Seeker

To mitigate the effects of endogeneity of the explanatory variables, it may be interesting to compare job-seekers leaving unemployment just before or just after the end of their benefit entitlements. Indeed, since these individuals have left unemployment at similar times, it is plausible to assume that they will suffer similar reductions in job offers as their unemployed period lengthens (either due to a loss of human capital or negative employability signaling).

However, we observe smaller decreases in satisfaction (for post-unemployment jobs compared to pre-unemployment jobs) when employment is found near the expiry of entitlements (at least a month-and-a-half before), rather than afterwards. Compared to jobs found in the run-up to the expiry of entitlements, jobs found after the expiry of entitlements are significantly lower rated, considered to be less interesting, less qualified, less well paid and are less frequently with permanent contracts. They are more frequently taken by default and the person has more often made attempts to change jobs. Conversely, they do not correspond less to the expectations of the job-seeker, nor do they expose him or her to lower working conditions or longer commute times (cf. Tables 3 and 4). These results could be interpreted as the fact that searching for employment without unemployment benefits restricts choice for job-seekers.

To investigate this finding, we included a term in the model for the interaction between the

date of resumption of employment compared to the expiry of entitlements, and the reduction in consumption expenditure experienced during unemployment (Table 5). For jobs found close to the expiry of entitlements, the drop in satisfaction is greater when respondents declare that they have significantly reduced their consumption expenditure: jobs are significantly less well rated, deemed to be less interesting, less qualified and farther away from the job-seeker's expectations.

But for jobs found after the expiry of entitlements, dissatisfaction is statistically identical whether the respondents reduced their consumption strongly during the period of unemployment or whether they did not. Among job-seekers who found a job in the run-up to the end of their entitlements, this dissatisfaction is not statistically different from that of other job-seekers who had greatly reduced their consumption, but it is stronger than for those who had only slightly reduced their consumption.

These results suggest that satisfaction with the job found around the expiry of unemployment benefit entitlements depends on the financial resources of the job-seeker. When returning to work as the expiry of entitlements approaches, job-seekers seem to rate jobs lower when the financial sacrifices they made during their period of unemployment were high. Furthermore, jobs taken during the run-up to the expiry of entitlements seems to fall into two categories: default jobs when unemployment has significantly reduced the agent's consumption expenditure, satisfactory jobs when job-seekers were under fewer financial constraints.

* *
*

Three conclusions can be drawn from this study. Firstly, elements other than pay and stability contribute to job satisfaction, intrinsic value in particular. Secondly, the expiry of entitlement to benefits seems to create a discontinuity in satisfaction with post-unemployment jobs. Jobs found after entitlements have ended are less well paid and more often short-term than when found during the month-and-a-half before the expiry of entitlements. At the same remuneration and stability levels, they are also scored far lower, considered to be less interesting and often represent a demotion for the respondent. They are usually taken by default, mainly for financial reasons, and individuals are more likely to leave them for another job. Lastly, satisfaction with jobs found as entitlements are coming to an end seems to significantly depend on the sacrifices made in terms of consumption: jobs tend to be scored lower when the latter is high.

Table 5
Job Statisfaction depending on Entitlements' Expiry and the Decrease in Consumption During Unemployment

Dependent variables	Explanatory variables					
	Exit to employment in relation to the end of entitlements...					
	... well before		... in the month-and-a-half before		... after	
	Decrease in consumption		Decrease in consumption		Decrease in consumption	
	Weak	Large	Weak	Large	Weak	Large
Score	Ref.	-0.198 (0.104)	0.012 (0.162)	-0.527*** (0.177)	-0.628*** (0.19)	-0.767*** (0.201)
Matches expectations	Ref.	-0.091*** (0.031)	-0.072 (0.048)	-0.206*** (0.053)	-0.205*** (0.058)	-0.233*** (0.054)
Interest	Ref.	-0.09*** (0.03)	-0.008 (0.046)	-0.099** (0.05)	-0.168*** (0.057)	-0.207*** (0.052)
Matches skills[a]	Ref.	-0.212*** (0.074)	-0.149 (0.117)	-0.301** (0.123)	-0.439*** (0.136)	-0.449*** (0.125)

(a) the salary variable is not included in the corresponding model.
Note: ** significant at 5%, *** at 1%. Estimation of parameters and standard errors (in parentheses). *Within* models regressing each of the four dependent variables considered on the exit of unemployment in relation to the expiry of entitlements crossed with the drop in consumption, and the explanatory variables (not shown in the table). A job matches the skill set if it requires the same level of education, the same qualifications and the same work experience as the job held before unemployment. Standard errors are estimated using White's method.
Reading note: All else being equal, the score for jobs found well before the end of entitlements is 0.198 lower when consumer spending has been sharply reduced during unemployment compared to a small reduction, but this difference is not statistically significant.
Coverage: Job-seekers finding a job, 4,057 observations.
Sources: *Pôle emploi*, survey *Parcours des demandeurs d'emploi indemnisés*.

These results, however, only establish correlations and cannot be interpreted as causal relationships. By themselves, they do not enable us to state that an increase in the maximum duration of benefits would lead to an increase in satisfaction with post-unemployment jobs. It would then be useful to replicate the analysis focusing on the discontinuity encountered around the age of 50, which impacts the maximum duration of unemployment benefits provided for by the legislation (job-seekers over the age of 50 are eligible for an extra year of benefits). This approach would have the disadvantage of being limited in scope to a specific population, and the results might not be able to be generalised; it would nevertheless allow a more rigorous identification strategy (see Le Barbanchon *et al.*, 2017). □

BIBLIOGRAPHY

Addison, J. T. & Blackburn, M. L. (2000). The effects of unemployment insurance on postunemployment earnings. *Labour Economics*, 7(1), 21–53. https://doi.org/10.1016/S0927-5371(99)00026-3

Akerlof, G., Rose, A. & Yellen, J. (1988). Job switching and job satisfaction in the US labor market. *Brookings Papers on Economic Activity*, 2, 495–582. https://doi.org/10.2307/2534536

Baetschmann, G., Staub, K. E. & Winkelmann, R. (2015). Consistent estimation of the fixed effects ordered logit model. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 178(3), 685–703. https://doi.org/10.1111/rssa.12090

Belzil, C. (2001). Unemployment insurance and subsequent job duration: job matching versus unobserved heterogeneity. *Journal of Applied Econometrics*, 16(5), 619–636. https://doi.org/10.1002/jae.618

Benz, M. & Frey, B. S. (2008). Being Independent is a Great Thing: Subjective Evaluations of Self-Employment and Hierarchy. *Economica*, 75(298), 362–383. https://doi.org/10.1111/j.1468-0335.2007.00594.x

Cahuc, P. & Carcillo, S. (2014). *Améliorer l'assurance chômage*. Paris : Presses de Sciences Po.

Caliendo, M., Tatsiramos, K. & Uhlendorff, A. (2013). Benefit Duration, Unemployment Duration and Job Match Quality: A Regression-Discontinuity Approach. *Journal of Applied Econometrics*, 28(4), 604–627. https://doi.org/10.1002/jae.2293

Card, D., Chetty, R., & Weber, A. (2007a). Cash-on-Hand and Competing Models of Intertemporal Behavior: New Evidence from the Labor Market. *The Quarterly Journal of Economics*, 122(4), 1511–1560. https://doi.org/10.1162/qjec.2007.122.4.1511

Card, D., Chetty, R. & Weber, A. (2007b). The Spike at Benefit Exhaustion: Leaving the Unemployment System or Starting a New Job? *American Economic Review*, 97(2), 113–118. https://doi.org/10.1257/aer.97.2.113

Centeno, M. & Novo, Á. A. (2006). The Impact of Unemployment Insurance on the Job Match Quality: A Quantile Regression Approach. *Empirical Economics*, 31(4), 905–919. https://doi.org/10.1007/s00181-006-0061-x

D'Addio, A. C., Eriksson, T. & Frijters, P. (2007). An analysis of the determinants of job satisfaction when individuals' baseline satisfaction levels may differ. *Applied Economics*, 39(19), 2413–2423. https://doi.org/10.1080/00036840600707357

Davoine, L. & Erhel, C. (2008). La qualité de l'emploi en Europe : une approche comparative et dynamique. *Économie et Statistique*, 410, 47–69. https://www.insee.fr/fr/statistiques/1376966?sommaire=1376968

Dormont, B., Fougère, D. & Prieto, A. (2001). L'effet de l'allocation unique dégressive sur la reprise d'emploi. *Économie et Statistique*, 343, 3–28. https://www.insee.fr/fr/statistiques/1376120?sommaire=1376128

Frey, B. S. & Stutzer, A. (2002). What Can Economists Learn from Happiness Research? *Journal of Economic Literature*, 40, 402–435. https://doi.org/10.1257/002205102320161320

Kroft, K., Lange, F., & Notowidigdo, M. J. (2013). Duration Dependence and Labor Market Conditions: Evidence from a Field Experiment. *The Quarterly Journal of Economics*, 128(3), 1123–1167. https://doi.org/10.1093/qje/qjt015

Krueger, A. B. & Mueller, A. I. (2012). Time Use, Emotional Well-Being, and Unemployment: Evidence from Longitudinal Data. *The American Economic Review*, 102(3), 594–599. https://doi.org/10.1257/aer.102.3.594

Kyyrä, T. & Ollikainen, V. (2008). To search or not to search? The effects of UI benefit extension for the older unemployed. *Journal of Public Economics*, 92(10), 2048–2070. https://doi.org/10.1016/j.jpubeco.2008.03.004

Lalive, R. (2008). How do extended benefits affect unemployment duration? A regression discontinuity approach. *Journal of Econometrics*, 142(2), 785–806. https://doi.org/10.1016/j.jeconom.2007.05.013

Lalive, R., van Ours, J. & Zweimüller, J. (2006). How Changes in Financial Incentives Affect the Duration of Unemployment. *The Review of Economic Studies*, 73(4), 1009–1038. https://doi.org/10.1111/j.1467-937X.2006.00406.x

Lalive, R., van Ours, J. & Zweimüller, J. (2011). Equilibrium unemployment and the duration of unemployment benefits. *Journal of Population Economics*, 24(4), 1385–1409. https://doi.org/10.1007/s00148-010-0318-8

Le Barbanchon, T. (2016). The effect of the potential duration of unemployment benefits on unemployment exits to work and match quality in France. *Labour Economics*, 42, 16–29. https://doi.org/10.1016/j.labeco.2016.06.003

Le Barbanchon, T., Rathelot, R. & Roulet, A. (2017). Unemployment insurance and reservation wages: Evidence from administrative data. *Journal of Public Economics*, forthcoming, available on line 17 May 2017. https://doi.org/10.1016/j.jpubeco.2017.05.002

Marimon, R. & Zilibotti, F. (1999). Unemployment vs. Mismatch of Talents: Reconsidering Unemployment Benefits. *Economic Journal*, 109(455), 266–291. https://doi.org/10.1111/1468-0297.00432

Meyer, B. (1990). Unemployment Insurance and Unemployment Spells. *Econometrica*, 58(4), 757–782. https://doi.org/10.2307/2938349

Mortensen, D. T. (1986). Job search and labor market analysis. In: Ashenfelter, O. & Layard, R. (Eds.), *Handbook of Labor Economics*, vol. 2, 849–919. Amsterdam: North Holland. https://doi.org/10.1016/S1573-4463(86)02005-9

Nauze-Fichet, E. & Tomasini, M. (2002). Diplôme et insertion sur le marché du travail : approches socioprofessionnelle et salariale du déclassement. *Économie et Statistique*, 354, 21–48. https://www.insee.fr/fr/statistiques/1376260?sommaire=1376266

Nekoei, A. & Weber, A. (2017). Does Extending Unemployment Benefits Improve Job Quality? *The American Economic Review*, 107(2), 527–561. https://doi.org/10.1257/aer.20150528

Pissarides, C. A. (2000). *Equilibrium unemployment theory.* Cambridge, Mass.: MIT Press.

Riedl, M. & Geishecker, I. (2014). Keep it simple: estimation strategies for ordered response models with fixed effects. *Journal of Applied Statistics*, 41(11), 2358–2374. https://doi.org/10.1080/02664763.2014.909969

Røed, K. & Zhang, T. (2003). Does Unemployment Compensation Affect Unemployment Duration? *The Economic Journal*, 113(484), 190–206. https://doi.org/10.1111/1468-0297.00086

Schmieder, J. F., & Von Wachter, T. (2016). The Effects of Unemployment Insurance Benefits: New Evidence and Interpretation. *Annual Review of Economics*, 8, 547–581. https://doi.org/10.1146/annurev-economics-080614-115758

Tatsiramos, K. (2009). Unemployment Insurance in Europe: Unemployment Duration and Subsequent Employment Stability. *Journal of the European Economic Association*, 7(6), 1225–1260. https://doi.org/10.1162/JEEA.2009.7.6.1225

van Ours, J. C. & Vodopivec, M. (2006). How Shortening the Potential Duration of Unemployment Benefits Affects the Duration of Unemploy-

ment: Evidence from a Natural Experiment. *Journal of Labor Economics*, 24(2), 351–378. https://doi.org/10.1086/499976

van Ours, J. C. & Vodopivec, M. (2008). Does reducing unemployment insurance generosity reduce job match quality? *Journal of Public Economics*, 92(3-4), 684–695. https://doi.org/10.1016/j.jpubeco.2007.05.006

White, H. (1980). A Heteroscedasticity Consistent Covariance Matrix Estimator and a Direct Test for Heteroscedasticity. *Econometrica*, 48(4), 817–838. https://doi.org/10.2307/1912934

Wooldridge, J. (2002). *Econometric analysis of cross section and panel data.* Cambridge, Mass.: MIT Press.

New Impacts of Globalization
Introduction to a Selection of Papers Presented at the 66th Annual Congress of the French Economic Association

Flora Bellone*

Abstract – This special thematic feature on "New impacts of globalization" was developed, in partnership with the French Economic Association (*Association française de science économique*, AFSE), from the contributions presented at its 66th annual congress which took place in Nice in June 2017. The four articles published here illustrate the different channels by which a country's international openness impacts its wealth, employment and subnational inequalities. This introduction builds on these works to present some recent avenues of research for modelling and quantifying the impacts of globalization.

JEL Classification: F60, F34, F24, F16
Keywords: globalization, growth, employment, capital flows

* *Université Côte d'Azur, CNRS, GREDEG and Sciences Po, OFCE (flora.bellone@unice.fr)*

Received 25 October 2018
Translated from the original version: "Nouveaux effets de la mondialisation – Introduction à une sélection d'articles présentés au 66e Congrès Annuel de l'AFSE"

To cite this article: Bellone, F. (2018). New Impacts of Gobalization : Introduction to a Selection of Papers Presented at the 66th Annual Congress of the French Economic Association. *Economie et Statistique / Economics and Statistics*, 503-504, 79–85. https://doi.org/10.24187/ecostat.2018.503d.1958

Ten years ago, the crisis of 2008 exposed the flaws in some of our most well-established economic theories and sparked productive, in-depth scientific debate on macroeconomic and financial regulatory policies.[1] Today, it is the challenge to free trade agreements, particularly by the United States, and the threat of blocks to the World Trade Organisation (WTO) that are prompting reflection on the limitations of our theories in the face of the new challenges of globalization in the 21st century.

This special thematic feature on the "New impacts of globalization" is the result of a partnership between the *Association française de science économique* (AFSE) and the journal *Economie et Statistique / Economics and Statistics*. This partnership aims to publish a selection of articles presented at the AFSE's annual congress on one key topics discussed during the congress; these articles were selected jointly by the association and the journal.

During the AFSE's 66th Congress which took place in Nice on 19-21 June 2017 under the aegis of the Université Côte d'Azur research group on Law, Economics and Management (*Groupe de Recherche en Droit, Economie et Gestion*, GREDEG) and the French national centre for scientific research (CNRS), the topic of the new impacts of globalisation was chosen primarily due to the number of papers directly or indirectly dealing with this issue. Out of the 300 scientific papers presented at the congress, some were directly associated with international economics and many others, focusing on different topics (labour economics, banking and finanical economics, industrial economics, development and growth economics, etc.), referred to the present state of globalisation as one of the key factors in the mechanisms being studied.

The compilation featured here brings together a selection of contributions that each highlight a specific dimension of these new globalisation challenges. Issues concerning the impact of globalisation on employment conditions and wages in developed countries are examined first, before turning to emerging and developing countries to look at the extent to which financial globalisation creates new growth opportunities for these countries, but also new sources of instability.

The first article, by **Philippe Frocrain and Pierre Noël Giraud**, looks more specifically at the sensitive issue of the impact of globalisation on employment in the context of the French economy. It looks at how new trends combined with technological progress and lower transport costs are linked with changes in the employment structure in France. More specifically, the authors apply Jensen and Kletzer's (2005) methodology to classify business sectors, and the corresponding jobs, into "tradable" and "non-tradable" categories.[2] The article studies the developments in these two types of employment in France over the 1999-2015 period, first at aggregate level and then at employment region level. It also explores how the skill-based structure has developed in these two employment categories, and how relative wages have been impacted, particularly by the significant gains in labour productivity achieved in the tradable sectors over the period.

The findings of Philippe Frocrain and Pierre Noël Giraud are extremely interesting as they run counter to certain received ideas about employment developments in France. For example, while one might think that job growth is stronger in the tradable sectors than jobs in the non-tradable sectors, with an increasingly internationalized economy, the reverse can actually be seen in France with a significant decline in tradable jobs.

---

*1. See the contributions compiled, a decade after the crisis, in many special journal issues on the subject (*Economie et Statistique / Economics and Statistics, *n° 494-495-496, 2017;* Revue de l'OFCE, *vol. 153, 2017;* Journal of Economic Perspectives, *vol. 32, n° 3, 2018;* Oxford Review of Economic Policy, *vol. 34, n°1-2, 2018) and Saraceno (2017) for further reflection on the development of macro-economic thinking.*

2. The first covers all the sectors that produce internationally traded goods and services and whose jobs therefore compete with jobs in the same sectors in other countries. Conversely, the second cover the business sectors that produce goods and services that are, for the vast majority, consumed locally.

In terms of wage dynamics, a comparison between the tradable and non-tradable sectors also shows remarkable developments, particularly when contrasted with labour productivity dynamics.

The respective roles of trade openness and technological progress in these dynamics is not analysed causally in the article. However, it invites to continue the analysis in line with recent works.[3] It also prompts reflection on the future transformations that lay in store, driven by advances in artificial intelligence and the growth in teleworking and remote robotisation. These two future trends in the digital revolution should in fact radically change the boundary between tradable and non-tradable goods and services (Baldwin, 2016).

The second article, by **Gilbert Cette, Jimmy Lopez and Jacques Mairesse**, looks at the impacts of labour market regulations, and more specifically the impacts of legislation concerning employment protection, on the choice of combination of production factors in a context of globalisation. The analysis was carried out on sector-based data using both the OECD STAN database and EU-KLEMS which make it possible to precisely differentiate between different categories of employment according to their skills level, and different categories of investment, particularly investments in information and communication technologies (ICT) and, for the first time in this literature, R&D investments. The link with the issue of globalisation is the fact that the authors study to what extent an industry's level of international openess is a key factor, that conditions the expected effect of variations in the level of employment protection on firms' organisational choices of substitution between different categories of capital and labour. The authors's guess is thatthe degree of employment protection has a greater impact in terms of reducing R&D and ICT investments in the sectors that are more open to international competition. Interestingly, the findings only partly match those expected. On the one hand, the authors show that a high level of employment protection tends to significantly reduce ICT investments in sectors that are more open internationally (whereas this impact was not found significant for the industries considered as a whole). On the other hand, the authors do not find any greater reduction in R&D investments.

As regards economic policy, the authors defend the view that promoting higher flexibility in labour markets in OECD countries should be an effective measure to boost both R&D and ICT investments and the employment of unskilled workers, all the more so in sectors that are subject to intense international competition. While their findings are not fully supportive of this view, they do show that reforms in labour market legislation can have highly varied impacts depending on an industry's level of openness. Here, several avenues for taking the study further come to mind. Firstly, a distinction could be made between industries according, not just to their average level of openness, but rather to their level of exposure to the penetration of imports, and their export opportunities. It would also be worthwhile developing these analyses at country-industry level rather than using as a benchmark the degree of openness of the U.S. industries. This would allow to take into account the specific competitive advantages/disadvantages of each country.[4] Another extension would be to use corporate data to explore whether companies at different stages of internationalisation adapt differently to legislative restrictions concerning employment protection.

The next two articles look at emerging and developing countries. For these countries, more so than for industrialised countries, globalisation in the 21st century has unique characteristics that bring new opportunities and new challenges. Of the new opportu-

---

3. See in particular Autor et al. *(2013), Acemoglu* et al. *(2016) for the United States, Eliasson* et al. *(2012) and Eliasson & Hansson (2016) for Sweden, Malgouyres (2017) and Harrigan* et al. *(2016) for France, and Keer* et al. *(2016) for Finland.*

4. Gilbert Cette, Jimmy Lopez and Jacques Mairesse justify their decision of basing their study on the rate of openness of American industries in relation to the potential bias of endogeneity that would be associated with the use of the same measures developed at the level of each country-industry. An interesting potential extension would be to look for estimation strategies using instrumental variables that would make it possible to limit such bias, without however losing the benefit of measures specific to each country-industry.

nities, the first is the ease of international technology transfers brought about by the digital revolution (Baldwin 2016). Among the greatest challenges are the difficulty of transfering governance rules that are complementary to the implementation of certain technologies (Romer, 2010) and the significant vulnerability of emerging economies to international capital movements in the new era of financial globalisation (Ocampo & Stiglitz, 2008; Jeanne & Korinek, 2010; Butzen *et al*., 2014; Blanchard *et al*., 2017). The two articles presented here look at the latter area of thinking. Neither comprehensively addresses the challenges associated with international capital flows, but each sheds light on a different aspect of the new sources of financing open to developing countries in 21st century globalisation.

The article by **Imad El Hamma** looks first at the impact of migrants' remittances on economic growth in developing countries. The increase in remittance flows is one of the unprecedented features of the current phase of globalisation. For certain countries, migrants' remittances have become the leading source of external funding, before international assistance to developing countries and before private investment flows from foreign companies. In this article, the author studies the role of structural factors, such as the degree of financial development and the level of institutional quality, which condition the impact of migrants' remittances on the economic growth of the beneficiary countries. The analysis specifically focuses on countries in the MENA region (Middle East and North Africa) for which the author uses unbalanced panel data for the period 1985-2015.

This study is one of many empirical works that focus on both the external and internal sources of economic development. In this literature, the impact of migrants' remittances has already been the focus of particular attention and a review of these previous works is proposed by the author. Imad El Hamma's contribution raises several points. Firstly, existing research had not yet looked at the case of countries in the MENA region, as they mostly focused on the case of Latin American and Sub-Sahara African countries. Secondly, previous studies had not reached a consensus, particularly as regards knowing whether migrants' remittances played a substitution role or, on the contrary, a supplementary role as regards sources of domestic financing.

In the fourth article, **Ramona Jimborean** looks at the factors that explain the significant increase, over the last two decades, in bank loans to the private sector in emerging countries. The author assesses the risks of this increased debt in light of the present growth slowdown in emerging countries and American monetary policy tightening measures.

The article's contribution to the literature is the analysis that simultaneously considers domestic and international explanatory factors, whereas existing works look at these two types of factors separately. This joint analysis is made possible by using consolidated banking statistics provided by the Bank for International Settlements (BIS) for the 1993-2014 period. The findings support the fact that, in emerging countries, growth in private debt is linked with credit demand, real exchange rate appreciation, monetary policy changes, control of macroeconomic vulnerabilities and the soundness of the domestic banking system. Added to this are global factors with a negative impact on the volatility of the global financial market and a positive impact on the interest rates of the U.S. Central Bank. It would be worthwhile continuing the study to understand the connection between the determinants of growth in private sector debt in emerging countries and the level of vulnerability of these economies. We lack theoretical and empirical studies on these connections, which could enable us to provide better recommendations on fiscal and macroprudential policies and on the international coordination of policies in each country.

To conclude, the articles compiled in this special feature show the different channels by which the international openness of countries can impact their wealth, both in terms of volatility and long-term growth, their employment, and their subnational

inequalities. They also remind us that the mechanisms conceptualised in a framework of relatively closed economies can have different impacts in more open economic environments. As regards economic policy, they show that economists need to rethink all of their areas of work in view of the new challenges of globalisation, from trade and integration policies to macroeconomic and structural policies, and industrial and innovation policies.

More generally, the research programme that is starting to look at the new impacts of globalisation should help us to renew significantly our teaching on trade gains. Until now, we have been too limited to teaching from static international trade theories and from macro-economic and financial theories that are focused on the short-term. However, combined advances in endogenous growth theory and new international trade and localization theories have already shown that, for a given economy, the long-term impacts of more ambitious trade openness could be, not just significant, but also positive or negative.[5] In these dynamic analysis frameworks, the impacts of trade integration on growth in a given economy depends on many factors, including 1) the technological advantages and disadvantages initially acquired by the country, 2) the relative size of its trade partners, 3) the relative significance of the cost of transport and the cost of knowledge transfers, and lastly 4) the relative degree of the intra-sector, inter-sector and international mobility of resources.[6] Overall, these new models show that trade gains analysis must take better account of the role of the forces of economic agglomeration and dispersion within countries and between countries, that have a direct impact on the distribution of those gains.

The literature has, however, still not thoroughly explored all the scenarios of interest that would help better focus countries' competitiveness strategies according to their own geographic, historical and institutional environments. Moreover, the works that look at the impacts of countries' trade integration are still too disconnected from those that deal with the impacts of financial globalisation. Lastly, as regards the regulation of real and financial international flows, major economic institutions are increasingly inclined to recognise that they must be more proactive in their analyses and more innovative in their recommendations.[7] The challenge is to have better tools to forecast and quantify the impacts of changes in bilateral or multilateral trade agreements, not just on the participating economies, but also on third-party economies. It is also a question of improving economies' vulnerability to international capital movements. Finally, it is a question of providing countries with the best tools for establishing their own competitiveness diagnostic according to their unique position in the world's economic geography. □

5. A particular example are the divergence scenarios with disadvantageous specialisations explored by Grossman and Helpman (1991, Chapter 8), Redding (1999), Baldwin, Martin and Ottaviano (2001), Bellone and Maupertuis (2003).
6. See Bellone and Chiappini (2016) for a review of this literature.
7. Awareness by major institutions of the new challenges of globalization can be illustrated by the new foreign trade strategy for 2011-2021 recommended by the World Bank (World Bank, 2011) and by the opening statement of the OECD Secretary General in September 2017 based on the OECD report (2017).

BIBLIOGRAPHY

Acemoglu, D., Autor, D., Dorn, D., Hanson, G. H. & Price, B. (2016). Import Competition and the Great US Employment Sag of the 2000s. *Journal of Labor Economics*, 34(S1), S141–S198.
https://doi.org/10.1086/682384

Autor, D., Dorn, D. & Hanson, G. H. (2013). The China syndrome: Local Labor Market Effects of Import Competition in the United States. *American Economic Review*, 103(6), 2121–2168.
https://doi.org/10.1257/aer.103.6.2121

Baldwin R., Martin, P. & Ottaviano, G. (2001). Global Income Divergence, Trade, and Industrialization: The Geography of Growth Take-Offs, *Journal of Economic Growth*, 6(1), 5–37.

Baldwin, R. (2016). *The Great Convergence: Information Technology and the New Globalization*. Cambridge: Belknap Press of Harvard University Press.

Banque mondiale (2011). *Leveraging trade for Development and inclusive growth: the World Bank Group trade strategy, 2011-2021*. Washington, DC: World Bank.
http://documents.worldbank.org/curated/en/246421468340181118/Leveraging-trade-for-development-and-inclusive-growth-the-World-Bank-Group-trade-strategy-2011-2021

Bellone, F. & Maupertuis, M.-A (2003). Economic Integration and Regional Income Inequalities: The Competing Dynamics of Regional Wages and Innovation Costs, *Review of International Economics*, 11(3), 512–526.
https://doi.org/10.1111/1467-9396.00399

Bellone, F. & Chiappini, R. (2016). *La compétitivité des pays*. Paris : La Découverte.

Blanchard, O. J. Ostry, Gosh, A. & Chamon, M. (2017). Are Capital Inflows Expansionary or Contractionary? Theory, Policy Implications, and Some Evidence, *IMF Economic Review*, 65(3), 563–585.
https://doi.org/10.1057/s41308-017-0039-z

Butzen P., Deroose, M. & Ide, S. (2014). Déséquilibres mondiaux et flux bruts de capitaux, *Banque Nationale de Belgique – Revue économique*, 43–64.
https://www.nbb.be/fr/articles/desequilibres-mondiaux-et-flux-bruts-de-capitaux-1

Economie et Statistique / Economics and Statistics (2017). *La crise : 10 ans après*, N° 494-495-496, Octobre 2017.

Eliasson, K. & Hansson, P. (2016). Are workers more vulnerable in tradable industries? *Review of World Economics*, 152(2), 283–320.
https://doi.org/10.1007/s10290-016-0249-x

Eliasson, K., Hansson, P. & Lindvert, M. (2012). Jobs and exposure to international trade within the service sector in Sweden. *The World Economy*, 35(5), 578–608.
https://EconPapers.repec.org/RePEc:bla:worlde:v:35:y:2012:i:5:p:578-608

Grossman, G. & Helpman, E. (1991). *Innovation and Growth in the Global Economy*. Cambridge MA and London UK: MIT Press.

Harrigan, J. A., Reshef, A. & Toubal, F. (2016). The March of the Techies: Technology, Trade, and Job Polarization in France, 1994-2007, *NBER Working Papers* 22110.

Jeanne, O. & Korinek, A. (2010). Excessive Volatility in Capital Flows: A Pigouvian Taxation Approach. *American Economic Review*, 100(2), 403–407.
https://www.jstor.org/stable/27805028

Journal of Economic Perspective (2018). *Symposium: Macroeconomics a Decade after the Great Recession*, Vol. 32 N° 3.

Macmillan, M. & Rodrik, D. (2011). Globalization, structural change and economic growth. In: Bachetta M. & Jansen M. (Eds), *Making Globalization Socially Sustainable,* pp. 49–84. Genève : International Labor Organization and World Trade Organization.
https://www.wto.org/english/res_e/publications_e/glob_soc_sus_e.htm

Malgouyres, C. (2017). The Impact of Chinese Import Competition on the Local Structure of Employment and Wages: Evidence from France. *Journal of Regional Science*, 57(3), 411–441.
https://ideas.repec.org/a/bla/jregsc/v57y2017i3p411-441.html

Ocampo, J. A. & Stiglitz, J. E. (2008). *Capital Market Liberalization and Development*. Oxford: Oxford Economic Press.

OECD (2017). Making globalization work: Better lives for all. *OECD Key Issues Paper*.
https://www.oecd.org/mcm/documents/C-MIN-2017-2-EN.pdf

Oxford Review of Economic Policy (2018). *Rebuilding macroeconomic theory*, 34(1-2).
https://academic.oup.com/oxrep/issue/34/1-2

Pekkala Keer, S., Maczulskij, T. & Miliranta, M. (2016). Within and Between Firm Trends in Job Polarization: Role of Globalization and Technology, *ETLA Working Papers* 41.
https://www.etla.fi/en/publications/within-and-between-firm-trends-in-job-polarization-role-of-globalization-and-technology/

Redding, S. (1999). Dynamic Comparative Advantage and the Welfare Effects of Trade. *Oxford Economic Papers*, 51(1), 15–39.
https://doi.org/10.1093/oep/51.1.15

Revue de l'OFCE (2017). *Où va l'économie ?* N° 153.
https://www.cairn.info/revue-de-l-ofce-2017-4.htm

Rodrik, D. (2013). Unconditional convergence in manufacturing. *The Quarterly Journal of Economics*, 128(1), 165–204.
https://doi.org/10.1093/qje/qjs047

Romer, P (2010). What Parts of Globalization Matter for Catch-Up Growth? American Economic Review, 100(2), 94–98.
https://doi.org/10.1257/aer.100.2.94

Saraceno, F. (2016). *L'économie à l'épreuve des faits. Comprendre les controverses du passé pour éclairer les défis de la société*. Paris: Revue Banque Éditions.

The Evolution of Tradable and Non-Tradable Employment: Evidence from France

Philippe Frocrain* and Pierre-Noël Giraud*

Abstract – The objective of this paper is to investigate the evolution of employment in the tradable and non-tradable sectors in France over 1999-2015. We find that tradable employment makes up the minority of French employment and has decreased over this period, dropping from 27.5% to 23.6% of total employment. There has been significant restructuring within the sector: tradable services jobs now make up the majority of tradable jobs and have grown sharply, while employment has declined in the rest of the tradable sector (manufacturing, agricultural and mining industries). We also identify a large wage and labor productivity gap between tradable and non-tradable sectors. Finally, we examine the distribution of tradable jobs across French local labor markets, and how their development affects non-tradable employment locally. Using the empirical approach developed by Moretti (2010), we find that for every 100 tradable jobs created in a French employment area between 2008 and 2016, 80 additional non-tradable jobs were created within the same area.

JEL Classification: F16, F66, O52, R15, R23
Keywords: tradable, non-tradable, globalization, multiplier, local labor market, French employment structure

** Mines ParisTech, Centre for Industrial Economics, PSL Research University, CNRS UMR (philippe.frocrain@mines-paristech.fr; pierre-noel.giraud@mines-paristech.fr)*

Received on 25 August 2017, accepted after revisions on 14 July 2018

To cite this article: Frocrain, P. & Giraud, P.-N. (2018). The Evolution of Tradable and Non-Tradable Employment: Evidence from France. *Economie et Statistique / Economics and Statistics*, 503-504, 87–107. https://doi.org/10.24187/ecostat.2018.503d.1959

The distinction between primary, secondary and tertiary sectors, initially made by Fisher (1935), forms the basis of classification of economic activities. Nevertheless, it has lost some of its relevance due to the blurring of the line between industrial activities and service activities. Manufactured goods involve a growing share of services that are required to produce them or are sold with them (Crozet & Milet, 2017). Symmetrically, some services are produced on an "industrial mode" (Fontagné *et al*., 2014) and require infrastructures and equipment, such as communication networks, to be delivered. On the other hand, the sharp growth in international trade in recent decades has made it increasingly necessary to distinguish between activities exposed to international competition and those not exposed to it, found in primary, secondary and tertiary sectors. This distinction between the tradable and non-tradable sectors has been widely used in international economics, with special relevance for, inter alia, the effects of devaluation, the purchasing-power-parity theory of exchange rates, the determination of inflation in open economies, and the specification and estimation of international trade flows (Goldstein & Officer, 1979). To date, the vast majority of empirical studies associate the tradable sector with the primary and secondary sectors, implicitly assuming that services are not tradable (Gervais & Jensen, 2015). Yet recent advances in information and communication technologies have increased the tradability of a great number of products and especially services, providing employment opportunities and risks. Surprisingly, only very few studies – Jensen and Kletzer (2005), Hlatshwayo and Spence (2014) for the United States, and Eliasson *et al*. (2012), Eliasson and Hansson (2016) for Sweden – have done a detailed analysis of tradable and non-tradable employment. We contribute to this recent literature and to the debate on the effects of increased globalization on the employment structure of our economies by analyzing employment, wages, skills, and labor productivity patterns across tradable and non-tradable industries in France from 1999 to 2015.

The distinction between tradable and non-tradable jobs stems from the division of a country's economy into two parts. The tradable sector produces goods and services that can be produced in one country and consumed in another – in the specific case of tourism, it is foreign consumers who travel. The non-tradable sector produces to satisfy exclusively domestic demand. Jobs in the tradable sector, usually referred to as *tradable jobs*, compete with jobs in other countries. This does not just involve jobs in the manufacturing and agricultural sectors, but also all the jobs engaged in producing remotely deliverable services. Thus, we can expect the tradable sector to include, e.g., automobile workers, call centre employees, milk producers, and software engineers. It also includes jobs in tourism, which are partly supported by the movement of foreign consumers. International tourists clearly consume in the territory where production takes place. But in choosing between several destinations, they put jobs located in different countries in competition with each other. Jobs in the non-tradable sector, referred to as *non-tradable jobs*, are only in direct competition with jobs in the same country, and often even in the same place. High tariffs can explain why some jobs are sheltered from international competition. Others are sheltered for regulatory or institutional reasons, e.g. soldiers and politicians. However, the most frequent barrier to international trade is transport costs, in particular for activities that require physical proximity between consumers and producers. A typical example is hairdressing, which is not yet automated or remotely controllable, and for which international differences in price and quality do not justify cross-border movement of consumers. This applies to a number of other non-tradable jobs (e.g. bakers, physiotherapists, etc.).

In practice, it is not easy to identify precisely tradable and non-tradable jobs. The distinction is not made in national accounts, and no consensual method has emerged in the academic literature. Moreover, the boundary between the two categories is not fixed once and for all, because of technical and regulatory changes. We identify three main, not mutually exclusive, methods to classify tradable and non-tradable jobs. A large body of literature (e.g., De Gregorio *et al*., 1994; Dwyer, 1992; Dixon *et al*., 2004; Amador & Soares, 2017) uses trade statistics to classify as tradable the industries that produce goods and services of which a sufficient portion are traded. For instance, based on Portuguese firm-level data, Amador and Soares (2017) include in the tradable sector the industries that report an export-to-sales ratio above 15%. Using this criterion, they find that almost one quarter of non-manufacturing employment is tradable. A second approach (Bardhan & Kroll, 2003; Blinder, 2009; Blinder & Krueger, 2013; Jensen & Kletzer,

2010) determines offshorability[1] based on the task content of occupations. The idea is that tasks involving little face-to-face customer contact or having high information content are likely to be offshorable. As an example, computer programming meets the criteria – unlike childcare, which requires close physical proximity. An important limitation, as shown by Lanz *et al*. (2011), is that workers performing tasks considered tradable also tend to perform non-tradable tasks. In addition, different offshorability measures coexist, even among authors using the same database (Püschel, 2013). In this paper, we choose a third approach, using geographic concentration indexes as an indicator of tradability.

In a stimulating contribution, Jensen and Kletzer (2005) compute geographic concentration indexes for industries and occupations to estimate the number of tradable jobs in the United States, paying particular attention to the tradability of services. Industries that produce tradable goods and services need to be geographically concentrated in order to take advantage of increasing returns to scale and agglomeration economies, or access to transportation nodes and natural resources. Conversely, non-tradable activities are more spatially dispersed, as they tend to follow the geographical distribution of population and income. Indeed, trade costs are so high for non-tradable industries that supply and demand necessarily converge domestically. For instance, bakeries tend to be highly dispersed, as they almost exclusively serve local customers, while car manufacturers are more concentrated, as the tradability of their output allows them to take advantage of concentration. Helpman and Krugman (1985) demonstrated this intuition in a formal model, while Krugman (1991) computed locational Gini coefficients for 106 three-digit US manufacturing industries.[2] From a methodological standpoint, the approach of Jensen and Kletzer (2005) differs in the sense that they do not study pure geographical concentration of supply as in Krugman (1991), but rather geographical concentration of supply relative to local demand. A few studies have since used this approach to classify industries and occupations. Eliasson *et al*. (2012) and Barlet *et al*. (2010) focus on the tradability of services in the case of Sweden and France respectively. Hlatshwayo and Spence (2014) study the evolution of the tradable and non-tradable sectors in the United States. Our work differs from Barlet *et al.* (2010) in the sense that they focus on the tradability of services, while we are interested in the evolution of all tradable and non-tradable jobs in the French economy and analyze not only employment, but also wages, skills, labor productivity, geography, and the local employment multiplier effect of tradable jobs on non-tradable jobs.

According to our classification of tradable and non-tradable industries, tradable employment is still the minority in France. And increasingly so: its share of total employment has significantly decreased, from to 27.5% in 1999 to 23.6% in 2015. In the space of sixteen years, non-tradable employment increased by 2.78 million, while tradable employment dropped by 400,000. Interestingly, tradable employment has become more tertiary, which is consistent with the growing importance of services in world trade and global value chains. Jobs in tradable service activities now represent almost half of tradable jobs, and have experienced a higher growth rate than jobs in non-tradable services. This has not however been sufficient to compensate for the decline in the manufacturing, agricultural and mining industries. The fall in tradable employment has also been accompanied by a widening productivity gap between the two groups: labor productivity gains are much more dynamic in tradable than non-tradable sectors. We also observe a large wage gap: in 2015, the annual gross wage in tradable jobs was on average 27% higher than in non-tradable jobs. The gap does not seem to reflect a difference in the skills structure, which is remarkably similar in the two sectors.

We also analyze how employment evolved at the local labor market level (French employment areas) between 2008 and 2016. Since tradable industries are concentrated in certain areas, there are disparities in regional exposure to foreign competition. We show that the increase in tradable services primarily benefited major metropolitan areas. In contrast, the erosion of manufacturing employment affected a great number of less-dense local economies. Strikingly, we observe that the employment areas in which tradable employment has shrunk the most have often also been affected by the destruction of

1. It should be noted that the concept of offshorability, i.e. the ability to perform work from abroad, differs slightly from our definition of tradability as it does not include jobs in tourism, which cannot strictly be offshored but depend partly on foreign demand.

2. More recently, Gervais and Jensen (2015) proposed a theoretical framework formalizing the idea that the disparity between local supply and local demand is an indicator of the extent of trade in an industry.

non-tradable jobs, and vice versa. To identify a causal relationship, we follow the econometric approach proposed by Moretti (2010) to estimate local multipliers, i.e. the impacts of employment changes in the tradable sector on employment in the non-tradable sector. Our results confirm the significant local multiplier effect of tradable employment. From 2008-2016, for every 100 additional jobs created in the tradable sector in an employment zone in mainland France, 80 jobs were also generated in the non-tradable sector within the same area.

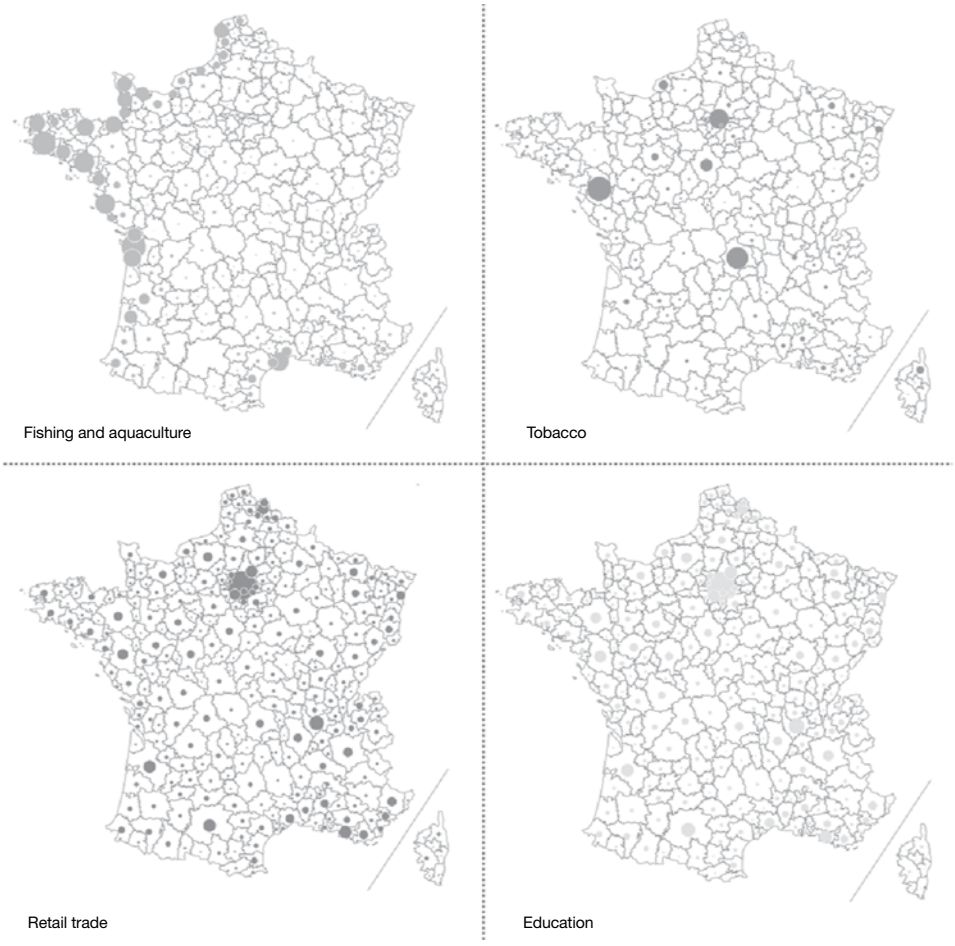
The remainder of this paper is organized as follows. The first section presents the classification used in this article and the methodology from which it is derived. In the second section we analyze employment trends and workers' characteristics in tradable and non-tradable sectors. The third section provides an estimate of local multipliers based on our classification of tradable and non-tradable jobs. The last section concludes.

Classification of Tradable and Non-Tradable Industries

Data and Methodology

Figure I depicts the distribution of employment across French employment areas for four industries. It illustrates the significant heterogeneity in the geographic concentration of production. Fishing and aquaculture jobs are concentrated in coastal areas, yet fish are consumed throughout France and even abroad. Although the presence of natural resources is determined by geography, these jobs are exposed to foreign competition if other countries propose similar or substitutable products. Similarly, 58% of jobs in "Tobacco products" are concentrated in three areas (Nantes, Clermont-Ferrand and Paris). In contrast, and as expected, jobs in "Retail trade" and "Education" are much more evenly distributed throughout France.

Figure I
Spatial Distribution of Employment, 2012



Produced using Philcarto: http://philcarto.free.fr.
Coverage: Naf rév. 2 A88, Metropolitan France.
Sources: Insee, Population Census 2012.

To measure geographic concentration, we compute Gini coefficients following the methodology of Barlet *et al*. (2010) based on the approach developed by Jensen and Kletzer (2005). Note that we use a different database. Our database includes more services (46 versus 36) than in Barlet *et al*. (2010), due to a change in the French classification of economic activities (NAF). Moreover, the number of employment areas have changed since their publication. In the rest of the paper, we indicate the NAF (rév.2) code in parentheses when referring to a particular industry.

We compute geographic concentration indexes to determine whether employment – a proxy for supply – in industry *i* is more concentrated than the demand it faces at the local level. If supply exceeds demand in a given area, then part of the production will necessarily be consumed outside the area, i.e. the output is tradable. Following Jensen and Kletzer (2005) and Barlet *et al*. (2010), we first compute the share of demand addressed to each industry in each employment area. Local demand for a given industry will vary depending on the amount of local household income and intermediate consumption from other industries.

All data come from Insee (the French National Statistical Institute). We use 2012 census data on local employment at the two-digit level (88 industries[3]) – the most disaggregated level for computing Gini coefficients and tracking the long-term evolution of employment – for 304 employment area,[4] and data on local population and median income for 2009.[5] We also use 2012 national Input-Output Supply and Use tables.[6] The demand share for industry *i* in employment area *ea* ($IDS_{i,ea}$) is calculated as follows:

$$IDS_{i,ea} = \sum_{j=1}^{J}\left(\frac{IC_{i,j}}{D_i} * \frac{EMP_{j,ea}}{EMP_j}\right) + \frac{HC_i}{D_i} * \frac{MINC_{ea}}{MINC_{tot}} * \frac{Pop_{ea}}{Pop_{tot}} \quad (1)$$

with:

– $IC_{i,j}$ the output of industry *i* used by sector *j* (intermediate consumption), $i \neq j$;

– D_i the demand for industry *i*'s products (final and intermediate consumptions, exports);

– $EMP_{j,ea}$ employment in industry *j* in area *ea*;

– EMP_j total employment in industry *j*;

– HC_i total household consumption of industry *i* products;[7]

– $MINC_{ea}$ the median income per consumption unit in employment area *ea*;

– $MINC_{tot}$ the median income in metropolitan France;

– Pop_{ea}: population in employment area *ea*;

– Pop_{tot}: population in metropolitan France.

The first term in (1) represents local demand for intermediate consumption. Importantly, with this term we take into account the fact that some non-tradable input suppliers might be concentrated because the downstream industry is itself concentrated. The second term is local household demand, assumed proportional to the employment area's population and median income. The higher the demand for industry *i*'s products in employment area *ea*, the higher the value of $IDS_{i,ea}$. Note that using this methodology we make three implicit assumptions, namely: (1) as input-output tables are only available at the national level, there are no local variations in the sectoral intermediate consumption structure, (2) output per worker is similar for local workers and national workers, and (3) income elasticity of final consumption is equal to 1.

We then compute a Gini coefficient (G_i) to determine whether an industry is more concentrated than the demand it faces. To compute the Gini coefficients we first need to sort employment areas by increasing order of local employment to local demand ratio, $\lambda_{i,ea} / IDS_{i,ea}$, with $\lambda_{i,ea} = EMP_{i,ea} / EMP_i$. Then we

3. Due to data availability we drop two industries from the initial 88 industries defined at this level of aggregation. The two industries not covered in national accounts are "Undifferentiated goods and services producing activities of private households for own use" (NAF code 98), and "Activities of extraterritorial organizations and bodies" (NAF code 99), which are very small in terms of employment so that their omission should not have a significant impact on results.

4. An employment area is a geographic area within which most of the labor force resides and works and in which employers can find most of the labor needed to fill available jobs. Due to data availability, we consider only metropolitan France, that is, 304 employment areas out of 322.

5. Data are taken from the Atlas des zones d'emploi 2010 *(Dares, Insee, Datar, 2012).*

6. We thank Insee for giving us access to this detailed data.

7. Total household consumption is the sum of household final consumption plus individual general government consumption expenditure in the supply and use table. We use public national account data on households' actual final consumption to complete the database when information is missing. Due to the lack of data on retail trade, except for motor vehicles and motorcycles, we assume that demand for this industry comes exclusively from households.

define the cumulative share of employment in industry *i* as:

$$\lambda_{i,ea(n)} = \sum_{ea=1}^{n} \lambda_{i,ea}$$

and the cumulative industry demand share as:

$$IDS_{i,ea(n)} = \sum_{ea=1}^{n} IDS_{i,ea}$$

The Gini coefficients can be written as:

$$G_i = 1 - \sum_{n=1}^{EA} \left[IDS_{i,ea(n)} - IDS_{i,ea(n-1)} \right] \left[\lambda_{i,ea(n)} + \lambda_{i,ea(n-1)} \right] \quad (2)$$

with $\lambda_{i,ea(0)} = IDS_{i,ea(0)} = 0$. Compared to a standard Gini coefficient, the baseline is the distribution of demand and not the uniform distribution of employment. In the case where employment in industry *i* strictly follows the spatial distribution of demand, the value of G_i is 0. On the contrary, a Gini coefficient equal to 1 corresponds to a situation where employment in industry *i* is concentrated in a single employment area while demand comes from other employment areas.

Admittedly, this methodology has some shortcomings. First, the calculated indexes may vary depending on the geographic unit used. This modifiable areal unit problem (MAUP), however, has only a limited impact in the case of France according to Barlet *et al.* (2010), who use three different geographic units. A second limitation when calculating Gini coefficients for only one period is that we assume static tradability over time. Third, production can be tradable and dispersed when not in an increasing return activity. Fourth, as pointed out by Collins (2010), domestic tradability does not necessarily imply international tradability, as transportation and transaction costs may differ. In particular, differences in language and legal frameworks are significant barriers to trade. Lastly, it is difficult to draw comparisons between countries, as detailed sectoral breakdown data are not available at the level of local labor markets for a panel of countries.

Choice of Tradability Threshold

The Gini coefficients inform us on an industry's degree of geographic concentration, but we still need to determine a threshold that separates the tradable and non-tradable sectors. This necessarily involves a degree of subjectivity. Jensen and Kletzer (2005) for instance consider that any activity with a Gini coefficient of over 0.1 is tradable. However, this threshold seems fairly irrelevant to our case since only 3 of the 86 sectors studied are situated below this figure. In other words, the concentration levels are on average higher in our estimations. This can result from the different sizes of the geographic units selected. The geographic division employed by Jensen and Kletzer (2005) for the United States (Metropolitan State Areas) corresponds to much larger areas. Yet the Gini coefficient tends to decrease as the size of the geographic unit increases (Barlet *et al.*, 2008). The tradability threshold of Barlet *et al.* (2010), which involves taking a threshold value corresponding to the Gini coefficient of the wholesale trade sector, is also unsuitable. It would lead us to include industries like "Public administration and defense" (84) and "Human health activities" (86) in the tradable sector. Since the tradability of the manufacturing sector is clearly identified in the empirical literature, the threshold value we select is the Gini coefficient of the least concentrated industry in that sector, i.e. "Repair and installation of machinery and equipment" (33). Therefore, industries with a Gini coefficient greater than or equal to 0.25 are considered as tradable. When the coefficient is below 0.25, jobs in the industry are non-tradable. This way of establishing the threshold value is similar to that used by Eliasson *et al.* (2012) for Sweden.

As expected, a high relative concentration of supply does not only concern the primary and secondary sectors. Some service industries also have very high Gini coefficients (Figure II), in particular "Air transport" (51), "Gambling and betting activities" (92), "Programming and broadcasting activities" (60), "Insurance" (65), and "Publishing activities" (58).[8] Other industries are located close to their clients or users (Table 2). Industries with a Gini coefficient lower than 0.25 include notably "Education" (85), "Human health activities" (86), "Retail trade" (47), "Public administration and defense" (84), "Other personal service activities" (dry cleaning-laundering, hairdressing, funeral services, etc.) (96), or "Services

8. We classify "Scientific research and development" (72) in the tradable sector without reporting a Gini coefficient. Since 2010, R&D is no longer considered as intermediate consumption expenditure, but as investment expenditure. Given that households do not consume this service, the demand measured at local level by the equation (1) is zero, so the Gini coefficient given by equation (2) is, by construction, equal to 1. Barlet et al. *(2010) have nevertheless shown that, with a Gini coefficient of 0.59 (well above our 0.25 threshold), this is one of the most concentrated sectors. The same problem arises for "Construction of buildings" (41). We consider this sector's employment, which is highly dispersed over the territory, as non-tradable.*

to buildings and landscape activities" (81). Obviously, a significant share of non-tradable employment corresponds to core services provided by the government throughout the country. Consequently, in what follows we sometimes break down non-tradable employment into a non-market component, grouping codes 84 to 88 of the NAF, and a market component, grouping all of the other divisions in the non-tradable sector. A complete list of the 86 industries and their classification can be found in the Appendix (see Table A1).

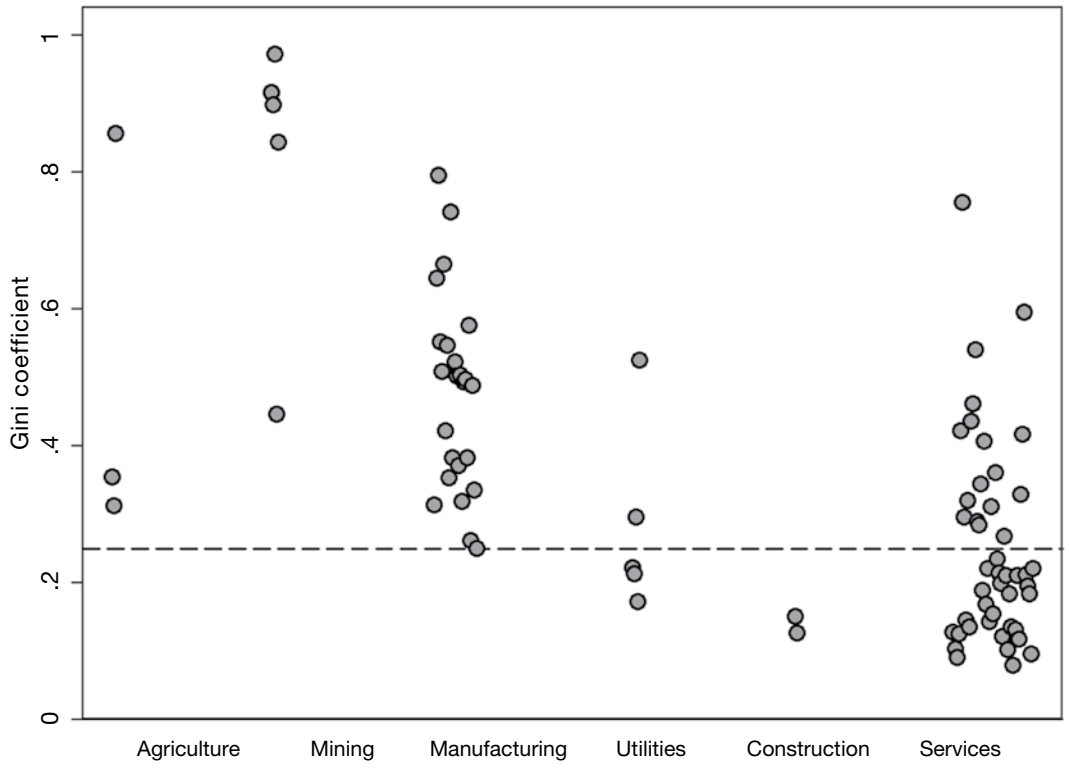
Tradable and Non-Tradable Employment in France

National Employment Trends

To study the evolution of tradable and non-tradable employment in France, we use national accounts data (Insee) on total employment by industry. We assume that the classification of industries established for 2012 does not vary throughout the period 1999-2015. Due to a change in the French classification system in 2008, it would be impossible for us to compare the Gini coefficients calculated for 1999 with those of 2012. Our results indicate that the share of tradable jobs significantly decreased between 1999 and 2015, dropping from 27.5% to 23.6% of total employment. This drop was very sharp from 2001 up to the financial crisis (2009-2010), and then less pronounced. In volume, the tradable sector lost around 400,000 jobs, while the non-tradable sector increased by 2.78 million (Figure III).

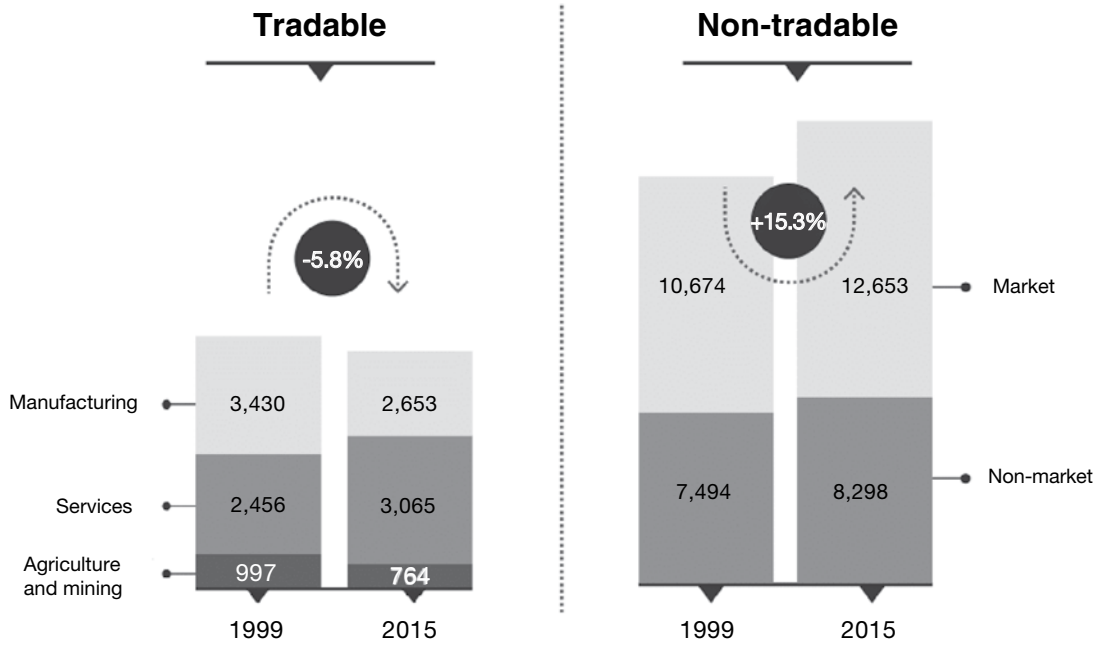
Perhaps more interesting is the increasingly tertiary nature of tradable jobs. Currently, almost one tradable job in two (47.3%) is in services, compared to 35.7% in 1999. While manufacturing, agriculture and the mining industry saw a considerable drop in their workforce, tradable services created a total of 610,000 jobs. Job creations in tradable services accelerated sharply from 2006 and slowed down very little during the crisis. Moreover, from 1999 to 2015, they increased much faster than non-tradable services and the non-tradable market sector (+24.8% compared to +14.5% and +18.5%). The most dynamic tradable services were "Activities of head offices,

Figure II
Gini Coefficients, 2012



Coverage: Naf rév.2 A88, Metropolitan France. The X-axis corresponds to the NAF code of each industry but we report only six broad sectors.
Sources: Insee, Population Census 2012, National Accounts and *Atlas des zones d'emploi*; authors' calculations.

Figure III
Employment Changes in Tradable and Non-Tradable Sectors (Thousands), 1999-2015



Sources: Insee, National Accounts; authors' calculations.

management consultancy activities" (70), +195,000; "Computer programming, consultancy and related activities" (62), +141,000; "Scientific research and development" (72), +81,000; as well as activities connected to tourism: "Creative, artistic and performance activities" (90), +69,000, and "Accommodation" (55), +47,000. While concerns have been raised about the recent increased tradability of services, our results suggest that this has not led to massive offshoring.

However, the growth in tradable service jobs has not counterbalanced the drop in other parts of the tradable sector. "Crop and animal production, hunting and related services" (1) dropped the most (-206,000), followed by traditional industries such as "Manufacture of wearing apparel" (14), -89,000, and "Manufacture of textiles" (13), -61,000, while industries like "Manufacture of motor vehicles, trailers and semi-trailers" (29) and "Manufacture of computer, electronic and optical products" (26) also contracted considerably (respectively -69,000 and -60,000). The fall in manufacturing employment results from a combination of factors: a strong productivity growth along with consumers' reduced sensitivity to price reductions on manufactured goods (low price elasticity of demand for manufactured goods); a change in the structure of household expenditure, including an increasingly large amount of services; outsourcing of some activities to specialized companies in the tertiary sector; and lastly, international competition, in particular from emerging countries. While in the 1990s there was a broad consensus that job losses were mostly attributable to technology, the surge in Chinese imports, a new focus in the literature on offshoring based on "trade in tasks" (Grossman & Rossi-Hansberg, 2008) have reopened the debate on the role of international trade in manufacturing employment decline. For instance, Chinese import competition could explain 13% of the recent decline in French manufacturing employment (Malgouyres, 2017), and around 25% in the case of the US (Autor *et al.*, 2013). According to Acemoglu *et al.* (2016), almost half of these job losses are concentrated in upstream industries, impacted through inter-industry linkages.[9]

In the non-tradable sector, the largest increases in employment were recorded in "Human health activities" (86), +364,000, the construction sector (41-43), +347,000, "Residential care activities" (87), +277,000, and "Food and beverage service activities" (56), 243,000. "Activities of membership organizations" (94) and "Public administration and defense"

9. The respective impacts of technological change and trade on the decline in manufacturing employment are still under debate. See Demmou (2010) for an evaluation of the significance of these structural determinants in the decline of industrial employment in France from 1980 to 2007.

(84) are the two non-tradable industries that destroyed the most jobs (respectively -184,000 and -114,000). The non-tradable market sector, with 1.98 million jobs created (+18.5%), was overall more dynamic than the non-market non-tradable sector, where employment increased by 804,000 (+10.7%).

The evolution of the employment structure in France is remarkably similar to that observed in the United States. During the same period, Hlatshwayo and Spence (2014) estimate that US tradable employment went from 30% to 26.3% of total employment, and decreased in volume (-3.4 million units). Like in France, the drop in manufacturing and agricultural employment was not counterbalanced by more jobs in the tradable service sector, while the number of non-tradable jobs increased dramatically. Eliasson and Hansson (2016) find a much larger share of tradable jobs in the case of Sweden (almost 40% of total employment in 2010). Between 1990 and 2005 they do not identify a significant change in employment, either in the tradable sector or in the non-tradable sector. However, the period also saw a shift towards tradable service activities within the Swedish tradable sector.

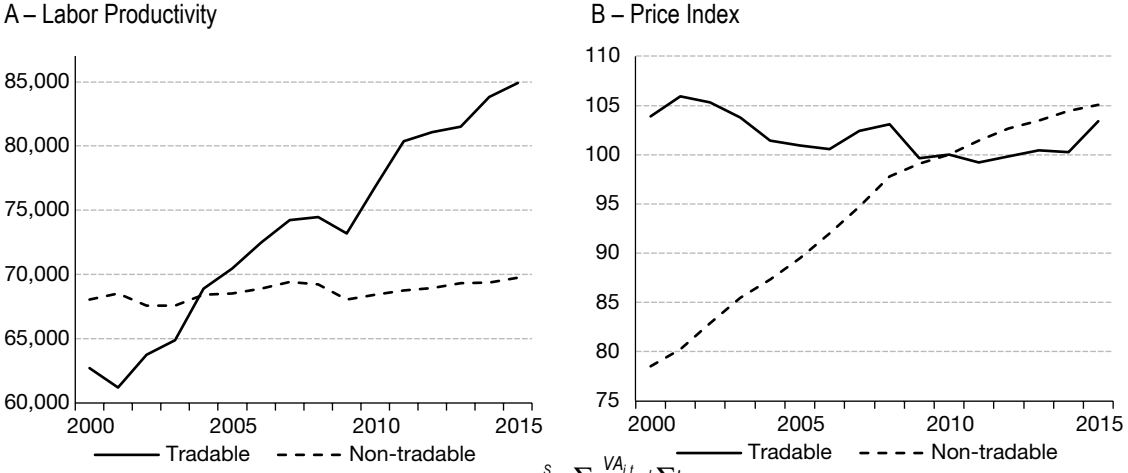
Labor Productivity, Wages and Skills

The distinction between tradable and non-tradable jobs reveals significant differences in labor productivity, defined here as real value added per worker in full-time equivalent. We observe much larger productivity growth in the tradable sector (Figure IV-A) between 2000 and 2015. The productivity differential may be explained by a rationalization effect of international trade: in Meltitz-type models (Melitz, 2003) with heterogeneous firms, trade leads to the intra-sectoral reallocation of resources. Put simply, foreign competition pushes the least productive domestic firms out of the market, and allows the most productive ones to extend their market shares. In addition, Timmer *et al.* (2014) showed that, within global value chains, advanced nations increasingly specialize in high value added activities. Another explanation may be that the shrinking tradable sector pushes the least able workers away (Young, 2014) and keeps the most productive ones. Perhaps as important in our opinion, this productivity gap may largely reflect the fact that numerous non-tradable service activities are still difficult to automate because they involve a high degree of social interaction (caregivers, psychiatrists, beauticians, etc.) or precision (hairdressers, cooks, decorators).

There is also a significant wage gap between tradable and non-tradable jobs. In 2015, workers gross annual wage (full-time equivalent) in the tradable sector was on average 27% higher, i.e. an annual difference of 9,156 euro.[10] Wages are also higher in tradable services, with an average annual gross wage of 48,279 euro

10. In the absence of detailed industry-level data for the self-employed (2.5 million people in France) at this level of sectoral disaggregation, we cannot generalize this result to all workers.

Figure IV
Price and Labor Productivity in Tradable and Non-Tradable Sectors, 2000-2013



Note: Labor productivity (in euros) at time t in sector $S=\{T,NT\}$ is $\varphi_t^S = \sum_{i\in S} \frac{VA_{i,t}}{PVA_{i,t}} / \sum_{i\in S} L_{i,t}$, where $VA_{i,t}$ is gross value added at current prices for each industry in sector S, $PVA_{i,t}$ is the price index of gross value added at time t for each industry in sector S (using 2010 as base year), and $L_{i,t}$ is full-time employment at time t in each industry in sector S. The price index at time t in sector S is $P_t^S = \sum_{i\in S} \omega_{i,t} PVA_{i,t}$, where $\omega_{i,t} = VA_{i,t} / VA_t^S$.
Sources: Insee, National Accounts; authors' calculations.

compared to 40,633 euro in manufacturing industries (see Table 1). This result is in line with Jensen and Kletzer (2005) and Eliasson *et al.* (2012) for the United States and Sweden, respectively.

Perhaps surprisingly, this wage gap does not reflect a difference in workers' educational attainment. Table 1 shows that tradable and non-tradable sectors have a very similar skills structure.[11] In the tradable sector, college graduates are principally employed in services. In the non-tradable sector, the share of college graduates is higher in non-market industries (46%), and particularly concentrated in health, education and administration, while workers in residential social-medical and social institutions and non-residential social action do not have a high school diploma. The skills structure of the market non-tradable sector is similar to the manufacturing sector, with less than one-third of college graduates. A higher wage in tradable industries is however consistent with the literature showing that exporters pay higher wages than non-exporters (Bernard & Jensen, 1995, 1997). Recent studies using matched employer-employee data find significant exporter wage premia, even after controlling for observable and unobservable individual characteristics (e.g., Schank *et al.*, 2007). The main usual explanation for the exporter wage premium is the higher productivity of exporting firms. Higher wages in the tradable sector are thus consistent with the productivity gap observed between the two sectors.

Interestingly, although significant productivity gains in the tradable sector may explain part of the wage differential, they have largely benefited non-tradable workers. The wage gap between tradable and non-tradable employees has in fact grown at a much slower pace than the productivity differential. From 2010 to 2015, the productivity ratio between tradable and non-tradable activities went up by 9.4 percentage points, while the wage ratio only increased by 1.6 percentage points.[12]

A classic "Balassa-Samuelson" effect (Balassa, 1964; Samuelson, 1964) can explain this phenomenon. According to this effect,

11. Note that the skill structure is similar even when broken down into 11 education levels.

12. Two mining industries, "Mining of coal and lignite" (05) and "Mining of metal ores" (07), for which value added was nil for several years are excluded from the calculation of tradable sector productivity and price index.

Table 1
Mean Wage and Education Attainment in the Tradable and Non-Tradable Sectors

Tradable	€ / %	Variation (%)	Non-tradable	€ / %	Variation (%)
All			*All*		
Mean yearly wage	43,258	8.8	Mean yearly wage	34,103	7.4
With no high school diploma	40.6	-14,2	With no high school diploma	41.9	-7,4
With high school diploma	18.8	-1,6	With high school diploma	20.4	4.8
With college diploma	40.5	9.3	With college diploma	37.7	10.3
Manufacturing			*Market*		
Mean yearly wage	40,633	8.1	Mean yearly wage	35,953	7.5
With no high school diploma	50.6	-16.6	With no high school diploma	46.5	-9.0
With high school diploma	18.3	-1.8	With high school diploma	21.8	3.6
With college diploma	31.1	5.6	With college diploma	31.7	13.8
Tradable services			*Non-market*		
Mean yearly wage	48,279	9.1	Mean yearly wage	31,497	7.4
With no high school diploma	24.5	-8.8	With no high school diploma	35.5	-4.5
With high school diploma	17.7	-3.0	With high school diploma	18.5	6.7
With college diploma	57.9	11.1	With college diploma	46.0	7.1

Notes: Yearly mean gross wage (including employee social security contribution but excluding employer social security) per worker in full-time equivalent in thousands of euro for the year 2015. Variation between 2010 and 2015. Skill structure in percentage for the year 2014. Variation rate in the number of workers for each category between 2010 and 2014. Census data provide information on the number of workers by education level for each industry. We aggregate the eleven educational levels into three categories: with no high school diploma, with high school diploma, with college diploma.
Sources: Insee, National Accounts, Population Census (2010-2014).

greater productivity growth in tradable industries translates into a rise in the relative price of non-tradable goods and services. Indeed, when productivity increases in the tradable sector, the wages of tradable workers go up because prices for tradable goods and services are set in international markets. Therefore, firms in the non-tradable sector also have to increase wages to prevent their employees from looking for work in the tradable sector where wages are higher. These wage increases for non-tradable workers can only be achieved through price increases, since productivity has remained the same in the non-tradable sector. As shown by Figure IV-B, prices in the non-tradable sector did in fact increase sharply while they went down slightly in the tradable sector. The impact of a productivity shock in the tradable sector on relative prices is closely dependent on labor mobility. When intersectoral mobility is high, non-tradable firms have to increase their prices significantly to align their wages with those of the tradable sector. Consumer preferences for non-tradable goods and services are also important. If consumers have strong preferences for non-tradable products, then the additional income generated by the increased productivity in the tradable sector will disproportionately benefit the non-tradable sector, pushing the price of these products even higher. The dynamics of relative prices may also be explained by the intensity of competition in the non-tradable sector. Due to greater protection of non-tradable markets, companies are freer to fix their prices and therefore tend to set them high. Bénassy-Quéré and Coulibaly (2014) show for instance that the divergence of relative prices within the European Union is explained in part by differences in the degree of regulation for product and labor markets. Lastly, a drop in real interest rates can trigger a faster increase in the prices of non-tradable goods and services. Piton (2016) identifies three mechanisms: 1) a higher demand for non-tradable products, following a drop in interest rates, cannot be satisfied by imports (Dornbusch, 1983); 2) the non-tradable sector is often more dependent on bank loans, especially in real estate (Reis, 2013); 3) the non-tradable sector may be more labor-intensive than the tradable sector and therefore benefit less from the drop in the cost of capital (Piton, 2017).

Strikingly, net destructions of jobs between 2010 and 2014 only concerned low-skilled workers, while the number of high-skilled workers increased in both tradable and non-tradable activities. This evolution is in line with that reported by Jensen and Kletzer (2005) who indicate – but for 1998-2002 – a general drop in low-skilled employment in the US and a steep rise in skilled employment in tradable services and the non-tradable sector. Interestingly, the erosion of low-skilled employment appears to be less pronounced in the non-tradable sector. While the number of workers without a high school diploma is rapidly declining in a large number of tradable sectors due to automation and competition from countries with low labor costs, some non-tradable industries have been relatively spared. For instance, services to buildings and landscape activities (81), along with residential care activities and social work activities without accommodation (87-88), are a kind of refuge for low-skilled workers.

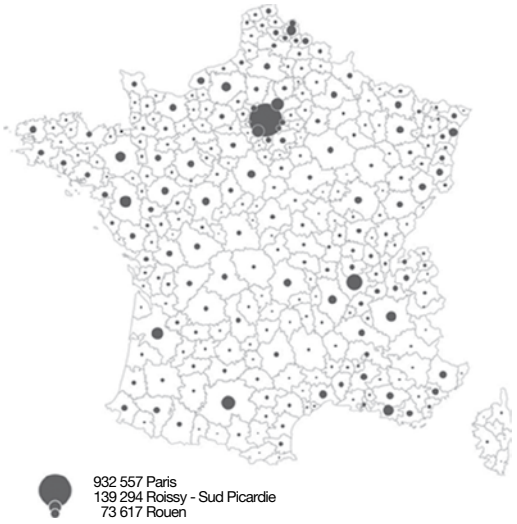
Geography

As a reminder, non-tradable jobs more or less follow the geographic distribution of their clients, unlike tradable jobs, which can produce far from the final consumer and therefore tend to be concentrated. The employment areas that feature the greatest number of tradable jobs are urban zones corresponding to the main French metropolitan areas, i.e. Paris, Lyon, Toulouse, Bordeaux, Nantes, Marseille, etc. (Figure V-A). The leading ten zones thus concentrate one third of French tradable employment. On the other hand, in relative terms, most tradable jobs are found in employment areas with few inhabitants. These are located in western France (Figure V-B), on a long strip of land going from Cognac (Charente), which specializes in producing brandy, to Vire (Calvados) in the northeast, which specializes in dairy processing, and in Auvergne and the Midi-Pyrénées. These zones are usually characterized by a high share of manufacturing jobs.

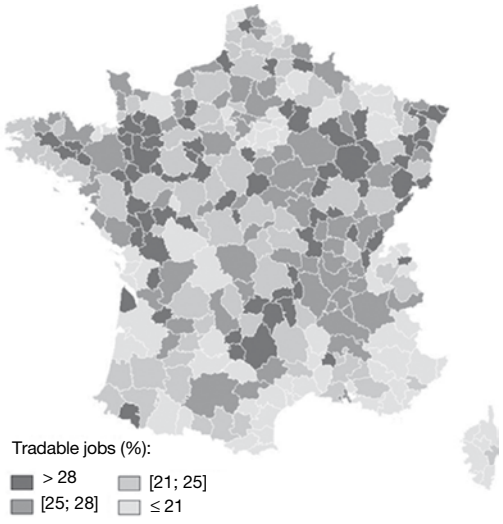
The Mediterranean coast is, on the contrary, the area in which tradable jobs represent the lowest shares of total employment. In this area, tradable sector employment is mainly composed of jobs in tradable services (Figure VI). Along with services linked to tourism, numerous workers are engaged in activities with higher added value (digital, R&D, corporate headquarters, etc.) in employment areas like Aix-en-Provence, Cannes-Antibes, and Marseille-Aubagne. However, this is insufficient to counterbalance the proportion of non-tradable jobs in the region.

Figure V
Number and Share of Tradable Jobs, Employment Areas (2012)

A – Number



B – Share

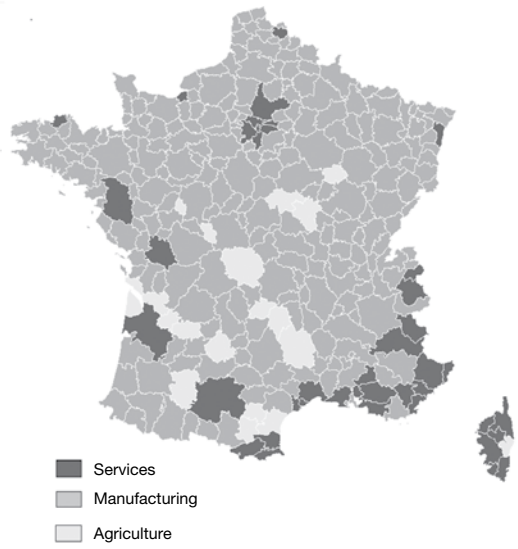


Produced using Philcarto: http:\\philcarto.free.fr.
Coverage: 304 employment areas of Metropolitan France.
Sources: Insee, Population Census 2012; authors'calculations.

Tradable services represent almost one tradable job in two nationally, but they are the majority component of tradable employment in only 41 of the 304 employment areas (Figure VI). They are concentrated around some of the major French cities and tourist areas. These 41 employment areas (37% of tradable employment) together account for 60% of national employment in tradable services. Agricultural employment only dominates tradable employment in a handful of rural employment areas, mostly located in the south of France. In the rest of the country, i.e. in 80% of employment areas, the manufacturing industry (41% of tradable employment) dominates the tradable sector.

This suggests that the continued drop in manufacturing employment, and to a lesser extent agricultural employment, is likely to destabilize a large number of local economies. Conversely, the growth of tradable services is likely to mostly benefit a reduced number of dense employment areas. Indeed, this is what we observe from 2008 to 2016 (Online complements C3 and C4).[13] Only 30 out of 304 employment areas saw an increase in manufacturing employment during that time. These zones of industrial resistance include for example Toulouse (aerospace), Figeac (aerospace), and Saint-Nazaire (shipbuilding). Deindustrialization is thus affecting most employment areas. Unsurprisingly, the traditional French industrial regions

Figure VI
Major Industry Within Tradable Employment, 2012



Produced using Philcarto: http:\\philcarto.free.fr.
Coverage: 304 employment areas of Metropolitan France.
Sources: Insee, Population Census 2012; authors'calculations.

(Hauts-de-France, Grand-Est, and Île-de-France) are undergoing the most deep-seated reorganization, while industrial employment is resisting better in the west. A non-negligible

13. We use the Acoss (Agence centrale des organismes de sécurité sociale) database to study the spatial distribution of jobs from 2008 to 2016. Note that it only concerns payroll employment, and excludes agricultural employees, households employing domestic personnel, and employees of public bodies.

number of these areas are also experiencing a drop in employment in tradable services. In other areas, employment in tradable services is sufficiently dynamic to compensate for deindustrialization. This mainly includes several major metropolitan areas (Nantes, Paris, Bordeaux, Montpellier, Lille, and Lyon). Finally, a small number of areas have seen an increase in both manufacturing and tradable services employment (Toulouse, Saint-Nazaire, Saint-Malo, Vitré, Chinon, Mont-Blanc, Salon-de-Provence, Les Sables d'Olonne, Ambert, and Corsica). Overall, though, only 14% of employment areas experienced an increase in tradable jobs from 2008 to 2016 (Online complement C1-I).

The growth of non-tradable employment is more widespread, concerning around half of employment areas (Online complement C1-II). However, the gains are highly concentrated: almost 60% of the non-tradable employment growth is concentrated in ten large metropolitan areas (representing 35% of non-tradable employment at the beginning of the period). Strikingly, the employment areas where non-tradable employment has dropped sharply (Centre, Bourgogne, Champagne-Ardennes, Lorraine) are often also areas that have been subject to a significant destruction of tradable jobs, and vice versa. This relation may be causal. Indeed, non-tradable jobs are highly dependent on the evolution of aggregated local income because their clients are mostly local, unlike tradable jobs, which satisfy scattered demand. We look at this issue in the next section.

The Local Multiplier Effect of Tradable Employment in France

Moretti (2010, 2011) has developed an econometric approach for estimating local employment multi- pliers, i.e. the number of non-tradable jobs created in a given area following an exogenous increase in the number of tradable jobs within the area. He finds a multiplier of 1.6 for US cities between 1980 and 2000, including only manufacturing industries in the tradable sector. We contribute to this recent literature by estimating the local employment multiplier effect for French employment areas between 2008 and 2016. The theoretical basis of Moretti's empirical approach builds upon the Rosen-Roback spatial general equilibrium model (Rosen, 1979; Roback, 1982) and is briefly outlined below.

Conceptual Framework

We assume that each employment area is a competitive economy that uses labor to produce tradable and non-tradable goods and services. Prices for tradable goods and services are set in international markets, whereas prices for non-tradables are determined locally. Workers are perfectly mobile across industries within an employment area, so that marginal product and wages are equalized locally in the long run. Workers' indirect utility depends on the local wage net of living costs and on idiosyncratic preferences for location. Idiosyncratic preferences for location hamper labor mobility across areas, implying a finite elasticity of local labor supply (upward-sloping local labor supply curve). The elasticity of local labor supply is also affected by local unemployment rates. Therefore, if local unemployment and geographical mobility of labor are low, then an increase in local labor demand mostly results in higher local wages and not in higher employment. Finally, the local housing supply is not fixed and depends on geography and land use regulations. Assuming upward-sloping local labor and housing supply curves, Moretti (2010, 2011) departs from the Rosen-Roback framework in which any shocks to local labor markets are fully capitalized in the price of land.

Let us consider the case of a permanent increase in tradable industry *j* labor demand in employment area *ea*. This could occur e.g. if the local economy manages to attract a new firm or if the labor productivity of a pre-existing firm increases. With these new tradable workers, the number of local jobs increases (direct effect). Therefore, the local aggregate income has to increase, triggering additional demand for tradable and non-tradable goods and services (indirect effect). It also pushes up local prices, as local labor and housing supply curves are upward sloping (general equilibrium effects). The multiplier effect on non-tradable employment is unambiguously positive and translates into a lower local unemployment rate and/or labor migration from other employment areas. The magnitude of the multiplier depends on several factors. First, if households have strong preferences for non-tradable goods and services, they will spend a large fraction of additional income on those products. Second, it depends on technology in the non-tradable sector. Labor-intensive technology implies that additional demand is met principally by hiring new workers. Third,

the magnitude of the local employment multiplier is also affected by the type of new jobs created in the tradable sector. For a given number of tradable job creations, local aggregate income increases more when high-paying jobs are created. Fourth, it depends on the offsetting general equilibrium effects induced by changes in local prices. Higher wages and housing costs will increase production costs, reducing the supply of non-tradable products. Low elasticities of local housing and labor supplies imply large offsetting general equilibrium effects and hence a low multiplier. But since labor and housing supply are not perfectly inelastic, negative general equilibrium effects only partially undo the first positive income effect. The increase in labor costs also negatively impacts tradable employment in firms that are not directly affected by the increase in demand. Indeed, they cannot increase their prices to compensate for higher labor costs as tradable prices are set in international markets. This lowers their competitiveness, unless agglomeration economies are sufficiently large to compensate for the increase in factor prices. Of course, tradable intermediate input suppliers may benefit from an increase in tradable industry *j*'s production. However, these suppliers are not necessarily located in the same employment area. Therefore, the local multiplier effect on tradable employment should be quantitatively smaller than the local multiplier effect on non-tradable employment.

Econometric Approach

Following Moretti (2010), we estimate the elasticity of non-tradable local employment with respect to tradable local employment using the following model (Model 1):

$$\Delta NT_{ea,t} = \alpha_1 + \beta_1 \Delta T_{ea,t} + \gamma_1 d_t + \varepsilon_{ea} \quad (3)$$

where $\Delta NT_{ea,t}$ and $\Delta T_{ea,t}$ are, respectively, the change over time in the log number of jobs in the non-tradable and tradable sectors in employment area *ea*. The period covered in this paper runs from 2008 to 2016. For each employment area we include two observations, corresponding to two time intervals 2008-2012 and 2012-2016. We introduce an indicator d_t for the second period, and an error term $\varepsilon_{ea,t}$. The β_1 coefficient is the elasticity of non-tradable to tradable employment.

A one-percent increase in the number of tradable jobs is associated with a β percent increase in non-tradable employment. To obtain the value of the local multiplier, we simply multiply the estimated β_1 by the relative size of the non-tradable sector over our two periods, i.e. the number of non-tradable jobs for each tradable job:

$$Multiplier = \frac{NT_{2008} + NT_{2012}}{T_{2008} + T_{2012}} \quad (4)$$

The local multiplier gives the number of jobs created in the non-tradable sector for one additional job in the tradable sector. Alternative specifications are estimated. The effect of tradable jobs on other tradable jobs (Model 2) is estimated by randomly splitting tradable industries into two parts:

$$\Delta T^1_{ea,t} = \alpha_2 + \beta_2 \Delta T^2_{ea,t} + \gamma_2 d_t + \varepsilon_{ea,t} \quad (5)$$

Unlike other studies, we estimate separate elasticities for the market and non-market non-tradable sectors (Model 3). Indeed we anticipate that the multiplier effect of tradable jobs is lower on non-market non-tradable jobs than on market non-tradable jobs because part of the non-market non-tradable sector is funded from national taxation and therefore less sensitive to local income variations.

OLS estimation will likely lead to inconsistent estimates if there are unobserved time-varying local shocks affecting employment growth in both sectors. As pointed out by Moretti and Thulin (2013), shocks to the labor supply of an employment area due, for instance, to changes in crime rates, schools, air quality, public services, or taxes, may induce bias. The sign of the bias can be either positive or negative, depending on whether the shock is correlated positively or negatively with changes in tradable employment. For instance, improvements in the quality of infrastructures in an employment area will attract new tradable activities while at the same time facilitating workers' migration to the area, thus increasing demand for non-tradable products and employment in the non-tradable sector. This would result in an upward bias in the OLS estimator of the elasticity of non-tradable to tradable employment. Conversely, the estimate would be biased downward if a local government reacted to the decline in non-tradable jobs in the area by encouraging employment creation in the tradable sector through subsidies. Another potential concern is that of reverse causality. For instance, the creation of a new university campus in a given employment area may induce some tradable firms to move to this area to

benefit from a pool of skilled workers and local knowledge spillovers. To estimate the causal effect of tradable employment growth on non-tradable employment growth, we need to isolate exogenous shifts in demand for tradable employment. Following Moretti and Thulin (2013) we use a classic "Bartik-instrument" (Bartik *et al.*, 1991). The idea is to isolate local variations in tradable employment caused by national shocks from the variations resulting from local specificities. The instrumental variable for Model 1 is constructed as:

$$\sum_{j \in J} \left\{ \frac{T^{j}_{ea,t}}{T^{J}_{ea,t}} \left[\ln\left(\sum_{ea' \in EA} T^{j}_{ea',t+4} \right) - \ln\left(\sum_{ea' \in EA} T^{j}_{ea',t} \right) \right] \right\} \quad (6)$$

where $\frac{T^{j}_{ea,t}}{T^{J}_{ea,t}}$ denotes the share of tradable industry j in total tradable employment of employment area ea at period t. The term in brackets is the nationwide change in employment between t and $t + 4$ in tradable industry j (excluding employment area ea itself). Thus an employment area is affected by national trends in proportion to its initial industry mix. Arguably, as long as national changes are not driven by specific economic conditions in a given employment area, the instrument captures exogenous changes in local labor demand.

Data and Results

We use Acoss (*Agence centrale des organismes de sécurité sociale*) data on payroll employment for the period 2008-2016. Data are available at the two-digit industry and employment area level. However, these data do not cover agricultural employees, households that employ domestic personnel, and employees of public bodies. Each of the 304 employment areas of mainland France is observed over two four-year time intervals, so that our database contains 608 observations.

Table 2 displays the results for the local multiplier in France between 2008 and 2016. Columns (1) and (2) present OLS estimates. In column (2), we control for other covariates – local unemployment rates, total local labor force, and the share of local non-tradable employment at the beginning of each period – and introduce regional fixed effects. In both columns the elasticity is positive and significant. However, as explained earlier, OLS estimates are likely to suffer from reverse causality or omitted variable bias, so that instrumental variable estimates are preferred. Our estimate obtained with the Bartik-instrument in column (5) indicates that, over the period, for every 100 tradable jobs created in an employment area in mainland France, 80 additional non-tradable jobs were created within the same area (i.e. a local multiplier of 0.8). This result is robust to the inclusion of additional controls and regional fixed effects, with a point estimate of 0.88 (column (6)). A comparison of OLS and IV results reveal that IV estimates provide significantly higher coefficients, suggesting that OLS estimates are biased downward.

We find a significant but lower multiplier effect of tradable jobs on other tradable jobs (0.39). This result is consistent with Moretti's theoretical framework. Firstly, demand (intermediate consumption and final household demand) for tradable goods and services mainly comes from firms and households located in other areas in France or abroad. Secondly, employment growth in part of the tradable sector pushes up local prices and may cause firms in the rest of the tradable sector to relocate or even disappear. As expected, the local multiplier is lower on non-market non-tradable jobs (0.1) than on market non-tradable jobs (0.74) and even lower than multiplier on tradable jobs. This arguably reflects the fact that non-market non-tradable jobs partly depend on state subsidies or social security contributions and are therefore less affected by local aggregate income variations.

Our local multiplier of tradable on non-tradable jobs is half the size of that estimated by Moretti (2010) in the case of the United States. However, as shown by Van Dijk (2018), Moretti's multiplier is likely to be overestimated. When Van Dijk (2018) includes additional controls, location fixed effects, and not only manufacturing but also tradable services, the size of the multiplier is reduced. He finds a multiplier of 1.0, which is in line with the multiplier we find in the case of France. Gerolimetto and Magrini (2015), who include the period 2000-2010, tradable services, and spatial interdependencies, find a lower local multiplier of 0.53 for the US. By including only manufacturing jobs in the tradable sector, Malgouyres (2017) finds a local multiplier of 1.46 in the case of France for the period 1995-2007. Altogether, our two studies identify a fairly large local multiplier for France, i.e. larger than in other studies including e.g. Moretti and Thulin (2013) in the case of Sweden, Wang and Chanda (2017) using Chinese data, and de Blasio and Menon (2011) for the case of Italy. These results suggest that trade shocks have large negative effects on French local employment, not only for jobs

Table 2
Summary of Estimated Local Multipliers for French Employment Areas Between 2008 and 2016

	OLS		IV		Multiplier	
	(1)	(2)	(3)	(4)	(5)	(6)
Model 1						
Tradable on non-tradable	0.140*** (0.029)	0.085*** (0.029)	0.327*** (0.062) [69.21]	0.361*** (0.126) [24.57]	0.80	0.88
Model 2						
Tradable on other tradable	0.212*** (0.049)	0.110** (0.054)	0.430*** (0.148) [38.32]	0.441* (0.244) [14.10]	0.39	0.40
Model 3						
Tradable on market non-tradable	0.161*** (0.032)	0.090*** (0.031)	0.367*** (0.068) [69.21]	0.344** (0.148) [17.93]	0.74	0.70
Tradable on non-market non-tradable	0.055 (0.046)	0.027 (0.047)	0.231** (0.103) [69.21]	0.320* (0.167) [27.71]	0.1	0.13
Year FE	Y	Y	Y	Y	Y	Y
Region FE	N	Y	N	Y	N	Y
Controls	N	Y	N	Y	N	Y

* Significance at the 10% level; ** significance at the 5% level and *** significance at the 1% level.
Notes: Robust standard errors clustered by employment area reported in parentheses. Kleibergen-Paap Wald rk F statistic in brackets. The multiplier in columns (5) (6) is calculated using the IV estimator in columns (3) (4). Control variables include local unemployment rates, local total labor force, and the share of local non-tradable employment at the beginning of each period. Location fixed effects correspond to dummy variables for 22 regions of Metropolitan France.
Coverage : Naf rév.2 A88, France métropolitaine.
Sources: Acoss and Insee; authors' computation.

directly exposed to foreign competition but also for non-tradable jobs.

Admittedly, we need to remain cautious about the exact value of the multiplier. Our database covers only payroll employment and not total employment or total hours worked. As the majority of French self-employed workers are in the non-tradable sector (personal services, health and social action, construction),[14] we may be underestimating the value of the local multiplier. On the other hand, we may be overlooking some long-term effects since we are studying four-year intervals. This could potentially reduce the size of the multiplier if crowding out effects take time to occur.

* *
*

In this paper, we first examine the evolution and characteristics of tradable and non-tradable jobs in France over the period 1999-2015. We establish a classification of 86 industries, based on their degree of geographic concentration. We show that tradable jobs are in the minority and decreasing. They make significant productivity gains and on average receive higher wages than non-tradable jobs. Non-tradable jobs, however, constitute the vast majority of jobs and are growing. These jobs have to date experienced lower productivity gains though they are not less skilled than tradable jobs. We also show that there has been significant restructuring within the sector: tradable services jobs now make up the majority of tradable jobs in France while manufacturing is declining.

Since employment areas tend to specialize in different tradable activities, they have evolved in different ways. Major metropolitan areas seem to benefit from the growth of employment in tradable services, while the drop in employment in the rest of the tradable sector is disrupting a great number of less-dense areas. We note in particular that the areas where non-tradable employment has decreased have, for the most part, also destroyed a high number of tradable jobs, and vice versa.

Using an econometric approach developed by Moretti (2010), we show that tradable jobs do

14. *See Omalek and Rioux (2015).*

appear to have a significant local multiplier effect on non-tradable jobs. According to our estimates, from 2008-2016, for every 100 additional jobs created in the tradable sector in an employment zone in mainland France, 80 jobs were also generated in the non-tradable sector within the same area. This result may explain why local governments grant numerous subsidies to attract or simply maintain tradable activities in their territory. It also suggests that trade shocks spill over beyond jobs directly exposed to foreign competition. □

BIBLIOGRAPHY

Acemoglu, D., Autor, D., Dorn, D., Hanson, G. H. & Price, B. (2016). Import Competition and the Great U.S. Employment Sag of the 2000s. *Journal of Labor Economics*, 34(S1), S141–S198. https://doi.org/10.1086/682384

Amador, J. & Soares, A. C. (2017). Markups and bargaining power in tradable and non-tradable sectors. *Empirical Economics*, 53(2), 669–694. https://doi.org/10.1007/s00181-016-1143-z

Autor, D., Dorn, D. & Hanson, G. H. (2013). The China Syndrome: Local Labor Market Effects of Import Competition in the United States. *American Economic Review*, 103(6), 2121–2168. https://www.jstor.org/stable/42920646

Balassa, B. (1964). The Purchasing-Power Parity Doctrine: A Reappraisal. *The Journal of Political Economy*, 72(6), 584–596.

Bardhan, A. D. & Kroll, C. (2003). The New Wave of Outsourcing. *Fisher Center for Real Estate & Urban Economics Research Report Series*. https://econpapers.repec.org/RePEc:cdl:fisher:qt02f8z392

Barlet, M., Briant, A. & Crusson, L. (2008). Concentration géographique dans l'industrie manufacturière et dans les services en France : une approche par un indicateur en continu. Insee, *Documents de Travail de la DESE* N° G2008/09. https://www.insee.fr/fr/statistiques/1380877

Barlet, M., Crusson, L., Dupuch, S. & Puech, F. (2010). Des services échangés aux services échangeables : une application sur données françaises. *Économie et Statistique*, 435-436, 105–124. https://www.insee.fr/fr/statistiques/1377478?sommaire=1377486

Bartik, T. J. (1991). *Who benefits from state and local economic development policies?* Kalamazoo, Mich.: W.E. Upjohn Institute for Employment Research.

Bénassy-Quéré, A. & Coulibaly, D. (2014). The impact of market regulations on intra-European real exchange rates. *Review of World Economics*, 150(3), 529–556. https://doi.org/10.1007/s10290-014-0185-6

Bernard, A. B. & Jensen, J. B. (1995). Exporters, Jobs, and Wages in U.S. Manufacturing: 1976-1987. *Brookings papers on economic activity. Microeconomics*, 1995, 67–119. https://www.brookings.edu/bpea-articles/exporters-jobs-and-wages-in-u-s-manufacturing-1976-1987/

Bernard, A. B. & Jensen, J. B. (1997). Exporters, skill upgrading, and the wage gap. *Journal of international Economics*, 42(1-2), 3–31. https://doi.org/10.1016/S0022-1996(96)01431-6

Blinder, A. S. (2009). How Many US Jobs Might be Offshorable? *World Economics*, 10(2), 41. https://econpapers.repec.org/RePEc:wej:wldecn:376

Blinder, A. S. & Krueger, A. B. (2013). Alternative Measures of Offshorability: A Survey Approach. *Journal of Labor Economics*, 31(S1), 97–128.

Collins, S. M. (2010). Comment on "measuring tradable services and the task content of offshorable services jobs". In: Abraham, K., Spletzer, J. R. & Harper, M. J., (Eds.), *Labor in the New Economy*, pp. 335–339. Chicago: University of Chicago Press.

Crozet, M. & Milet, E. (2017). The servitization of French manufacturing firms. In: Fontagné, L. & Harrison, A. (Eds.), *The factory-free economy: Outsourcing, Servitization, and the Future of Industry*, pp. 111–135. Oxford: Oxford University Press.

de Blasio, G. & Menon, C. (2011). Local Effects of Manufacturing Employment Growth in Italy. *Giornale degli Economisti e Annali di Economia*, 70(3), 101–112. https://www.jstor.org/stable/41756381

De Gregorio, J., Giovannini, A. & Wolf, H. C. (1994). International evidence on tradables and nontradables inflation. *European Economic Review*, 38(6), 1225–1244.
https://doi.org/10.1016/0014-2921(94)90070-1

Demmou, L. (2010). Le recul de l'emploi industriel en France entre 1980 et 2007. Ampleur et principaux déterminants: un état des lieux. *Économie et Statistique*, 438-439-440, 273–296.
https://www.insee.fr/fr/statistiques/1377172?sommaire=1377175

Dixon, H., Griffiths, D. & Lawson, L. (2004). Exploring tradable and non-tradable inflation in consumer prices, *New Zealand Association of Economists conference*.

Dornbusch, R. (1983). Real Interest Rates, Home Goods, and Optimal External Borrowing. *Journal of Political Economy*, 91(1), 141–153.
https://www.jstor.org/stable/1840434

Dwyer, J. (1992). The Tradeable Non-Tradeable Dichotomy: A Practical Approach. *Australian Economic Papers*, 31(59), 443–459.
https://ideas.repec.org/a/bla/ausecp/v31y1992i59p443-59.html

Eliasson, K. & Hansson, P. (2016). Are workers more vulnerable in tradable industries? *Review of World Economics*, 152(2), 283–320.
https://link.springer.com/article/10.1007/s10290-016-0249-x

Eliasson, K., Hansson, P. & Lindvert, M. (2012). Jobs and Exposure to International Trade within the Service Sector in Sweden. *The World Economy*, 35(5), 578–608.
https://ideas.repec.org/a/bla/worlde/v35y2012i5p578-608.html

Fisher, A. G. B. (1935). *The clash of progress and security*. London: Macmillan.

Fontagné, L., Mohnen, P. & Wolff, G. (2014). Pas d'industrie, pas d'avenir ? *Notes du conseil d'analyse économique* N° 2014/3, 1–12.
https://www.cairn.info/revue-notes-du-conseil-d-analyse-economique-2014-3-page-1.htm

Gerolimetto, M. & Magrini, S. (2015). A spatial analysis of employment multipliers in the US. *Letters in Spatial and Resource Sciences*, 9(3), 277–285.
https://link.springer.com/article/10.1007/s12076-015-0157-z

Gervais, A. & Jensen, J. B. (2015). The Tradability of Services: Geographic Concentration and Trade Costs. NBER *Working Paper* N° 19759.
https://www.nber.org/papers/w19759

Goldstein, M. & Officer, L. H. (1979). New Measures of Prices and Productivity for Tradable and Nontradable Goods. *Review of Income and Wealth*, 25(4), 413–427.
https://doi.org/10.1111/j.1475-4991.1979.tb00116.x

Grossman, G. M. & Rossi-Hansberg, E. (2008). Trading tasks: A simple theory of offshoring. *American Economic Review*, 98(5), 1978–1997.
https://doi.org/10.1257/aer.98.5.1978

Helpman, E. & Krugman, P. R. (1985). *Market structure and foreign trade: Increasing returns, imperfect competition, and the international economy*. Cambridge, Mass.: MIT press.

Hlatshwayo, S. & Spence, M. (2014). Demand and defective growth patterns: The role of the tradable and non-tradable sectors in an open economy. *The American Economic Review*, 104(5), 272–277.
https://www.jstor.org/stable/42920949

Jensen, J. B. & Kletzer, L. G. (2005). Tradable Services: Understanding the Scope and Impact of Services Offshoring. In: Jensen, J. B., Kletzer, L. G., Bernstein, J. & Feenstra, R. C. (Eds.) *Brookings trade forum*, pp. 75–133. Washington, DC : Brooking Instituion Press.
https://www.jstor.org/stable/25058763

Jensen, J. B. & Kletzer, L. G. (2010). Measuring tradable services and the task content of offshorable services jobs. In: Abraham, K., Spletzer, J. R. & Harper, M. J., (Eds.), *Labor in the New Economy,* pp. 309–335. Chicago: University of Chicago Press.

Krugman, P. R. (1991). *Geography and Trade*. Cambridge, Mass.: MIT press.

Lanz, R., Miroudot, S. & Nordås, H. (2011). Trade in Tasks. OECD *Trade Policy Working Papers* N° 117.
http://dx.doi.org/10.1787/5kg6v2hkvmmw-en

Malgouyres, C. (2017). The Impact of Chinese Import Competition on the Local Structure of Employment and Wages: Evidence from France. *Journal of Regional Science*, 57(3), 411–441.
https://doi.org/10.1111/jors.12303

Melitz, M. J. (2003). The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity. *Econometrica*, 71(6), 1695–1725.
https://doi.org/10.1111/1468-0262.00467

Moretti, E. (2010). Local Multipliers. *American Economic Review*, 100(2), 373–377.
https://doi.org/10.1257/aer.100.2.373

Moretti, E. (2011). Local Labor Markets. In: *Handbook of Labor Economics*, vol. 4B, pp. 1237–1313.
https://econpapers.repec.org/RePEc:eee:labchp:5-14

Moretti, E. & Thulin, P. (2013). Local multipliers and human capital in the United States and Sweden. *Industrial and Corporate Change*, 22(1), 339–362. https://doi.org/10.1093/icc/dts051

Omalek, L. & Rioux, L. (2015). Panorama de l'emploi et des revenus des non-salariés. *Insee Référence – Emploi et revenus des indépendants,* 11–28. https://www.insee.fr/fr/statistiques/1374690?sommaire=1374698

Piton, S. (2016). Divergence des prix relatifs : une maladie européenne? *La Lettre du CEPII* N° 369. http://www.cepii.fr/CEPII/fr/publications/lettre/abstract.asp?NoDoc=9450

Piton, S. (2017). A European Disease? Non-tradable inflation and real interest rate divergence. *CESifo Economic Studies*, 63(2), 210–234. https://doi.org/10.1093/cesifo/ifw018

Püschel, J. (2013). *A Task-Based Approach to US Service Offshoring*. PhD thesis, Freie Universität Berlin.

Reis, R. (2013). The Portuguese slump and crash and the euro crisis. *Brookings Papers on Economic activity*, Spring 2013, 143–210. https://www.brookings.edu/bpea-articles/the-portuguese-slump-and-crash-and-the-euro-crisis/

Roback, J. (1982). Wages, Rents, and the Quality of Life. *The Journal of Political Economy*, 90(6), 1257–1278. https://www.jstor.org/stable/1830947

Rosen, S. (1979). Wage-based indexes of urban quality of life. In: Mieszkowski, P. & Straszheim, M. (Eds.), *Current Issues in Urban Economics*, pp. 74–104.

Samuelson, P. A. (1964). Theoretical Notes on Trade Problems. *The Review of Economics and Statistics*, 46(2), 145–154. https://www.jstor.org/stable/1928178

Schank, T., Schnabel, C. & Wagner, J. (2007). Do exporters really pay higher wages? First evidence from German linked employer–employee data. *Journal of international Economics*, 72(1), 52–74. https://doi.org/10.1016/j.jinteco.2006.08.004

Timmer, M. P., Erumban, A. A., Los, B., Stehrer, R. & de Vries, G. J. (2014). Slicing Up Global Value Chains. *Journal of Economic Perspectives*, 28(2), 99–118. https://doi.org/10.1257/jep.28.2.99

Van Dijk, J. J. (2018). Robustness of econometrically estimated local multipliers across different methods and data. *Journal of Regional Science*, 58(2), 281–294. http://dx.doi.org/10.1111/jors.12378

Wang, T. & Chanda, A. (2018). Manufacturing Growth and Local Multipliers in China. *Journal of Comparative Economics*, 46(2), 515–543. https://doi.org/10.1016/j.jce.2017.10.002

Young, A. (2014). Structural Transformation, the Mismeasurement of Productivity Growth, and the Cost Disease of Services. *American Economic Review*, 104(11), 3635–3667. https://doi.org/10.1257/aer.104.11.3635

APPENDIX

Table A-1
Gini Coefficient, Tradable/Non-Tradable Classification, and Employment by Industry

Naf code	Industry	Gini	Tradable / Non-tradable	Employment 2015
01	Crop and animal production, hunting and related service activities	0.35	T	708.56
02	Forestry and logging	0.31	T	29.80
03	Fishing and aquaculture	0.86	T	18.22
05	Mining of coal and lignite	0.92	T	0.02
06	Extraction of crude petroleum and natural gas	0.90	T	0.25
07	Mining of metal ores	0.97	T	0.55
08	Other mining and quarrying	0.45	T	18.11
09	Mining support service activities	0.84	T	0.17
10	Manufacture of food products	0.31	T	593.37
11	Manufacture of beverages	0.64	T	30.63
12	Manufacture of tobacco products	0.80	T	1.32
13	Manufacture of textiles	0.55	T	43.15
14	Manufacture of wearing apparel	0.51	T	44.13
15	Manufacture of leather and related products	0.67	T	23.63
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	0.42	T	66.15
17	Manufacture of paper and paper products	0.55	T	61.59
18	Printing and reproduction of recorded media	0.35	T	75.45
19	Manufacture of coke and refined petroleum products	0.74	T	8.80
20	Manufacture of chemicals and chemical products	0.38	T	119.68
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	0.52	T	46.43
22	Manufacture of rubber and plastic products	0.50	T	162.66
23	Manufacture of other non-metallic mineral products	0.37	T	106.08
24	Manufacture of basic metals	0.50	T	85.69
25	Manufacture of fabricated metal products. except machinery and equipment	0.32	T	314.24
26	Manufacture of computer. electronic and optical products	0.49	T	82.50
27	Manufacture of electrical equipment	0.50	T	83.49
28	Manufacture of machinery and equipment n.e.c.	0.38	T	164.04
29	Manufacture of motor vehicles. trailers and semi-trailers	0.58	T	123.17
30	Manufacture of other transport equipment	0.26	T	80.57
31	Manufacture of furniture	0.49	T	53.12
32	Other manufacturing	0.33	T	75.44
33	Repair and installation of machinery and equipment	0.25	T	280.63
35	Electricity, gas, steam and air conditioning supply	0.22	N	137.12
36	Water collection, treatment and supply	0.21	N	19.37
37	Sewerage	0.30	T	25.83
38	Waste collection, treatment and disposal activities; materials recovery	0.17	N	107.94
39	Remediation activities and other waste management services	0.53	T	4.62
41	Construction of buildings	n.r.	N	168.20
42	Civil engineering	0.15	N	181.85
43	Specialised construction activities	0.13	N	1488.23
45	Wholesale and retail trade and repair of motor vehicles and motorcycles	0.13	N	483.17
46	Wholesale trade, except of motor vehicles and motorcycles	0.10	N	1109.67

➔

Table A-1 (contd.)

Naf code	Industry	Gini	Tradable / Non-tradable	Employment 2015
47	Retail trade, except of motor vehicles and motorcycles	0.09	N	2093.05
49	Land transport and transport via pipelines	0.13	N	791.46
50	Water transport	0.42	T	15.20
51	Air transport	0.76	T	66.81
52	Warehousing and support activities for transportation	0.30	T	260.94
53	Postal and courier activities	0.15	N	237.50
55	Accommodation	0.32	T	237.69
56	Food and beverage service activities	0.14	N	905.76
58	Publishing activities	0.44	T	119.19
59	Motion picture, video and television programme production, sound recording and music publishing activities	0.46	T	58.10
60	Programming and broadcasting activities	0.54	T	35.06
61	Telecommunications	0.29	T	137.08
62	Computer programming, consultancy and related activities	0.28	T	403.44
63	Information service activities	0.34	T	70.16
64	Financial service activities, except insurance and pension funding	0.19	N	422.06
65	Insurance, reinsurance and pension funding. except compulsory social security	0.41	T	180.89
66	Activities auxiliary to financial services and insurance activities	0.17	N	177.93
68	Real estate activities	0.22	N	351.18
69	Legal and accounting activities	0.14	N	331.38
70	Activities of head offices; management consultancy activities	0.31	T	447.26
71	Architectural and engineering activities; technical testing and analysis	0.15	N	387.87
72	Scientific research and development	-	T	446.90
73	Advertising and market research	0.36	T	168.55
74	Other professional, scientific and technical activities	0.23	N	92.94
75	Veterinary activities	0.21	N	25.95
77	Rental and leasing activities	0.20	N	139.23
78	Employment activities	0.12	N	801.38
79	Travel agency, tour operator and other reservation service and related activities	0.27	T	55.08
80	Security and investigation activities	0.21	N	166.70
81	Services to buildings and landscape activities	0.10	N	462.31
82	Office administrative, office support and other business support activities	0.18	N	382.08
84	Public administration and defense; compulsory social security	0.14	N	2392.57
85	Education	0.08	N	1825.31
86	Human health activities	0.13	N	1824.16
87	Residential care activities	0.21	N	782.69
88	Social work activities without accommodation	0.12	N	1168.88
90	Creative. arts and entertainment activities	0.33	T	224.19
91	Libraries, archives, museums and other cultural activities	0.42	T	55.90
92	Gambling and betting activities	0.60	T	24.18
93	Sports activities and amusement and recreation activities	0.21	N	272.37
94	Activities of membership organisations	0.20	N	314.93
95	Repair of computers and personal and household goods	0.18	N	83.85
96	Other personal service activities	0.10	N	374.15
97	Activities of households as employers of domestic personnel	0.22	N	155.16

Employment Protection Legislation Impacts on Capital and Skills Composition

Gilbert Cette*, Jimmy Lopez and Jacques Mairesse*****

Abstract – The article investigates the effects of Employment Protection Legislation (EPL) on capital and skills according to the intensity of international competition. Grounded on a panel data sample for 14 OECD countries and 18 industries from 1988 to 2007, and a difference-in-difference approach, we find that strengthening EPL: (i) leads to a capital-labour substitution in favour of non ICT non R&D capital to the detriment of employment, this effect being mitigated in industries highly exposed to international competition; (ii) lowers ICT capital and, even more severely, R&D capital relatively to other capital components; and (iii) works at the relative disadvantage of low-skilled workers. Strengthening EPL can therefore be an impediment to organizational and so technological change and risk taking on globalized markets. An illustrative simulation suggests that structural reforms weakening EPL could have a significant favorable impact on firms' ICT and R&D investment and on hiring low-skilled workers.

JEL Classification: E22, E24, O30, L50, O43, O47, C23
Keywords: regulation, capital, R&D, ICT, skill

* *Banque de France and Aix-Marseille School of Economics, Cnrs & EHESS (gilbert.cette@banque-france.fr)*
** *Université de Bourgogne Franche-Comté (LEDi) and Banque de France (Jimmy.Lopez@u-bourgonne.fr)*
*** *Ensae-Crest and Banque de France, Maastricht University (Unu-Merit) and NBER (mairesse@ensae.fr)*

Received on 16 October 2017, accepted on 15 July 2018

To cite this article: Cette, G., Lopez, J. & Mairesse, J. (2018). Employment Protection Legislation Impacts on Capital and Skill Composition. *Economie et Statistique / Economics and Statistics*, 503-504, 109–122. https://doi.org/10.24187/ecostat.2018.503d.1960

Numerous economic studies have been devoted to exploring the impact of labour market regulations on firms' behavior. Many of them relied on the Employment Protection Legislation (EPL) indicators of OECD on procedures and costs involved in dismissing individuals or groups of workers and in hiring workers on fixed-term or temporary work agency contracts. Among them, several studies also focused on the effects of EPL on firms' innovation as proxied by patents and/or its effects on various measures of firms' productivity.[1] Much fewer studies have investigated the impacts of labour regulations on specific production factors. Some have considered the impact of labour regulations on the overall capital-to-labour ratio (or capital intensity), and have found apparently conflicting results such as Autor *et al.* (2007), Calgagnini *et al.* (2014), Cingano *et al.* (2010 and 2014), Janiak & Wasmer (2014). Others have studied the impact of EPL on Information and Communication Technology (ICT) capital (Aghion *et al.,* 2009; Cette & Lopez, 2012; Guerrieri *et al.,* 2011), but none, to our knowledge, on Research and Development (R&D) capital.[2]

R&D and ICT investments have become major determinants of economic growth and productivity, and are vital at the firm level to maintain competitiveness vis-a-vis firms from both developed countries and developing countries, notably through the supply of lower-skilled and less costly labour. The originality of our study is to investigate the effects of EPL on four capital and three labour skill components, precisely construction, non-ICT, ICT and R&D capital components on the one hand, and low, medium- and high-skill labour components on the other hand. Our paper has also the advantage of being grounded on a large country-industry panel dataset of 14 OECD countries, 18 manufacturing and market service industries, over the 20 years from 1988 to 2007. It relies on the implementation of a difference-in-difference econometric approach (with country*industry and country*year interacted fixed effects).

Our main estimation results show that strengthening EPL leads to a capital-to-labour substitution in favour of non-ICT non-R&D capital. However, this strengthening lowers both ICT capital and, even more severely, R&D capital relatively to non-ICT and non-R&D capital. This strenghtening also works at the relative disadvantage of the employment of low-skill workers with respect to high-skill workers. These results confirm that firms consider that the strengthening of EPL involves significant adjustment costs for labour and indirectly capital, and can be an impediment to organizational change and to risk taking.[3] Taking into account the intensity of international competition on our results, through the interaction of EPL and an indicator of industry exposure to external trade, shows that the EPL differential impact tend to diminish with increased openness for R&D capital and high-skill labour, but not for ICT capital.

An illustrative policy simulation based on our results suggests that structural reforms lowering EPL to the "lightest labour regulation practice", defined as the level of EPL in the USA, could have in the medium-long term a favorable impact of about 30% on R&D capital intensity in average, and of about 10% on unskilled employment in average. Thus, EPL reforms may also contribute to maintain OECD countries' national competitiveness in the face of increasing international competition.

Our paper proceeds as follows. The two next sections respectivily explain our choice of model specification and present our data. The two following sections show and comment first our main econometric results, then propose, based on these results, a policy simulation of the impacts on capital and skill composition of a structural reform consisting in adopting the lightest labour regulation practice observed in the USA. We summarize our findings in the final section.

Model Specification

Employment Protection Legislation (EPL) may impact specific production factors and their combination in various ways: through observed labour cost, adjustment costs, efficiency and risk characteristics, directly and indirectly. In this paper, we investigate the overall, direct and indirect impacts of EPL on major production factors. We distinguish four components of capital: non-residential construction, non-ICT, ICT and R&D, and three

1. See for instance Acharya et al. *(2013); Bassanini* et al. *(2009); Cette* et al. *(2016); Conti & Sulis (2016); Griffith & Macartney (2014); Micco & Pages (2006), which find detrimental impacts of labour regulations on patents, Total Factor Productivity level or growth.*

2. Appendix 1 provides a short review of the papers investigating the impact of labour regulations on on overall capital, ICT capital or patents referred to here.

3. This interpretation is also confirmed by Bartelsman et al. *(2016) results which show that high-risk industries are smaller in countries with high EPL and by Conti and Sulis (2016) findings which suggest a detrimental impact of EPL on high-technology adoption.*

skill components of labour: high, medium and low-skilled employment. We expect that EPL would influence these seven production factors differently.

We expect two opposite effects of EPL concerning capital intensity. Due to its influence on labour adjustment cost, an increase in EPL should have a similar positive impact on capital intensity as an increase in the observed labour costs. However, if market constraints prevent the implementation of an optimal labour organization, thus reducing the efficiency of advanced technologies, an increase in EPL could also have a negative impact on capital intensity. This should be particularly the case for ICT capital which requires stronger labour reorganization and flexibility. This should be even more so for R&D capital which is very risky and requires higher labour flexibility. Moreover, internal R&D expenses consist largely of labour costs, so R&D capital user cost would tend to increase in line with the labour costs and the a priori positive impact of EPL due to labour adjustment cost would be small. On the whole, one should expect that the negative impact of EPL on R&D would be even much stronger than on ICT.

EPL differential impacts on employment skill composition depend largely on the differences in the labour adjustment costs between the three different skill levels. We thus expect that an increase in EPL should have a higher negative impact on the employment of low-skill workers, and hence should translate on a higher positive impact on the share of employment to total employment for high-skill workers.

In addition to these direct effects of EPL on each production factors, we may expect also indirect effects to the extent that complementarities between them are different. For instance, if high-skill employment is complementary to capital intensity, EPL may influence the capital demand through high-skill employment. Our empirical investigation is not able to tackle this issue as it would require to estimate a more general or structural model with an equation for each production factor as a different left hand-side variable, as we do here, but with also the other production factors as the right hand-side variables. This model will be much more complicated to estimate consistently (on this issue see Appendix 3). We privilege here a more reasonable and less ambitious model specification which must be viewed as a reduced form model allowing estimating the total impact of EPL on each production factor, but not disentangling between the direct and indirect channels.

The model we consider corresponds to one equation for each production factor (with small letters for logarithms):[4]

$$\left(x_f - l\right)_{cit} = \alpha_f - s_f \cdot \left(c_f - w\right)_{cit} + \beta_f \cdot \lambda_i \cdot \mathrm{EPL}_{ct} + \eta_{f,ci} + \eta_{f,ct} + \epsilon_{f,cit} \quad (1)$$

where f is an index denoting the seven different factors of production; c, i, t are the country, industry and time indices; X_f and C_f stand for the quantity and unit user cost of production factor f, L for total employment, W for the average labour compensation, λ_i for an industry specific characteristic (see below), and EPL the OECD indicator of Employment Protection Legislation. The coefficients to be estimated are α_f, s_f and β_f. Country*industry and country*year fixed effects $\eta_{f,ci}$ and $\eta_{f,ct}$ are also included in addition to the usual idiosyncratic error or residual term $\epsilon_{f,cit}$.

We introduce country*industry $\eta_{f,ci}$ and country*year $\eta_{f,ct}$ fixed effects to prevent from various sources of endogeneity, such as reverse causality and omission bias stemming from the fact that national governments would reform their employment legislation in view of their country changing economic situation. We thus rely on a difference-in-difference type of approach, allowing us to estimate consistently the various differences between the main coefficients of interest: $(\beta_f - \beta_{f'})$ for all distinct f and f'. To identify the effects of EPL, which is collinear to country*year fixed effects, we allow EPL effects to depend on an industry specific characteristic λ_i, measuring an intensity of use of labour. In our main specification, λ_i is proxied by the industry labour share over production in the USA in 2000, which we can view as a rather 'natural' reference, since USA is in our sample the country with the lowest EPL values.

The *a priori* expectations we suggested in the beginning of this section on the relative size of the impacts of EPL (precisely the elasticities of $\lambda_i \cdot \mathrm{EPL}_{ct}$) are well confirmed by our estimation results. We find that the two elasticities β_f are positive for the non-ICT capital equipment and non-residential capital construction intensities, the one for R&D capital intensity is negative and

4. A more formal presentation of the model can be found in the Online complement.

significantly higher, while the one for the ICT capital intensity is in between. We find similarly that the elasticity β_f for the share of high-skilled employment is positive and the one for the share of low-skilled employment is negative.

We also consider a variant of relation (1) taking into account that national firms exposed to international competition have to face higher demand variability and higher risks. We do so by including as an additional explanatory variable the product interaction of EPL with the level of openness to external trade:

$$\left(x_f - l\right)_{cit} = \alpha_f - s_f \cdot \left(c_f - w\right)_{cit} + \beta_f \cdot \lambda_i \cdot \mathrm{EPL}_{ct} + \mu_f \cdot Openess_i \cdot \mathrm{EPL}_{ct} + \eta_{f,ci} + \eta_{f,ct} + \epsilon_{f,cit} \quad (2)$$

where $Openess_i$ is the average level of openness of industry i to external trade observed in the US. This level of openness corresponds to the sum of exports and imports in product i divided by twice the production of industry i.[5]

Data

Our study sample is an unbalanced country-industry panel dataset of 3,625 observations. It covers 14 countries: Australia, Austria, Czech Republic, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, the United Kingdom and the United States for 18 manufacturing, network and service industries from 1988 to 2007.[6] Six industries (almost) do not invest in R&D and are excluded from the R&D intensity estimation sample; our estimation results are robust when the estimation sample include these industries, (see Appendix 2). Our study sample is reduced to 3,200 observations from 1988 to 2005 when we use data on wages by skill. Detailed descriptive analysis of data are presented on web supplementary material.

To estimate relation (1) we need data on capital stocks and their user cost, on employment by skill level and a measure of EPL. We compute capital using the so-called permanent inventory method $X_{f,t} = \left(1 - \delta_f\right) \cdot X_{f,t-1} + I_{f,t-1}$, where I_f corresponds to the investment in factor f, using the EU-KLEMS investment data, OECD ANBERD R&D expenses and the following depreciation rates δ_f: non-residential structures, 5%; non-ICT equipment, 10%; ICT equipment, 20%; R&D, 25%. We compute the user-cost of capital according to Jorgenson (1963) formula: $C_{f,t} = P_{f,t-1} \cdot \left(\delta_f + \Delta \ln\left(P_{f,t}\right) + r_t\right)$, where P_f is the investment price of factor f and r the long-term interest rate.[7] We measure total employment as the number of persons employed, using the OECD STAN database, and EU-KLEMS data on hours worked for the share of employment by skill level.

Finally, our analysis uses the OECD EPL indicator, which is the most frequently used in the empirical literature on the impacts of labour market regulations on capital intensity, productivity and growth. Based on detailed information on laws, rules and market settings, this indicator measures the procedures and cost involved in dismissing individual workers with regular contracts and regulations on temporary contracts, including regulations on fixed-term and temporary work agency contracts. The scale of the OECD EPL indicator is 0-6, with 0 for the most flexible country labour market (see OECD Employment Outlook 2013 for more information). The OECD EPL indicator experienced large decreases over our sample period in some previously highly-regulated countries (see the supplementary web material).

Main Results

Table 1 gives the main relation (1) estimate results. The estimated elasticities of capital intensity with respect to its unit user cost of production factor f relative to wage are always negative, as expected, and significant. These elasticities are quite similar for the different capital components, within the interval -0.61 (for non-ICT equipment, column (2)) to -0.37 (for construction, column (3)). The

*5. As we introduced industry and country*year fixed effects in the estimated specifications, we do not add to these specifications each of the interacted variables (λ_i, $Openess_i$ and EPL_{ct}) separately. Data on industry labour share over production (λ) and on openness to external trade (Openess) are available over time and country and these variables may have an interesting impact on capital and skill composition. However, these two country*industry*year variables may be strongly endogeneous, because of omission bias but also of reverse causality, as capital and skills may influence compensation and trade. Therefore, we only use the average US values in order to prevent from endogeneity bias and estimate the differential impact of EPL.*

6. These industries are (ISIC Rev. 3 codes in brackets): food products (15-16), textiles (17-19), wood products (20), paper (21-22), chemicals products (23-25), non-metallic mineral products (26), metal products (27-28), machinery not elsewhere classified (29), electrical equipment (30-33), transport equipment (34-35), manufacturing not elsewhere classified (36-37), energy* (40-41), construction* (45), retail distribution*(50-52), hotels & restaurants* (55), transport & communication (60-64), banking services* (65-67) and professional services (72-74). The six industries with a "*" almost do not invest in R&D.*

7. Investment prices are from EU-KLEMS, but in order to improve comparability we have assumed, as suggested by Schreyer (2000), and as we have done in numerous studies, that for ICT investments in hardware, software and telecommunications equipment the ratio of investment prices to the GDP prices is the same for all countries as for in the USA, since the USA is the country that uses most systematically hedonic methods during the study period. Because of the lack of specific price information for R&D, we have used as a proxy the manufacturing production deflator.

corresponding elasticities are lower (in absolute value) for the two skill components of employment: -0.23 (high-skilled, column (6)) and -0.21 (low-skilled, column (7)). In other words, the price sensitivity is higher for capital intensity than for the share of employment by skill.

The estimated coefficients of the differential impacts of EPL differ among factors and have the expected signs. Concerning non-ICT non R&D equipment and constructions (columns (2) and (3)) they are positive and significant, respectively 0.17 and 0.12 (only at a level of confidence for constructions). Concerning the two high-quality capital components they are negative, non-significant for ICT (column (4)), and very significant and high for R&D: -1.10 (column (5)). These results suggest that the impact of labour regulations on the non-ICT and non-R&D capital-to-labour ratio is qualitatively similar to that of a change in the labour cost. More importantly, they suggest that labour regulations have a detrimental impact on capital quality, i.e. the share of R&D and ICT in total capital, in industries using labour intensively relatively to the other industries. Investment in high-quality capital is more risky in terms of results than investment in lower quality capital, and firms would take this risk less often as their labour force adaptability decrease. These results are consistent with those of Conti and Sulis (2016) and of Bartelsman *et al.* (2016), which suggest a detrimental impact of EPL on high-technology adoption and on growth of high-risk industries, respectively.[8]

It is noteworthy to stress that the estimated coefficient of the impact of EPL on total capital elasticity is positive but small and non-significant (column (1)). This elasticity is consistent with those obtained for the different capital components, which implies that it could be positive or negative, depending on the share of high-quality capital components (ICT and R&D) in total capital. These results are original and more detailed than the previous empirical ones from Autor *et al.* (2007) or Cingano *et al.* (2010) and (2014) who find positive or negative impacts of EPL on the capital-to-labour ratio. This divergence in our estimates and theirs may reflect differences in the capital share of high-quality capital components in their estimation samples.

The estimated coefficients of the impact of EPL also differ for the two shares of employment skill levels: positive and significant of 0.35 for the share of high-skilled employment (column (6)) and negative and significant of -0.22 for that of low-skilled employment (column (7)). This suggests that labour regulations are particularly detrimental to low-skilled employment, which is an interesting and original paradox as one of the main goals of labour regulations is usually to protect low-skilled workers. These regulations seem to frighten employers, who consider that they lead to an increase in labour costs with a negative impact on low-skilled employment. The positive impact on the share of high-skilled employment supports the idea of Janiak and Wasmer (2014) that stronger labour regulations impact positively the capital-to-labour

8. To illustrate the consequences of these results in terms of Total Factor Productivity (TFP), we may use a growth accounting analysis. We still assume a Cobb-Douglas production function and calibrate the value added elasticity vis-à-vis the production factors by the average factor cost shares in total cost in 2005 (these values are: 10.5% for non-ICT equipments, 5.2% for constructions, 2.6% for ICT capital and also 2.6% for R&D capital). According to this calibration and Table 1 estimation results, a one unit increase of "EPL impact" would induce a 0.6% reduction of TFP through capital composition. Note that in the presence of strong positive R&D and/or ICT externalities, this negative impact on TFP would be much higher.

Tableau 1
EPL Impact on Capital and Skill Composition, Depending on Labor Intensity of Use

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep. Var.	Total Cap. Intensity (log)	Capital intensity (log)				Employment share (log)	
		Non-ICT	Cons.	ICT	R&D	High-skilled	Low-skilled
Relative cost ($c_i - w$)	-0.449*** [0.0310]	-0.606*** [0.0400]	-0.369*** [0.0432]	-0.477*** [0.0226]	-0.474*** [0.144]	-0.233*** [0.0537]	-0.212*** [0.0317]
EPL impact (λ_i·EPL)	0.0474 [0.0557]	0.176*** [0.0595]	0.122* [0.0642]	-0.0738 [0.0914]	-1.106*** [0.249]	0.347*** [0.0682]	-0.219*** [0.0428]
Observations	3,625	3,625	3,625	3,625	2,537	3,200	3,200
R-squared	0.799	0.751	0.662	0.942	0.684	0.792	0.900
rmse	0.0965	0.104	0.112	0.159	0.273	0.111	0.0685

Included fixed effects: country, industry, year, country*industry and country*year. Robust standard errors in brackets: *** p<0.01, ** p<0.05, * p<0.1.
Sources: OECD ANBERD, EPL and STAN databases; EUKLEMS database; authors' calculations.

ratio and, due to the complementarity between capital and high-skilled workers, the share of these high-skilled workers in total employment. Our results, however, are more detailed. Higher labour regulations have no clear impact on the ICT capital-to-labour ratio and a negative and large one on the R&D capital-to-labour ratio.

We have carried out a number of robustness checks which are presented in Appendix 2. The elasticities of substitution between factors may be significantly biased because of the difficulties of measuring well the corresponding user costs variables and may be very sensitive to our choice of measuring the intensity of use of labour by the 2000 USA industry labour share over production. When we constrain the elasticities of substitution between factors to be all equal to one, which is the extreme case of an underlying Cobb-Douglas production function, the EPL impact elasticity estimates β_f on capital intensity and on labour shares by skill do not appear qualitatively different from those of Table 1, as can be seen in Table A2-1. When we multiply EPL by a binary indicator of industry layoff propensity, rather than by the labour intensity, the qualitative differences between the EPL impact elasticity estimates β_f remain mostly confirmed, as recorded in Table A2-2. Our conclusions on the differential EPL impact elasticities are also not affected when we slightly modify the contours of our study sample as shown in Tables A2-3 and A2-4.

As we already stressed, there are certainly complementarities between the production factors, but we do not investigate the impact of each factor on the others because of the endogeneity issue that this would induce. Table 1 estimates thus correspond to a reduced form model of the impact of EPL. In other words, the estimated effect of EPL on a production factor may correspond to a direct impact on this specific factor demand and/or to an indirect impact coming through the impact of EPL on another complementary factor. Appendix 3 presents an attempt to take into account such production factor complementarity.

To take into account that international competition may require a higher capacity for adaptation from firms and industries, Table 2 presents in a similar format as Table 1 our estimation results of relation (2), which includes the interaction of EPL and the US industry trade openness indicator in relation (1). We see that the impact of EPL is changed in an interesting way. The higher the exposure to external trade, the higher EPL impact is detrimental to ICT intensity, with now a statisticaly significant coefficient. The negative impact of EPL on R&D intensity is unchanged, whereas the positive effects on construction and non-ICT equipment appear smaller with trade openness, reducing only slightly the differential impact of EPL on R&D capital relatively to non-ICT non-R&D capital. It appears also that the positive impact of EPL on the share of high-skilled workers and the negative impact on the share of low-skill workers are slightly smaller with trade openness. These last results may be explained by the complementarity of skills with ICT capital (as investigated in Appendix 3). Indeed, ICT implementation requires skilled workers, so by reducing ICT investment EPL reduces also the

Tableau 2
EPL Impact Depending on Labor Intensity of Use and Trade Openness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep. Var.	Total Cap. Intensity (log)	Capital intensity (log)				Employment share (log)	
		Non-ICT	Cons.	ICT	R&D	High-skilled	Low-skilled
Relative cost ($c_f - w$)	-0.441*** [0.0308]	-0.587*** [0.0403]	-0.350*** [0.0435]	-0.475*** [0.0226]	-0.460*** [0.146]	-0.227*** [0.0536]	-0.202*** [0.0318]
EPL impact (λ_i·EPL)	-0.00771 [0.0560]	0.142** [0.0601]	0.0885 [0.0648]	-0.118 [0.0923]	-1.096*** [0.250]	0.315*** [0.0689]	-0.199*** [0.0431]
EPLxOpenness (Openess$_i$·EPL)	-0.110*** [0.0170]	-0.0662*** [0.0184]	-0.0662*** [0.0199]	-0.0908*** [0.0281]	-0.0374 [0.0583]	-0.0659*** [0.0210]	0.0476*** [0.0129]
Observations	3,625	3,625	3,625	3,625	2,537	3,200	3,200
R-squared	0.801	0.752	0.664	0.942	0.684	0.793	0.901
rmse	0.0959	0.103	0.112	0.159	0.273	0.111	0.0683

Included fixed effects: country, industry, year, country*industry and country*year. Robust standard errors in brackets: *** p<0.01, ** p<0.05, * p<0.1.
Sources: OECD ANBERD, EPL and STAN databases; EUKLEMS database; authors' calculations.

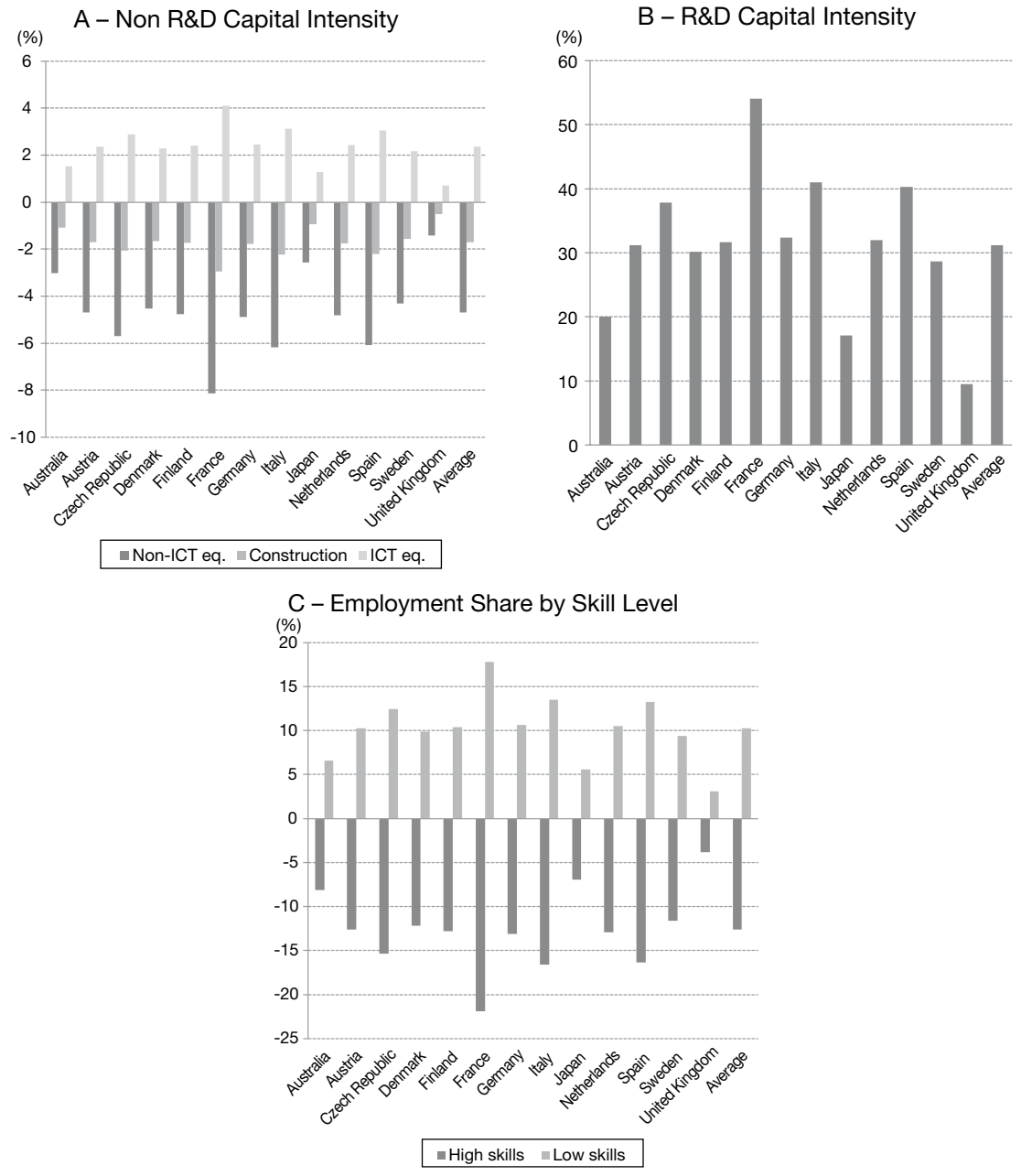
demand for skilled workers in industries with high trade openness.

Simulation

To illustrate the meaning and potential implication of our results, we simulate what could be the impact of having for all countries in our study sample the same EPL than in the USA in 2013. The USA is the country with the lightest level of regulation according to the OECD EPL indicator and 2013 is the most recent year the EPL indicator was available to us. The adoption of USA EPL level would require very large scale structural reforms of labour markets in several countries, in particular France and Italy. The implementation of such drastic reforms would be very difficult and cannot be considered politically or socially desirable realistic.

The potential impacts of adopting the USA EPL are calculated at the industry level using our main estimates (given in Table 1) and then

Figure I
Long-Term Impact of Adopting the USA EPL



Sources: OECD ANBERD, EPL and STAN databases; EUKLEMS database; authors' calculations.

aggregated at the country level using the 2000 USA industry shares in the whole economy for each production factor.[9] The country level impacts thus depend, for each factor, on the corresponding EPL gaps with the US. They can be viewed as long-term impacts, after dynamic adjustments which are not specified and simulated. The results of our simulation are shown in Figures I-A, B and C. They are the following:

- Overall the impacts are always the largest in France, followed by Italy, Spain and the Czech Republic, which are the four countries with the highest EPL level. They are always the smallest in the UK, the least regulated country after the USA;

- The capital-labour ratio would decrease from 1.4% to 8.1% for non-ICT equipment and from 0.5% to 3.0% for construction (Figure I-A). Conversely, it would increase from 0.7% to 4.1% for ICTs (Figure I-A) and from 9.5% to 54.1% for R&D (Figure I-B). This large impact for R&D must be related to the fact that R&D only accounts on average for 9.7% of the capital stock in industries where R&D capital is not negligible, and 7.1% in all industries;

- The labour shares increase from 3.1% to 17.8% for low-skilled employment and decrease from 3.8% to 21.9% for high-skilled employment (Figure I-C).

* *
*

The main results of our difference-in-difference approach using a large and original unbalanced country-industry panel dataset can be summarized as follows: 1) non-ICT and non-R&D capital intensity increases overall with EPL; 2) ICT capital intensity is not significantly impacted by EPL; 3) R&D capital intensity decreases with EPL; and 4) the share for high-skilled workers in total employment increases with EPL, while it decreases for low-skilled workers; 5) the higher the exposition to international trade openness, the more EPL is detrimental on non-R&D capital intensities; 6) the positive impact of EPL on the share of high-skilled workers diminishes with trade openness. These results support overall the fact that firms consider an increase in EPL to be a rise in labour costs, which implies a capital-to-labour substitution impact hindering sophisticated technologies and detrimental to unskilled workers.

The finding that labour regulations are particularly detrimental to low-skilled employment, is an interesting paradox, since one of the main goals of labour regulations is to protect low-skilled workers. These regulations seem to frighten employers, who tend to see them as a labour cost increase, which explains their negative impact on low-skilled employment. It support the idea by Janiak and Wasmer (2014) that higher labour regulations increase the capital-to-labour ratio and, due to the complementarity between capital and high-skilled workers, the share of the latter in total employment. But our results provide more details about this channel: this added capital is not the most sophisticated one, from higher labour regulations, the ICT capital to labour ratio does not significantly change and the R&D capital to labour ratio even decreases hugely.

From these results, the proposed simulations suggest that structural reforms that reduce EPL could have a favorable impact on R&D investment and would be helpful for unskilled employment. The simulated impact of a decrease in EPL to the US level appears large for several countries. But this decrease in EPL would require a very ambitious reform plan in these countries, and the simulated impact is a long-term one. This confirms that the potential gains from the implementation of ambitious labour market plans could be sizeable. □

9. To compute these effects from our difference-in-difference approach, we assume that EPL changes would have no impact on industries with employment close to 0.

BIBLIOGRAPHY

Acharya, V., Baghai, R. & Subramanian, K. (2013). Labour Laws and Innovation. *The Journal of Law and Economics*, 56(4), 997–1037. https://www.journals.uchicago.edu/doi/full/10.1086/674106

Aghion, P., Askenazy, P., Bourlès, R., Cette, G. & Dromel, N. (2009). Education, market rigidities and growth. *Economics Letters*, 102(1), 62–65. https://dash.harvard.edu/handle/1/30752414

Arellano, M., & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies*, 58(2), 277–297. https://doi.org/10.2307/2297968

Autor, D., Kerr, W. & Krukler, A. (2007). Does Employment Protection Reduce Productivity? Evidence from US States. *The Economic Journal*, 117(521), F189–F217. https://doi.org/10.1111/j.1468-0297.2007.02055.x

Bartelsman, E., Gautier, P. & Wind, J. (2016). Employment Protection, Technology Choice, And Worker Allocation. *International Economic Review*, 57(3), 787–826. https://doi.org/10.1111/iere.12176

Bassanini, A. & Duval, R. (2006). Employment Patterns in OECD Countries: Reassessing the Role of Policies and Institutions. OECD *Social, Employment and Migration Working Papers*, N° 35. https://doi.org/10.1787/702031136412

Bassanini, A., Nunziata, L. & Venn, D. (2009). Job Protection Legislation and Productivity Growth in OECD Countries. *Economic Policy*, 24(58), 349–402. https://www.jstor.org/stable/40272543

Calcagnini, G., Ferrondo, A. & Giombini, G. (2014). Does employment protection legislation affect firm investment? The European case. *Economic Modelling*, 36(C), 658–665. https://doi.org/10.1016/j.econmod.2013.06.036

Cette, G. & Lopez, J. (2012). ICT demand behaviour: an international comparison. *Economics of Innovation and New Technology*, 21(4), 397–410. https://ideas.repec.org/a/taf/ecinnt/v21y2012i4p397-410.html

Cette, G., Lopez, J. & Mairesse, J. (2016). Market Regulations, Prices, and Productivity. *American Economic Review, Papers & Proceedings*, 106(5), 104–108. https://doi.org/10.1257/aer.p20161025

Cingano, F., Leonardi, M., Messina, J. & Pica, G. (2010). The effect of employment protection legislation and financial market imperfections on investment: evidence from a firm-level panel of EU countries. *Economic Policy*, 25(61), 117–163. https://econpapers.repec.org/RePEc:bla:ecpoli:v:25:y:2010:i::p:117-163

Cingano, F., Leonardi, M., Messina, J. & Pica, G. (2016). Employment Protection Legislation, Capital Investment and Access to Credit: Evidence from Italy. *The Economic Journal*, 126(595), 1798–1822. https://doi.org/10.1111/ecoj.12212

Conti, M. & Sulis, G. (2016). Human capital, employment protection and growth in Europe. *Journal of Comparative Economics*, 44(2), 213–230. https://doi.org/10.1016/j.jce.2015.01.007

Griffith, R. & Macartney, G. (2014). Employment Protection Legislation, Multinational Firms, and Innovation. *The Review of Economics and Statistics*, 96(1), 135–150. https://doi.org/10.1162/REST_a_00348

Guerrieri, P., Luciani, M. & Meliciani, V. (2011). The determinants of investment in information and communication technologies. *Economics of Innovation and New Technology*, 20(4), 387–403. https://doi.org/10.1080/10438599.2010.526313

Janiak, A. & Wasmer, E. (2014). Employment protection and capital-labour ratios. SciencesPo, Laboratoire Interdisciplinaire d'Evaluation des Politiques Publiques (LIEPP) *Working Paper* N° 33. https://hal-sciencespo.archives-ouvertes.fr/hal-01061024

Jorgenson, D. (1963). Capital Theory and Investment Behavior. *American Economic Review*, 53(2), 47–259. https://www.jstor.org/stable/1823868

Micco, A. & Pages, C. (2006). The Economic Effects of Employment Protection: Evidence from International Industry-Level Data. Institute for the Study of Labor (IZA) *Discussion Papers* 2433. https://ideas.repec.org/p/iza/izadps/dp2433.html

OECD (2013). *Employment Outlook*. Paris: OECD.

Schreyer, P. (2000). The Contribution of Information and Communication Technology to Output Growth: a Study on the G7 Countries. OECD *Science, Technology and Industry Working Papers* N° 2000/2. https://doi.org/10.1787/151634666253

APPENDIX 1

INVESTIGATING THE IMPACT OF LABOUR PROTECTION LEGISLATION ON TOTAL AND ICT CAPITAL: COMPLEMENTARY LITERATURE REVIEW

Several papers investigate the impact of labour regulations on a few production factors, although not on variety of them. This appendix presents briefly this literature.

The empirical literature on the impact of labour market regulations on total capital intensity provides different results. Author ***et al.*** (2007) use a large US establishment-level dataset (of more than 120,000 observations) and show that the adoption of unfair-dismissal protection by state courts in the US from 1970 to 1999 reduced employment flows and firm entry rates, reduced TFP and increased the capital-to-labour ratio and labour productivity. Their interpretation of these results is that an increase in employment protection corresponds to an increase in labour adjustment costs. Higher labour adjustment costs result in a decrease in TFP as well as an increase in the capital-to-labour. This capital deepening effect dominates the TFP effect and so labour productivity increases. Cingano *et al.* (2014) use a large Italian firm-level dataset (of more than 25,000 observations) and show that the implementation, in 1990, of a reform that introduced unfair-dismissal costs for firms below 15 employees had increased in these firms the capital-to-labour ratio, particularly in labour-intensive firms. But in a previous study carried out using a large panel of European firms, Cingano ***et al.*** (2010) had found a negative impact of EPL on the capital-to-labour ratio, and Calcagnini *et al.* (2014) also found a negative empirical relation between EPL and investment dynamics using a small European firm-level dataset (2,600 firms in 10 European countries). For Cingano *et al.* (2014), these differences in the results of their two studies *"may be reconciled by adopting the view, proposed by Janiak and Wasmer (2014)".* Indeed, Janiak and Wasmer (2014) observe at the country level an inverted U-shape relationship between employment protection legislation, measured by the usual OECD indicator of EPL , and the capital-to labour ratio. Their interpretation, using a theoretical model, is that two opposite effects are at play: a higher EPL decreases profits and consequently investment, explaining the negative correlation between EPL and capital intensity, but it also has a positive effect on human capital accumulation which is complementary to capital, explaining the positive correlation. The last effect dominates at low level of EPL and the first effect at high level of EPL. This interpretation based on complementarity is supported by Cingano *et al.* (2014): according to their estimation results, the adoption of unfair-dismissal protection had increased the share of high-tenured workers with high-specific human capital who are likely to be complementary with capital investments. These various results underline the importance of investigating simultaneously capital intensity and workers' skill composition. But in modern economies, capital quality is also essential.

Cette and Lopez (2012) propose a survey of the literature on the influence of labour market regulations on capital quality in terms of ICT or the share ICT in the capital stock. Their estimates using a country panel dataset show that labour regulations, measured by the usual EPL indicator, have a negative impact on ICT and on the share of ICT in capital, like previous studies (among others, see Aghion *et al.*, 2009, or Guerrieri *et al.,* 2011). They also show the favorable impact on ICT diffusion of post-secondary education among the working age population and the detrimental impact of product market rigidities. These results suggest that an efficient use of ICT requires a higher degree of skilled labour than in other technologies and firm reorganisations which can be constrained by strict labour market regulations.

To our knowledge, there are no studies focusing on the impact of labour market regulations on R&D spending. But some previous papers deal with the similar topic of the impact of labour market regulations on innovation measured by the patenting behavior. Griffith and Macartney (2014) give a survey of this literature and show, from an original large dataset of big European firms, that EPL has two types of effect on innovation: a higher EPL increases job security and hence worker investment in innovative activity but, at the same time, it reduces investment in activities that are likely to require adjustment, including technologically advanced innovation.

APPENDIX 2

SENSITIVITY ANALYSIS

This appendix presents the different robustness checks that we have been able to carry out.

First of all, all the estimated coefficients of relative cost differ significantly from the Cobb-Douglas unitary elasticity, which suggests that our unconstrained specification is preferable. We cannot exclude the fact that estimates of relative cost elasticities lower than one (in absolute value) could partly reflect the impact of relative cost measurement errors. Therefore, we also estimate relation (1) with an elasticity of substitution equal to -1 and the estimated coefficients of impact of EPL are robust to this constraint, as shown in Table A2-1. The only change is that the impact of EPL coefficient for low-skilled employment becomes non-significant (column (7)) but as the coefficient remains positive and significant for high-skilled employment (column (6)), a rise in the impact of EPL still increases the share of high-skilled labour relative to low-skilled employment.

Tableau A2-1
Relation (1) Estimate Results When the Elasticity of Substitution Parameters are Constrained to -1

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Factor	Total Cap.	Non-ICT eq.	Cons.	ICT	R&D	High-skilled	Low-skilled
Relative cost ($c_f - w$)	-1 [0]	-1 [0]	-1 [0]	-1 [0]	-1 [0]	-1 [0]	-1 [0]
EPL impact (λ_i·EPL)	0.157*** [0.0580]	0.209*** [0.0603]	0.176*** [0.0662]	0.0453 [0.0987]	-1.061*** [0.250]	0.268*** [0.0705]	0.0115 [0.0462]
Observations	3,625	3,625	3,625	3,625	2,537	3,200	3,200
R-squared	0.122	0.146	0.141	0.175	0.125	0.266	0.204
rmse	0.101	0.105	0.115	0.172	0.274	0.115	0.0757

Included fixed effects: country, industry, year, country*industry and country*year. Robust standard errors in brackets: *** p<0.01, ** p<0.05, * p<0.1.
Sources: OECD ANBERD, EPL and STAN databases; EUKLEMS database; authors' calculations.

Another question relates to the measure of the industry-specific characteristic (λ_i), which is equal to the industry *i* labour share in the USA in 2000 for Table 1 estimates. Alternatively, we can also test whether EPL is more binding in industries which require more labour flexibility. As suggested by Bassanini and Duval (2006), we use the layoff propensity as an indicator of the labour flexibility need. This indicator appears to be quite volatile over time, and for this reason we measure the industry-specific characteristic (λ_i), by a simple fixed effect: $\lambda_i = 1$ in the half industries with the highest layoff propensity in the US in 2000 (textiles, wood products, non-metallic mineral products, metal products, machinery not elsewhere classified, electrical equipment, manufacturing not elsewhere classified, construction, transport & communication), and $\lambda_i = 0$ in other industries.

The estimate results appear robust to this choice, as shown in Table A2-2. The only changes are that the EPL impact coefficient becomes non-significant for construction (column (3)) and low-skilled (column (7)) but we retain the contrast between a positive and significant EPL impact coefficient for non-ICT equipment (column (2), a non-significant coefficient for ICT (column (4)) and a negative and significant coefficient for R&D (column (5)). We also find that a rise in the impact of EPL increases the share of high-skill labour (column (6)).

Finally, we investigate the estimation result sensitivity to our choices of estimation sample. Indeed, our main estimations use different estimation samples: industries almost not investing in R&D are excluded when estimating the R&D demand and data on years 2006 and 2007 are not available for the employment demand by skill. Tables A2-3 and A2-4 show the robustness of our estimation results to these sample choices.

Tableau A2-2
Relation (1) Estimate Results When the Industry Characteristic (λ_i) is the Layoff Propensity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Factor	Total Cap.	Non-ICT eq.	Cons.	ICT	R&D	High-skilled	Low-skilled
Relative cost ($c_f - w$)	-0.446*** [0.0308]	-0.604*** [0.0400]	-0.364*** [0.0432]	-0.476*** [0.0228]	-0.476*** [0.145]	-0.258*** [0.0537]	-0.247*** [0.0311]
EPL impact (λ_i·EPL)	0.0220** [0.0105]	0.0329*** [0.0112]	-0.00369 [0.0121]	0.0128 [0.0174]	-0.0953** [0.0372]	0.0270** [0.0129]	-0.00367 [0.00795]
Observations	3,625	3,625	3,625	3,625	2,537	3,200	3,200
R-squared	0.799	0.751	0.662	0.942	0.682	0.791	0.899
rmse	0.0965	0.104	0.112	0.159	0.274	0.112	0.0688

Included fixed effects: country, industry, year, country*industry and country*year. Robust standard errors in brackets: *** p<0.01, ** p<0.05, * p<0.1.The industry characteristic λ_i equal 1 for industries with high layoff propensities (ISIC code Rev. 3: 17-19, 20, 26, 27-28, 29, 30-33, 36-37, 45, 60-64) and 0 otherwise.
Sources: OECD ANBERD, EPL and STAN databases; EUKLEMS database; authors' calculations.

Tableau A2-3
Relation (1) Estimate Results for R&D Intensity When all Industries are Included in the Sample

	(1)	(2)
Factor	R&D	
Sample	R&D industries	All industries
Relative cost ($c_f - w$)	-0.474*** [0.144]	-0.761*** [0.143]
EPL impact (λ_i·EPL)	-1.106*** [0.249]	-1.956*** [0.215]
Observations	2,537	3,555
R-squared	0.684	0.562
rmse	0.273	0.363

Included fixed effects: country, industry, year, country*industry and country*year. Robust standard errors in brackets: *** p<0.01, ** p<0.05, * p<0.1.
Sources: OECD ANBERD, EPL and STAN databases; EUKLEMS database; authors' calculations.

Tableau A2-4
Relation (1) Estimate Results When the Estimation Samples is Reduced to Data available on Skills

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Factor	Total Cap.	Non-ICT eq.	Cons.	ICT	R&D	High-skilled	Low-skilled
Relative cost ($c_f - w$)	-0.457*** [0.0331]	-0.586*** [0.0424]	-0.364*** [0.0445]	-0.438*** [0.0237]	-0.402*** [0.149]	-0.233*** [0.0537]	-0.212*** [0.0317]
EPL impact (λ_i·EPL)	0.0363 [0.0559]	0.180*** [0.0605]	0.0657 [0.0636]	-0.103 [0.0938]	-1.019*** [0.247]	0.347*** [0.0682]	-0.219*** [0.0428]
Observations	3,200	3,200	3,200	3,200	2,247	3,200	3,200
R-squared	0.801	0.748	0.685	0.940	0.681	0.792	0.900
rmse	0.0910	0.0990	0.104	0.154	0.256	0.111	0.0685

Included fixed effects: country, industry, year, country*industry and country*year. Robust standard errors in brackets: *** p<0.01, ** p<0.05, * p<0.1.
Sources: OECD ANBERD, EPL and STAN databases; EUKLEMS database; authors' calculations.

APPENDIX 3

FACTOR COMPLEMENTARITY

Our main specifications does not take into account production factors complementarity, thus we are not able to disentangle the direct effect of EPL on a production factor from the indirect effect on this factor caused by changes in other complementary factors. We consider this issue in this Appendix.

All factors may have some degree of complementarity, but because of multicollinearity we investigate only the complementarity of production factors with respectively High-skill employment and ICT diffusion. High-skill employment may be an important factor of ICT diffusion as well as R&D expenses and ICT investment may change significantly the organization of the production process. Table A3-1 and A3-2 presents the estimations results. The estimated coefficient of EPL-impact are robust to the inclusion of these explanatory variables. We find a positive and equivalent relation of High-skill employment share and ICT capital intensity with every capital intensity, except a much more stronger relation between High-Skill employment share and R&D. However, it is important to note that because of High-skill employment and ICT capital intensity endogeneity these estimates are biased. In other words, taking into account of the production factor complementarity in order to distinguish between the direct and indirect effects of EPL on each production factors would require to estimate a simultaneous equation model with endogenous explanatory variables, which is beyond what we can do with our data. Indeed, it would require not only to find exogenous instruments for each production factor but also strong instruments which in particular will not suffer too much from multicollinearity with relatively low time dimension and variability.

Tableau A3-1
Relation (1) Estimate Results Introducing High skilled Employment Share as Explanatory Variable

	(1)	(2)	(3)	(4)	(5)
Factor	Total Cap.	Non-ICT	Cons.	ICT	R&D
Relative cost ($c_f - w$)	-0.445*** [0.0329]	-0.572*** [0.0419]	-0.355*** [0.0444]	-0.431*** [0.0237]	-0.391*** [0.147]
High skilled emp. share	0.108*** [0.0153]	0.140*** [0.0166]	0.0848*** [0.0176]	0.108*** [0.0261]	0.498*** [0.0594]
EPL impact (λ_j·EPL)	-0.00590 [0.0557]	0.127** [0.0601]	0.0335 [0.0637]	-0.144 [0.0941]	-1.227*** [0.244]
Observations	3,200	3,200	3,200	3,200	2,247
R-squared	0.804	0.755	0.688	0.940	0.693
rmse	0.0902	0.0977	0.104	0.153	0.251

Included fixed effects: country, industry, year, country*industry and country*year. Robust standard errors in brackets: *** p<0.01, ** p<0.05, * p<0.1.
Sources: OECD ANBERD, EPL and STAN databases; EUKLEMS database; authors' calculations.

Tableau A3-2
Relation (1) Estimate Results Introducing ICT Capital Intensity as Explanatory Variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Factor	Total Cap.	Non-ICT eq.	Cons.	ICT	R&D	High-skilled	Low-skilled
Relative cost ($c_f - w$)	-0.428*** [0.0272]	-0.414*** [0.0362]	-0.261*** [0.0427]	-0.477*** [0.0226]	-0.272* [0.149]	-0.211*** [0.0537]	-0.209*** [0.0317]
ICT capital intensity	0.273*** [0.00885]	0.283*** [0.00980]	0.159*** [0.0115]		0.198*** [0.0395]	0.0636*** [0.0130]	-0.0227*** [0.00798]
EPL impact (λ_j·EPL)	0.0931* [0.0489]	0.211*** [0.0529]	0.142** [0.0623]	-0.0738 [0.0914]	-1.173*** [0.248]	0.361*** [0.0680]	-0.224*** [0.0428]
Observations	3,625	3,625	3,625	3,625	2,537	3,200	3,200
R-squared	0.845	0.803	0.682	0.942	0.688	0.794	0.901
rmse	0.0847	0.0921	0.108	0.159	0.272	0.111	0.0684

Included fixed effects: country, industry, year, country*industry and country*year. Robust standard errors in brackets: *** p<0.01, ** p<0.05, * p<0.1.
Sources: OECD ANBERD, EPL and STAN databases; EUKLEMS database; authors' calculations.

APPENDIX 4

SURE ESTIMATIONS

Table A4 presents SURE estimates in order to discuss the interdependence between production factors. The SURE estimator allows taking into account of the correlation of the residuals across equations, thus increasing the efficiency of our estimates. The covariance matrix of residuals of the SURE estimation shows that physical capital intensities are strongly correlated, confirming Table A3-2 estimation results. More importantly, the estimated coefficients of EPL-impact are robust to this sensitivity analysis.

Tableau A4
Relation (1) Estimate Using the SURE Estimation Method

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	Capital intensity (log)				Employment share (log)	
	Non-ICT eq.	Cons.	ICT	R&D	High-skilled	Low-skilled
Relative cost ($c_f - w$)	-0.512*** [0.0340]	-0.303*** [0.0393]	-0.442*** [0.0191]	-0.212** [0.0861]	-0.147*** [0.0449]	-0.175*** [0.0264]
EPL impact (λ_f·EPL)	0.172*** [0.0562]	0.0871 [0.0598]	-0.0850 [0.0864]	-0.518*** [0.127]	0.329*** [0.0593]	-0.206*** [0.0373]
Observations	3,625	3,625	3,625	2,537	3,200	3,200
Log-likelihood	17,072					
Correlation matrix of residuals						
Non-ICT eq.	1					
Cons.	0.52	1				
ICT	0.48	0.28	1			
R&D	0.07	0.12	0.09	1		
High-skilled	0.15	0.08	0.07	0.12	1	
Low-skilled	-0.09	-0.08	-0.03	0.02	-0.09	1

Included fixed effects: country, industry, year, country*industry and country*year. Robust standard errors in brackets: *** p<0.01, ** p<0.05, * p<0.1.
Sources: OECD ANBERD, EPL and STAN databases; EUKLEMS database; authors' calculations.

Migrant Remittances and Economic Growth: The Role of Financial Development and Institutional Quality

Imad El Hamma*

Abstract – This paper investigates the conditional effects of remittances on economic growth in 14 Middle East and North Africa (MENA) countries. Using unbalanced panel data over the period 1982-2016, we study the hypothesis that the effect of remittances on economic growth varies depending on the level of financial development and institutional environment in recipient countries. We use Two-Stage Least Squares (2SLS/IV) instrumental variables method in which we address the endogeneity of remittances. Our results reveal a complementary relationship between financial development and remittances to ensure economic growth. The estimations show that remittances promote growth in countries with a developed financial system and a strong institutional environment.

JEL Classification: G23, O17, O22
Keywords: remittances, economic growth, financial development, institutions quality

* *Université Paris-Est-Marne-la-Vallée, ERUDITE, and Université Côte d'Azur, GREDEG, CNRS (Imad.elhamma@gmail.com)*

The author would like to thank the Arab Council for the Social Sciences for the financial support, as well as the participants at the AFSE meeting in Nice and two anonymous referees. The author is also responsible for any error or omission in this document.

Received on 25 August 2017, accepted after revisions on 24 August 2018

To cite this article: El Hamma, I. (2018). Migrant Remittances and Economic Growth: The Role of Financial Development and Institutional Quality. *Economie et Statistique / Economics and Statistics*, 503-504, 123-142. https://doi.org/10.24187/ecostat.2018.503d.1961

The increase in the volume of international migration over recent decades has led to an unprecedented increase in financial flows to labor-exporting countries. Indeed, international migrant remittances,[1] or money sent from migrants to households in the country of origin, have begun to be a significant source of external financing for developing countries. Considering only the remittances passing through formal channels their amount increased by 8.5 percent in 2017, rising to US$ 466 billion (World Bank, 2018). In all regions, remittances have rebounded in 2017: by 20.9 percent in Europe and Central Asia, 11.4 percent in Sub-Saharan Africa, 9.3 percent in the Middle East and North Africa (MENA), 8.7 percent in Latin America and the Caribbean, and by 5.8 percent in East Asia and the Pacific or in South Asia. The trend is expected to continue in 2018, with remittance flows to developing countries growing by an estimated 4.1 percent to reach $485 billion. With US$ 73 billion of remittances, the MENA region is one of the top remittance recipients in the world after East Asia and the Pacific, Latin America and the Caribbean.

In the last decade, remittances have expanded while other financial inflows have declined. This has made remittances one of the most important sources of foreign exchange and household income. They contribute significantly to GDP surpassing Official Development Assistance (ODA), as well as to private debt and portfolio equity. In the countries of MENA region, in 2017, personal remittances received represented on average 6.5% of GDP (World Bank, 2018). The top receivers in terms of percentage of GDP are Lebanon (15.3%) and Palestine (14.3%) closely followed by Jordan (11%), Egypt (9.5%) and Morocco (6.2%) (cf. Appendix, Figure A-I).

However, recorded data on remittances are imperfect and underestimate the actual flows. On the one hand, a number of developing countries do not report remittances in their balance of payments (e.g. Afghanistan, Cuba). On the other hand, since fees for sending money (bank or transfer operators fees) are relatively high, remittances are often sent via informal channels such as friends, relatives and the Hawala system.[2] El Qorchi *et al.* (2003) estimate informal flows in the range of 10 to 50% of recorded remittances. Remittances fees are known to be high, they depend on the transferred amount, the exchange rate and the country of destination. The World Bank estimates that these fees represent about 10% of the amount sent. Consequently, the high costs of operations may discourage migrants from sending small amounts through formal channels. Moreover, while migrants might be able to access formal operators or banking services to send money, this is not necessarily the case for recipients.

In the literature, the macroeconomic effects of remittances have been the subject of renewed attention in recent years. As other financial flows, remittances have positive and negative effects. They may increase investments, affect human capital accumulation and alleviate poverty. They may also significantly reduce work effort, create moral hazards or lead to Dutch disease effects. However, the majority of these studies have only focused on the direct effects and they do not incorporate the indirect or the conditional effects. Potential endogeneity problem may also affect these estimations. Remittances are endogenous to education, household income and labour supply of family members and relatives left behind. Reverse causality,[3] common factors affecting both remittances, economic growth, and measurement error are also sources of endogeneity.

To address the endogeneity of remittances, in addition to their direct effect, this paper examines the conditional effects of remittances on economic growth in 14 MENA countries.[4] Our contribution to the literature consists in looking specifically at the interaction between remittances and financial development, on the one hand, and between remittances and the level of institutional quality, on the other hand. Thus, we include a number of interaction variables in the empirical investigations. Our regressions show that a solid financial system and good level of institutional quality complement the positive effect of remittances on economic growth. The remainder of this paper is organised as follows. The next section provides a literature survey of the relationship between remittances and economic growth. The following

1. Transfers in kind are not included in international statistics.
2. Hawala system is a parallel, informal remittance system. A Hawala transaction does not involve any physical transfer of cash from one country to another one. The system relies on a network of operators called Hawaldars or Hawala dealers. A person willing to transfer money contacts a Hawala operator at the source location. The Hawala operator collects the money and indicates the beneficiary. He then contacts his counterpart in the destination place/country (another Hawala operator) who will deliver the money to the designated beneficiary.
3. Migrants' remittances may reduce income volatility, promote the financial sector and increase the quality of institutions.
4. Algeria (DZA), Egypt (EGY), Iran (IRN), Iraq (IRQ), Israel (ISR), Jordan (JOR), Lebanon (LBN), Turkey (TUR), Morocco (MAR), Syria (SYR), Malta (MLT), Tunisia (TUN) and Palestine (PSE).

section describes the data, model specification and econometric technique. Then the empirical results are discussed.

Literature Survey

Existing studies on remittances do not provide conclusive evidence of their macroeconomic impacts. While some have found that remittances may increase investments (Woodruff & Zenteno, 2007; Giuliano & Ruiz-Arranz, 2009), make human capital accumulation easy (Edwards & Ureta, 2003; Rapoport & Docquier, 2005; Calero *et al*., 2009; Combes & Ebeke, 2011), enhance total factor productivity (Abdih *et al.*, 2012) and alleviate poverty (Akobeng, 2016; Majeed, 2015; Adams Jr & Cuecuecha, 2013), others have pointed out that remittances may significantly reduce recipient households' work effort (El Hamma, 2017; Chami *et al.,* 2005), create moral hazards (Gubert, 2002), accelerate inflation (Khan & Islam, 2013), and lead to Dutch disease effects i.e. an appreciation in the real exchange rate accompanied by resource re-allocation from the traded sector towards the non-traded sector (Amuedo-Dorantes *et al.,* 2010; Bourdet & Falck, 2006; Acosta *et al.,* 2009).

Likewise, neither theoretical nor empirical studies have provided conclusive answers regarding the specific effect of remittances on economic growth. Faini (2002) provides evidence of their positive effect on economic growth, but Chami *et al.* (2003) find a negative correlation between remittances and growth, due to moral hazard and the reduction of recipients' labour force participation. However, Lucas (2005) criticised Chami's study for not taking into account the remittances' endogeneity problem. In the Philippines, using simple correlation and vector autoregression technique (Impulse Response Functions) on annual data for 1985-2002, Burgess and Haksar (2005) argue that the long-term economic effects of remittances are ambiguous. However, they find evidence of a stabilising impact of remittances on private consumption. For the same country, Ang (2009) finds that the overall impact of remittances on growth is positive. Ziesemer (2012) provides evidence suggesting that the effect of remittances on economic growth is stronger in low-income countries (i.e. income lower than US $ 1,200 per capita). Moreover, the author shows the presence of remittances would increase the growth rate by two percentage points. For Latin American countries, Mundaca (2009), using the domestic bank credit as a regressor to examine the effect of remittances on growth, also finds a positive effect of remittances on economic growth. According to this author, a 10% increase in remittances (measured as a percentage of GDP) contributes to increasing per capita GDP by 3.49%. When she drops domestic bank credit from the equation, the GDP per capita increases only by 3.18%.

More recently, in Sub-Saharan African (SSA) countries, Singh *et al*. (2011) report that the impact of international remittances on economic growth is negative. However, countries with good governance have more opportunity to unlock the potential for remittances to improve economic growth. In a related study, using annual panel data for 64 African, Asian, and Latin American-Caribbean countries from 1987-2007, Fayissa and Nsiah (2012) find that remittances boost growth in countries with less developed financial systems, by providing an alternative way to finance investment and helping overcome liquidity constraints. In contrast, Ahamada and Coulibaly (2013) report that remittances do not increase growth in 20 SSA countries: for the authors, remittances do not increase physical capital investment. Adams and Klobodu (2016) using the General Method of Moments estimation technique, examine the effect of remittances and regime durability on economic growth find no evidence that remittances have contributed to economic growth in the SSA region.

Until the last decade, most empirical studies seemed to neglect other channels through which remittances can stimulate economic growth. As stated above, remittances can increase the volume of disposable income and savings. Thus, they can stimulate the investment rate and hence economic growth. In Pakistan, Adams Jr (2003) shows that international remittances have a positive effect on the saving rate. For the author, the marginal propensity to save on international remittances is 0.71, while it is only 0.085 on rental income. Moreover, the author demonstrates that the Pakistani households who receive remittances have a very high propensity to save, and the effect of remittances on growth could be amplified if remittances are channelled by the banking sector. In Kyrgyzstan, Aitymbetov (2006) also finds that remittances positively affect economic growth because about 10% of these transfers are invested. Using survey data from Mexico, Woodruff and Zenteno

(2007) find that 5% of remittances received are invested in micro-enterprises. For the authors, remittances have a positive effect on economic growth because they boost investment in the long term. Finally, in five Mediterranean countries, Glytsos (2005) investigates the impact of exogenous shocks of remittances on consumption, investment, imports, and output. Building a Keynesian model in which he includes the remittances as part of disposable income, he demonstrates that remittances boost growth. For the author, the effect of remittances on growth passes through the income disposable and investment channels.

These empirical studies investigate the direct effect of remittances on the determinants of economic growth. However, other researchers have investigated the conditional effect by incorporating an interaction term between international remittances and other variables that could complement the direct effect in stimulating growth. Fajnzylber *et al*. (2008) explore for Latin American countries the remittances' effect on real per capita growth. The authors include as a regressor a term of interaction between remittances and human capital, political institutions and the financial development. They find a negative indication of the remittances' coefficient and a positive sign of the interaction term when human capital and institutions are included. However, the remittances coefficient has a positive sign and the interaction term has a negative sign when the financial system depth is included. Fajnzylber *et al*. (2008) conclude that human capital accumulation and improvement in institutional quality enhance the positive effect of remittances on economic growth. But the financial development substitutes for international remittances in stimulating growth. On the basis of these findings, remittances are considered to be ineffective in enhancing economic development in countries where financial institutions are weak or where there is low human capital accumulation. Giuliano and Ruiz-Arranz (2009) conducted a study similar to Mundaca's. They used financial development in interaction with remittances as regressor and found that remittances are an alternative way to finance investment, help overcome liquidity constraints (substitute for the absence of financial development). In addition, Bettin and Zazzaro (2012) include an interaction variable (remittances multiplied by bank efficiency index) and find a complementary relation between remittances and financial development. As Giuliano and Ruiz-Arranz (2009), Catrinescu *et al.* (2009) use political and institutional variables as terms of interaction with remittances. The authors, using the Anderson-Hsio estimator, found a positive relation between remittances and growth. However, Barajas *et al.* (2009) use microeconomics variables as instruments to deal with the potential endogeneity between remittances and growth. They find non-significant direct effects of growth of remittances in an estimate for a panel of 84 developing countries.

The literature review above reveals that the impact of remittances on economic growth found in the studies highly depends on the estimation method, the sample period, the country characteristics (strong financial development, good institutions quality, strong bank efficiency), observed and unobserved country-specific effects and the endogeneity of regressors. However, as far as we know, no studies have directly investigated the conditional effect of remittances on growth in the MENA region, having focused only on the direct effect. This paper is an attempt to fill the gap. Specifically, we investigate the interaction between remittances, financial development and the level of institutional quality. To do this, a number of interaction variables have been included in the specifications to assess the conditions in which remittances can improve economic growth in MENA countries.

Model Specification, Data and Variables

We investigate empirically the links between remittances, financial development, institutional quality and economic growth by using an extended version of the growth model of Barro (1991, 1996). The following reduced-form regression is used:

$$\text{GrowthGDP}_{it} = \alpha_0 + \beta_0 \text{GDP}_{it-1} + \beta_1 \text{REM}_{it} + \theta X_{it} + \eta_t + \nu_i + \varepsilon_{it} \quad (1)$$

Here, GrowthGDP_{it} indicates the growth of real GDP per capita in country i at time t. GDP_{it-1} is the initial (logarithm) GDP per capita, REM_{it} is the key explanatory variable referring to the ratio of the remittances to GDP, η_t is the time-specific effect, ν_i an unobserved country-specific effect and ε_{it} is the error term. X_{it} is the matrix of control variables.

Following the definition of the World Bank, remittances are the current transfers sent by

resident or non-resident workers to their countries of origin. They include personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash received (sent) by resident households from (to) nonresident households. Personal transfers thus include all current transfers between resident and nonresident individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities. The remittances variable is scaled by the home country's GDP. It should be kept in mind that the data underestimate the amounts because they do neither include transfers through informal channels (either such as hand-carries by friends or family members or organised as through Hawala), nor in-kind remittances (clothes and other consumer goods).

The choice of control variables and proxies of the determinants of growth are guided by the literature (Barro, 1996; Giuliano & Ruiz-Arranz, 2009; Combe & Ebeke, 2011; Imai *et al*., 2014). These variables consist of:

- The initial GDP per capita ($\log(GDP_{t-1})$) to test the convergence hypothesis (Barro, 1996);

- The ratio of gross fixed capital formation to real GDP used as a proxy for investment in physical capital;

- A proxy for the country's degree of openness, measured by the ratio of the sum of exports and imports to GDP;

- The inflation rate, as a proxy for monetary discipline and macroeconomic stability;

- Government spending, measured as the ratio of government consumption to GDP;

- The age dependency ratio, that is, the ratio of dependents (people younger than 15 or older than 64) to the working-age population (those ages 15-64), as a proxy of capital human.

To capture the role of financial development on the effect of remittances on growth, we use three proxies related to the banking sector: the domestic credit to the private sector by banks as a percentage of GDP, M3 (the sum of currency and deposits in the central bank) as part of GDP and bank efficiency ratio. The first variable evaluates financial intermediation. The second one is used as a proxy of the size of financial intermediaries (relative to the size of the economy). The bank efficiency ratio is defined as the sum of expenses (without interest expenses) divided by the revenue. This is a quick and easy measure of banking productivity, i.e. a bank's ability to turn resources into revenue. All these variables have been chosen to form the financial indicator of World Development Indicators (WDI).

To evaluate the role of the institutional quality level on the effect of remittances on growth, we use four proxies: Political Institutions index, Law and Order, Government Stability and Democratic Accountability indexes. The first index is used to assess the political stability of the countries, Law and Order is used to assess the strength, impartiality of the legal system and popular observance of the law. Government Stability and Democratic Accountability indexes are used to respectively evaluate the government's ability to carry out its declared program(s) and its ability to stay in office, and how responsive government is to its people. These indices on institutional quality are available in data from the PRS Group, who specializes in country risk analysis.[5]

Apart from the variables on institutions quality, all the others are drawn from the World Bank's indicators (World Development Indicators, WDI). WDI is a collection of time-series data for 217 economies, with many indicators going back to more than 50 years, that provides cross-country comparable statistics about development and people's lives around the globe. Summary statistics for all variables and availability of the data are detailed in the Appendix (see Table A-1). The model is estimated on annual observations, as well as 4-years averaged data. All the variables are described in the Appendix (see Table A-2).

The paper implements a panel regression analysis of 14 countries ($N = 14$) from 1982 to 2015 ($T = 34$). The countries are Algeria, Egypt, Iran, Iraq, Israel, Jordan, Lebanon, Malta, Morocco, Palestine, Syria, Tunisia, Turkey and Yemen. These countries were chosen for being the top emigration countries in the region, and also countries for which relevant data on remittances inflows was available over the period 1982-2016.

As a starting point (equation (1)), we do not include variables for financial development

5. Detailed definitions and calculation method for institutional quality data are available at https://www.prsgroup.com/wp-content/uploads/2012/11/icrgmethodology.pdf.

or institutional quality. Then, in a second set of regressions, we test the hypothesis that the responsiveness of economic growth to remittances depends on the level of financial development and the level of institutional quality. In other words, we explore how the level of financial development or the institutional quality level of the recipient country affects the impact of remittances on economic growth. The novelty of the present paper lies in the estimation of the combined effect of remittances and conditional variables (financial development or the institutional quality). To this end, we introduce an interaction term between remittances and the financial development level or the institutional quality in equation (1). The modified versions of equation (1) that include the interactive terms can be written as:

$$\begin{aligned} \text{GrowthGDP}_{it} &= \alpha_i + \beta_0 \text{GrowthGDP}_{it-1} \\ &+ \beta_1 \text{REM}_{it} + \beta_2 (\text{REM}_{it} \times \text{Findvp}_{it}) \\ &+ \beta_3 \text{Findvp}_{it} + \theta X_{it} + \eta_t + \nu_i + \mu_{it} \end{aligned} \quad (2)$$

$$\begin{aligned} \text{GrowthGDP}_{it} &= \alpha_i + \beta_0 \text{GrowthGDP}_{it-1} \\ &+ \beta_1 \text{REM}_{it} + \beta_2 (\text{REM}_{it} \times \text{InstQ}_{it}) \\ &+ \beta_3 \text{InstQ}_{it} + \theta X_{it} + \eta_t + \nu_i + \varepsilon_{it} \end{aligned} \quad (3)$$

In equation (2) and (3), the interaction term indicates that the effect of remittances on economic growth is different for different value of financial development or institutions quality, respectively. The unique effect of remittances on economic growth is not limited to β_1 but also depends on the value of β_2 and financial development/institutions quality. In other words, β_1 and β_2 provide information on the marginal impact[6] of remittances on growth conditional upon the financial development level or the institutional quality. Moreover, in equation (2), if β_1 is positive and β_2 is negative, remittances are more effective in promoting growth in countries with a shallower finance system. In other words, a negative interaction means that remittances have de facto acted as a substitute for financial services to enhance economic growth. However, when the effect of remittances is significantly negative, a positive interaction suggests that remittances and the financial system are complements (a better functioning financial system would lead remittances towards growth-enhancement). In a similar way, in equation (3), a positive interaction ($\beta_2 > 0$) would indicate that the institutional quality enhances the positive effect of remittances on growth when ($\beta_1 > 0$). Otherwise, when the interaction is negative ($\beta_2 < 0$), the institutional quality diminishes ($\beta_1 > 0$) or aggravates ($\beta_1 < 0$) the negative impact of remittances on growth.

A panel fixed effect (FE-OLS / OLS) estimation is used to estimate the effect of remittances on economic growth. However, we apply a Fixed Effects Two-Stage Least Squares (FE 2SLS) developed by Bollen (1996) to deal with the potential endogeneity problem and measurement errors. For example, remittances and finance development are likely to be correlated with the error terms because of the reverse causality from growth to those variables. However, when we run FE 2SLS, we test if the instruments selected are correlated with the endogenous regressors using the weak instrument test developed by Cragg and Donald (1993) and test their endogeneity using the Sargan's overidentifying restrictions test. According to the literature (Bollen, 1996; Bollen & Paxton, 1998; Pesaran & Taylor, 1999; Bollen *et al*., 2007), 2SLS method not only deals with the endogeneity problem and the possible causality between remittances and growth: it easily caters for non-linear and interactions effects, it permits the routine use of often ignored diagnostic testing procedures for problems such as heteroscedasticity and specification error, and simulation evidence from econometrics suggests that 2SLS may perform better in small samples. For the endogenous variables, we rely on the internal instruments that are one lag variables. To check the validity of our estimations, collinearity, causality and endogeneity tests have been applied. In all the regressions, time-dummy variables were included to deal with any specific time effect. This should help to reduce the degree of heteroscedasticity in the error terms. We believe that would make the FE 2SLS more reliable because they are asymptotically efficient as estimates from Generalized Method of Moments developed by Arellano and Bond (1991) and Blundell and Bond (1998).

Differentiating equations (2) and (3) with respect to remittances, equations (4) and (5) capture the marginal effect of remittances on GDP per capita growth for different levels of financial development and institutional quality, respectively. Moreover, according to equation (4) and (5), the minimum level (threshold) of

6. β_1 measures the direct effect while β_2 represents to the conditional effect.

financial development and institutional quality at which the effect of remittances on economic growth is equal to zero is $(-\beta_1/\beta_2)$.

$$\nu\text{Findvp} = \frac{\partial \text{REM}}{\partial \text{GDP}} = -\beta_1 + \beta_2 \times \text{Findvp}_{it} \quad (4)$$

$$\nu\text{InstQ} = \frac{\partial \text{REM}}{\partial \text{GDP}} = -\beta_1 + \beta_2 \times \text{InstQ}_{it} \quad (5)$$

Econometric Results

Tables 1 and 2 (models 9-11) report FE-OLS and 2SLS regression based on equation 2 and using both annual and 4-year averaged data to avoid any potential simultaneity bias. However, we only interpret the results of the 2SLS estimation, because OLS results are likely to be biased: the relationship between remittances-growth and remittances-financed development is certainly endogenous. Fixed effects and period effects are added to the whole regression, which makes sense as far as the level of remittances may change over time. Tables 1, 2 and 3 show that the regressions satisfy mutually the Kleibergan-Paap test for weak instruments, and overidentification test of all instruments. The estimations reported in Table 1 (Model 1) show that the coefficient of the GDP lag is negative and strongly significant, and investment and trade openness are positively correlated with economic growth. Human capital, population growth rate and government spending negatively affect the growth rate (Jongwanich, 2007; Acosta *et al*., 2009). This finding seems to validate the idea that higher involvement of the government in the economy will have significant consequences on economic growth (Fer & Henrekson, 2001). Finally, high inflation is associated with a lower growth rate. These results are confirmed by estimation based on 4-year averaged data (see Table 2).

Moving to the key variables, we can see that all the measures of financial development have a positive and statistically different from zero effect. However, the estimated coefficients of remittances are not statistically different from zero (i.e. remittances do not have a significant impact on economic growth). These findings contrast with previous literature which found a positive effect of remittances on economic growth (Klobodu *et al.,* 2016; Imai *et al.,* 2014; Nyamongo *et al.,* 2012). These results suggest that remittances inflows to MENA countries could be sent in the presence of asymmetric information. The latest creates an imbalance of power between migrants and recipients: the latter may adopt an opportunistic behaviour and display a deterioration in their living conditions in order to receive more remittances. In other words, recipients who opt to live off the transfers they receive are likely to decrease their labour force participation or work effort, limit their job search, or engage in risky ventures (Ebeke, 2012). In these cases, remittances arguably create moral hazard which is harmful to economic growth.

These results also lead to questioning the nature of the relationship between remittances and growth. In other words, the effect of remittances on economic growth may depend on other variables. Therefore, we explore this issue by investigating whether the financial development and the institutional level of the receiving countries influence the effect of remittances on the performance of economic growth. First, we estimate equation (2) in which a number of interaction variables have been added. We explore whether there is a substitutability or complementarity relationship between remittances and financial development in promoting economic growth in MENA countries. Models 2 to 4 (Table 1) and Models 9 to 11 (Table 2) present the outcomes of the regression models for both annual and four-year averaged data. In each model, we use one proxy for financial development. The estimated coefficients of remittances and the interaction term are significantly negative and positive, respectively. As we explain above, the remittances and the financial development have a complementary effect in boosting the growth of GDP. This finding suggests that remittances have a positive effect on economic growth only if the domestic banking system is sufficiently sound. Similar findings were also obtained by Bettin and Zazzaro (2012) and Nyamongo *et al.* (2012). However, these results are not in line with those of Barajas *et al.* (2009) or Giuliano and Ruiz-Arranz (2009) that supported the substitution view. Unlike our study, Giuliano and Ruiz-Arranz only used measures of the size of the financial sector, ignoring its efficiency (i.e.the ability to provide high-quality products and services at the lowest cost).

Solving equation (4), the threshold for a positive effect of remittances on economic growth is equal to $-(-\beta_1/\beta_2)$. Based on 2SLS estimations of model 1, and taking into account the ratio of domestic credit provided by banks to GDP as measure of the level of financial development, one obtain a value of -(-0.31/0.07309 = 4.2413). The

Table 1
Growth, Remittances and Financial Development (Annual Data)

Independent variables	Dependent variable: GDP per capita growth (Annual data)							
	Model 1		Model 2		Model 3		Model 4	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
GDP per capita (initial)	-0.0997	-1.281***	-0.106	-1.661***	-0.143	-1.582***	-0.113	-1.875***
	(0.108)	(1.467)	(0.0986)	(0.578)	(0.0902)	(1.583)	(0.0933)	(0.523)
Investment	-0.515	3.151***	1.638*	5.591***	1.615*	4.904***	1.569*	5.905***
	(1.083)	(1.184)	(0.881)	(1.571)	(0.875)	(1.637)	(0.878)	(1.590)
Inflation	-0.00250	-0.00733*	-0.0113	-0.0312**	-0.0120	-0.0300***	-0.0109	-0.0295***
	(0.0118)	(0.00722)	(0.00938)	(0.0181)	(0.00935)	(0.0168)	(0.00936)	(0.0171)
Trade openness	0.137	-0.751	0.504	0.916	0.317	0.935	0.363	1.414
	(0.755)	(1.666)	(0.594)	(1.453)	(0.588)	(1.449)	(0.582)	(1.526)
Population growth	-1.996***	-2.932***	-1.378**	-3.232***	-1.987***	-2.566***	-1.443**	-3.406***
	(0.655)	(0.766)	(0.570)	(0.643)	(0.600)	(0.650)	(0.578)	(0.656)
Government spending	-1.135	-3.915**	-1.757*	-3.623**	-2.081**	-2.523	-1.777**	-3.479**
	(1.151)	(1.924)	(0.928)	(1.741)	(0.905)	(1.751)	(0.905)	(1.765)
Human capital	-0.338	-7.638***	0.162	-5.805***	1.231	-5.590***	0.105	-5.444***
	(1.616)	(2.835)	(1.349)	(2.023)	(1.343)	(1.879)	(1.317)	(2.109)
Remittances (REM)	0.479	1.005	-0.226	-0.310**	-0.541**	-0.4580**	-0.330	-0.1421*
	(0.274)	(0.486)	(0.172)	(0.017)	(0.227)	(0.099)	(0.222)	(0.084)
Findvp1			0.0113*	-0.0560*				
			(0.0142)	(0.0330)				
REM * Findvp1			0.0033	0.07309**				
			(0.069)	(0.0085)				
Findvp1					-0.373*	0.4945*		
					(0.199)	(0.0289)		
REM * Findvp2					0.0564	0.1438*		
					(0.0234)	(0.0122)		
Findvp3							-0.0487	0.0140**
							(0.0357)	(0.0068)
REM * Findvp3							0.373*	0.0757**
							(0.199)	(1.0164)
Constant	-0.163**		0.0331*		0.0289		0.0393*	
	(0.0733)		(0.0847)		(0.0851)		(0.0847)	
Observations	359	355	311	309	331	324	311	303
R-squared	0.331	0.292	0.292	0.295	0.234	0.276	0.234	0.290
Kleibergen Paap test stat.		0.269		2.873		1.270		1.321
P-value Overidentit		0.311		0.728		0.292		0.172
Number of id	14	14	14	14	14	14	14	14

Notes: * p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses and their significance were calculated using the robust procedure in the Stata software application. Findvp1 = Domestic credit to private sector by banks in % of GDP; Findvp 2 = Liquide Liabilities (Broad money) in % GDP sector to GDP; Findvp3 = Claims on private sector (annual growth as % of broad money).
Sources: See Table A-1 in Appendix; author's calculations.

Table 2
Growth, Remittances, Financial Development and Institutional Quality (4-Year Average Data)

Independent variables	Dependent variable: GDP per capita growth (4 year average)								
	Financial development			Institutions quality				Findvp & InstQ	
	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16	Model 17
	Findvp1	Findvp2	Findvp3	Polit. risk	Law and order	Gov. Instab.	Demo. Account..	Findev1/ Pol. Risk	Findvp2/ Gov. Sta.
GDP per capita initial	-0.057***	-0.052***	-0.087***	-0.024***	-0.016***	-0.018***	-0.231***	-0.058***	-0.015***
	(0.02)	(0.03)	(0.01)	(0.02)	(0.03)	(0.00)	(0.04)	(0.08)	(0.06)
Investment	1.060***	1.063**	1.026**	1.724**	1.313***	1.420***	3.994*	1.179**	1.280**
	(0.13)	(0.11)	(0.10)	(0.08)	(0.00)	(0.08)	(0.04)	(0.25)	(0.41)
Human capital	1.195	1.234	1.038	8.978	3.499	5.163	3.214	6.385	-3.291
	(0.79)	(0.97)	(0.18)	(0.23)	(0.85)	(0.32)	(0.04)	(0.35)	(0.98)
Government spending	0.0483*	0.0471**	0.0560**	1.161**	0.421***	0.761*	1.354***	0.846**	0.398**
		(0.02)	(0.01)	(0.22)	(0.06)	(0.03)	(0.04)	(0.33)	(0.99)
Inflation (coefficient * 100)	-0.02***	-0.034***	-0.0475***	-2.41***	-0.719***	-1.47***	-1.40***	-1.53**	-0.641**
	(0.06)	(0.13)	(0.08)	(0.19)	(0.58)	(0.28)	(0.04)	(0.26)	(0.65)
Population Growth	-0.321***	0.301***	0.259**	1.823**	5.012**	3.0444*	6.138	3.459*	4.330*
	(0.10)	(0.09)	(0.05)	(0.20)	(0.61)	(0.29)	(0.04)	(0.26)	(0.64)
Trade Openness	-0.0311	-0.0252	-0.0714	-0.333	-0.0601	0.148	-1.110	-0.114	0.0266
	(0.08)	(0.06)	(-0.09)	(0.10)	(0.01)	(0.17)	(0.04)	(0.07)	(0.06)
Remittances (REM)	-0.0135**	-0.254**	-0.975***	0.897**	0.646*	2.207***	21.46**	-0.0259*	-0.749
	(0.03)	(0.05)	(0.05)	(-0.08)	(0.39)	(-0.26)	(-0.04)	(-0.00)	(0.48)
Findvp1	0.154**							0.072 **	
	(0.14)							(0.03)	
REM * Findvp1	0.0626*							0.094*	
	(0.20)							(0.65)	
Findvp2		0.0345**							0.0305
		(0.01)							(0.10)*
REM * Findvp2		.0181 ***							.0364**
		(0.00)							(0.44)
Findvp3			0.894***						
			(0.15)						
REM * Findvp3			0.0885**						
			(0.05)						
Political Risk Index				-0.144				0.0984	
				(0.22)				(0.34)*	
REM * Pol.Risk Index				0.0270				0.176	
				(0.04)				(0.16)	
Government Instability					-0.436***				-0.382*
					(0.84)				(0.9)
REM * Gov. Instability					0.0687***				0.0397
					(0.05)				(0.03)
Law and Order						-0.295**			
						(0.15)			
REM * Law and Order						0.0540***			
						(0.27)			
Democratic Accountability							7.488		
							(0.04)		
REM * Demo. Account.							0.062		
							(0.04)		
Observations	61	61	58	58	58	58	58	58	58
R-squared	0.232	0.231	0.254	0.392	0.119	0.230	0.131	0.219	0.323
Kleibergen Paap test stat.	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.000
P-value Overidentit.	0.458	0.456	0.468	0.789	0.759	0.843	0.755	0.525	0.568
Number of id	14	14	14	13	13	13	13	13	13

Notes: * p<0.05, ** p<0.01, *** p<0.001. No data from Institutional Quality Database being available for Palestine, the country was excluded from the sample in models 12 to 17.
Sources: See Table A-1 in Appendix; author's calculations.

sample mean is equal to log(68.435) = 4.2196, indicating that the main part of the sample could benefit from remittance flows.

Table 3 provides the list of countries satisfying the threshold for the estimated models (models 2 to 4). We can see that 8 out of 14 countries satisfy the requested threshold of models 2 and 3. However, only 6 countries reach the requested threshold estimated with model 4. In the other countries, the impact of remittances on growth is negative.

For example, in the case of Egypt, when financial development is measured as the ratio of domestic credit provided by the financial sector to GDP, the total effect is $\partial GDP / \partial REM = -0.4352 + (0.1873 \times 4.4775) = 0.0172$. This indicates that a 1% increase in the share of remittances in GDP leads to a 0.0172% increase in GDP per capita growth rate. However, in Algeria, a 1% increase in remittances leads to a 0.046% decrease in the GDP growth rate. Figure I presents the impact of remittances on GDP per capita growth calculated for each country at the mean level of the three financial development indicators. This figure shows that whatever the financial development indicator, only 6 countries of the sample seem to benefit from remittances.

As for the last estimations, all control variables have the expected sign and are on the whole significant, whatever the nature of the specification. From Table 4, we can note that the direct effect of the institutional variables is positive (with one exception, the case of the democratic accountability). This suggests that countries with high level of institutions quality (lower risk) register a higher growth rate than countries with low level of institutions quality. This finding is in line with Farooq *et al*. (2013) for Pakistan, Agostino *et al*. (2016) for African countries, Huang (2015) for Asia Pacific countries and Alam (2017) for a panel of 86 countries.

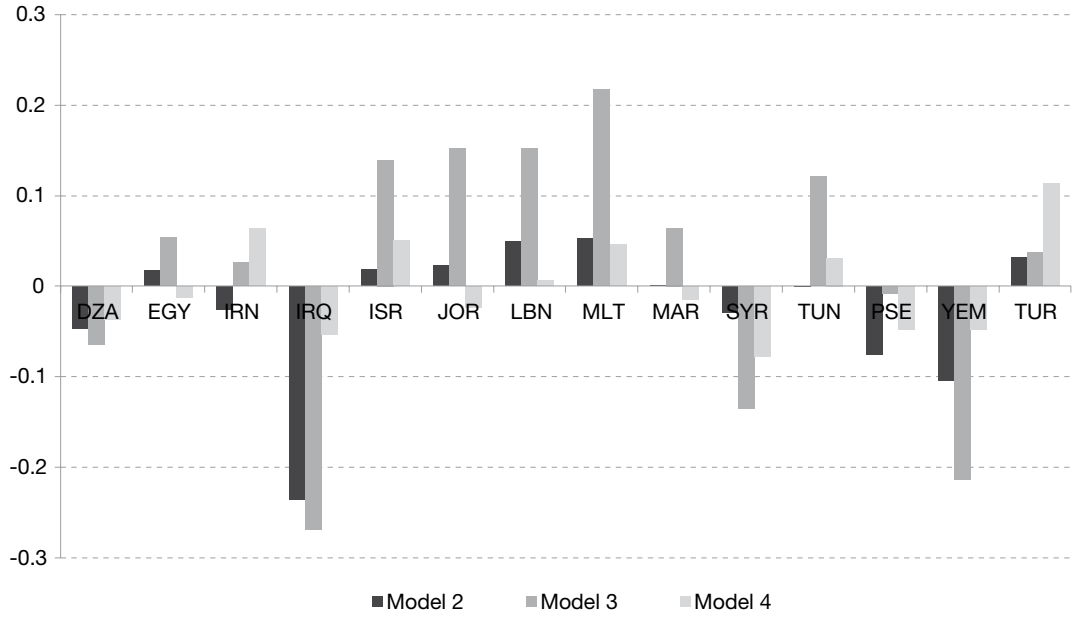
Results of equation (3) appear in Table 4 (annual data) and in Table 2 (4-year averaged data, models 12 to 15). In this estimation, we test the interaction between remittances and the institutional environment. In other words, the specification allows us to test the hypothesis that the effect of remittances on growth is conditioned by the institutional quality. We present five specifications. In the first one, we use the composite Political Risk Index. This index is the sum of 12 components measuring various dimensions of the political and business environment faced by the firms operating

Table 3
Financial Development Threshold (Annual Data)

Mean by component				Model 2		Model 3		Model 4	
				β_1	β_2	β_1	β_2	β_1	β_2
				-0.3100	0.0730	-0.458	0.1438	-0.1421	0.0757
	Findvp1	Findvp2	Findvp3	Threshold					
Algeria	3.601424	2.735302	1.382847	4.2413		3.1850		1.8771	
Egypt	4.477593	3.554391	1.709718	Countries satisfying the threshold by model					
Iran	4.247697	3.364963	2.721709						
Iraq	1.019601	1.317312	1.173017	Egypt		Egypt			
Israel	4.487161	4.152959	2.537411	Iran		Iran		Iran	
Jordan	4.545133	4.240894	1.564242	Israel		Israel		Israel	
Lebanon	4.913593	4.240236	1.956086	Jordan		Jordan		Lebanon	
Malta	4.958192	4.691771	2.4798	Lebanon		Lebanon		Malta	
Morocco	4.253182	3.630694	1.6798	Malta		Malta		Tunisia	
Palestine	3.209784	3.127658	1.240927	Morocco		Morocco		Turkey	
Syria	3.837318	2.241324	0.8459081	Tunisia		Tunisia			
Tunisia	4.24037	4.026381	2.286178	Turkey		Turkey			
Turkey	4.66627	3.443014	3.372612						
Yemen	2.813941	1.700788	1.23657						

Sources: See Table A-1 in Appendix; author's calculations based on annual estimation (cf. Table 1).

Figure I
Marginal Effect of Remittances on Economic Growth Based on Each Country's Findvp Index Value



Sources: See Table A-1 in Appendix; author's calculations.

in a country. The value of this index varies from 0 for very high risk to 100 for very low risk. Then we replace the Political Risk Index by indices of Government Stability, Law and Order, and Democratic Accountability to better assess which of these components is effective in transmitting the effect of remittances to economic growth.

Considering our variables of interest, we note that all the interaction terms are positive and significant (exception for democratic accountability). The coefficients of remittances are negative, meaning that a higher level of institutional quality could eliminate the negative effect of remittances on economic growth. Remittances and institutional quality are complements in enhancing growth. Thus, the strength and impartiality of the legal system, popular observance of the law, the government's ability to carry out its declared programs, and its ability to stay in office send a positive sign to recipient households, which may correct the asymmetry of information and promote growth. This implies that, in MENA countries, the economic performance is positively correlated with the quality of institutions. Based on these results, Table 5 compares this calculated threshold with the level of the institutional quality in each country of the sample. As we can see, out of 14 countries considered in the analysis, only Iraq and Lebanon do not have the robust and resilient institutional system required to benefit from remittances. Figure II shows the marginal effect of remittances on growth based on each country's Institutions quality index value. As we can see, remittances may have a negative effect on economic growth. However, the institutions of the country of origin can moderate this effect. First, a legal and regulatory system involving protection of property rights, contract enforcement, and good accounting practices has been identified as essential for financial development (Huang, 2010). A solid financial system in the country of origin increases migrants' confidence in the banking system, and money will be sent through banks. In the country of origin, remittances tend to reduce the liquidity constraints of the financial system, allowing to finance other projects stimulating economic growth.

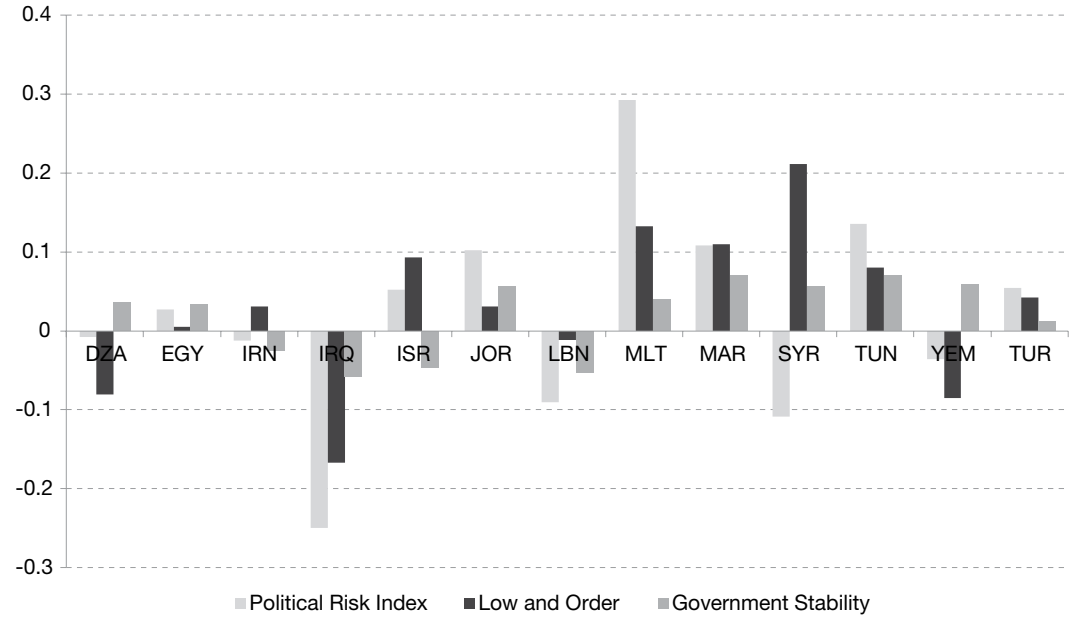
Policy implications are of different orders. First, remittances might become a substitute for inefficient or non-existent credit markets, providing local entrepreneurs with an alternative source of credit, and helping bypass the

Table 4
Growth, Remittances and Institutional Quality (Annual Data)

Independent variables	Dependent variable: GDP per capita growth (Annual data)							
	Model 5		Model 6		Model 7		Model 8	
	OLS	*2SLS*	*OLS*	*2SLS*	*OLS*	*2SLS*	*OLS*	*2SLS*
GDP per capita (initial)	-0.161*	-1.983***	-0.105	-1.478***	-0.120	-1.304***	-0.132	-1.320***
	(0.0909)	(0.804)	(0.0879)	(0.669)	(0.0926)	(0.488)	(0.0886)	(0.490)
Investment	1.639*	4.642***	1.648*	5.057***	1.363	4.738***	1.601*	5.780***
	(0.896)	(1.618)	(0.897)	(1.531)	(0.883)	(1.593)	(0.883)	(1.598)
Inflation	-0.0116	-0.0270*	-0.0113	-0.0290*	-0.00760	-0.0272*	-0.0133	-0.0288*
	(0.00942)	(0.0154)	(0.00945)	(0.0164)	(0.00957)	(0.0153)	(0.00973)	(0.0160)
Trade Openness	0.276	0.854	0.508	0.880	0.162	0.830	0.246	1.037
	(0.614)	(1.418)	(0.578)	(1.434)	(0.584)	(1.449)	(0.590)	(1.520)
Population Growth	-2.092***	-2.836***	-1.410**	-3.033***	-1.785***	-2.582***	-1.513***	-3.219***
	(0.621)	(0.611)	(0.574)	(0.602)	(0.603)	(0.656)	(0.561)	(0.575)
Government spending	-2.133**	-2.611	-1.746*	-3.365**	-1.707*	-2.943*	-2.028**	-3.353**
	(0.911)	(1.723)	(0.906)	(1.695)	(0.936)	(1.696)	(0.931)	(1.699)
Human capital	0.841	-5.893***	0.125	-5.661***	1.137	-5.313***	0.436	-5.606***
	(1.279)	(1.991)	(1.419)	(1.936)	(1.351)	(1.824)	(1.355)	(2.031)
Remittances (REM)	-0.588**	-0.6821**	-0.220	-0322*	-0.410**	-0.428**	-0.296	0.570
	(0.239)	(0.075)	(0.071)	(0.024)	(0.014)	(0.045)	(0.216)	(0.340)
Political Risk Index	-0.0175	0.0520**						
	(0.0246)	(0.0351)						
REM * Pol. Risk Index	0.218**	0.0124**						
	(0.090)	(0.0137)						
Law and Order			-0.0327	0.0725*				
			(0.192)	(0.280)				
REM * Law and Order			0.0974	0.0981**				
			(0.0999)	(0.144)				
Government Stability					0.180	0.245*		
					(0.117)	(0.130)		
REM * Gov. Stability					0.098*	0.0569*		
					(0.0548)	(0.0113)		
Democratic Accountability							0.163	-0.0399
							(0.170)	(0.244)
REM * Demo. Account.							0.00991	-0.105
							(0.0890)	(0.105)
Constant	1.907*		1.133		-2.149		1.423	
	(7.653)		(7.998)		(7.681)		(7.896)	
Observations	316	310	313	310	313	310	313	310
R-squared		0.246		0.659		0.252		0.242
Kleibergen Paap test stat.		0.365		1.863		1.654		1.761
P-value Overidentit.		0.311		0.728		0.292		0.342
Number of id	13	13	13	13	13	13	13	13

* p<0.05, ** p<0.01, *** p<0.001. Standard errors in parentheses; significance is calculated using Stata's robust procedure.
Note: Data from Institutional Quality Database are not available for Palestine.
Sources: See Table A-1 in Appendix; author's calculations.

Figure II
Marginal Effect of Remittances on Growth Based on Each Country's Institutions Quality Index Value



Note: Data from Institutional Quality Database are not available for Palestine.
Sources: See Table A-1 in Appendix; author's calculations.

Table 5
Institutional Quality's Threshold (Annual Data)

Mean by component				Model 5		Model 6		Model 7	
				β_1 -0.6821	β_2 0.0124	β_1 -0.322	β_2 0.0981	β_1 -0.428	β_2 0.0569
	Political Risk Index	Law and Order	Government Stability	Threshold					
Algeria	54.2	2.5	8.2	54.7871		3.2824		7.5220	
Egypt	57.0	3.3	8.1	Countries satisfying the threshold by model					
Iran	53.8	3.6	7.1						
Iraq	34.7	1.6	6.5	Egypt		Egypt		Algeria	
Israel	59.0	4.2	6.7	Israel		Jordan		Egypt	
Jordan	63.0	3.6	8.5	Jordan		Israel		Jordan	
Lebanon	47.6	3.2	6.6	Malta		Malta		Malta	
Malta	78.3	4.6	8.2	Morocco		Morocco		Morocco	
Morocco	63.5	4.4	8.8	Turkey		Turkey		Turkey	
Syria	46.1	5.4	8.5	Yemen		Yemen		Tunisia	
Tunisia	65.7	4.1	8.8	Tunisia		Tunisia			
Turkey	59.2	3.7	7.7						
Yemen	51.9	2.4	8.6						

Note: Data from Institutional Quality Database are not available for Palestine.
Sources: See Table A-1 in Appendix; author's calculations based on Table 3.

lack of collateral or high lending costs to start productive activities (Giuliano & Ruiz-Arranz, 2009). Second, a higher level of institutions quality (enforcement of contracts, property rights, absence of corruption), might reassure the migrants regarding the situation of their home country, possibly leading to virtuous circles of migrants increasing their transfers to invest, innovate and take part in the economic activity, and recipient families further motivated to invest in physical and human capital.

* *
*

In the last two decades, remittances reached the highest level in history and the receiving countries realized their importance. However, despite the growing literature, economists and researchers do not have a clear consensus regarding their impact on economic growth. Indeed, since many channels exist, it is challenging to establish the direction of relationship between migrants' transfers and economic growth. In this paper, we were interested in the role of financial sector and institutions quality as channels from which remittances may affect growth. Thus, we use, respectively, three and four indexes of financial development and institutions quality. Our Two-Stage Least Squares estimations show that high level of financial development and a strong institutional environment are required to enable remittances to enhance growth, independently of the measure of financial development and institutions quality used. However, our data have several limitations. First, we could not find an indicator taking into account the complex multidimensional nature of financial development. In other words, there is no composite measure that would encompass simultaneously the size, depth and efficiency of financial institutions. Second, the frequency and availability of data on institutions quality within the time horizon of the study vary between countries, making international comparisons difficult. Third, we did not include informal remittances and in-kind transfers, which may affect our estimations. Finally, within these limits, a policy implication for MENA countries could be that it is important not only attract more remittances inflows, but also to should provide more incentives for theses inflows to be spent in productive investments contributing to economic growth. □

BIBLIOGRAPHY

Abdih, Y., Chami, R., Dagher, J. & Montiel, P. (2012). Remittances and Institutions: Are Remittances a Curse? *World Development*, 40(4), 657–666. http://doi.org/10.1016/j.worlddev.2011.09.014

Acosta, P. A., Lartey, E. K. K. & Mandelman, F. S. (2009). Remittances and the Dutch disease. *Journal of International Economics*, 79(1), 102–116. http://doi.org/10.1016/j.jinteco.2009.06.007

Acosta, P. A., Baerg, N. R. & Mandelman, F. S. (2009). Financial Development, Remittances, and Real Exchange Rate Appreciation. *Federal Reserve Bank of Atlanta Economic Review*, 94(1), 14. http://hdl.handle.net/10419/57669

Adams, R. H., Jr. (2003). International Migration, Remittances, and the Brain Drain: A Study of 24 Labor-Exporting Countries. World Bank, *Policy Research Working Paper* N° 3069. https://openknowledge.worldbank.org/handle/10986/18161

Adams, R. H., Jr. & Cuecuecha, A. (2013). The Impact of Remittances on Investment and Poverty in Ghana. *World Development*, 50, 24–40. http://doi.org/10.1016/j.worlddev.2013.04.009

Adams, S. & Klobodu, E. K. M. (2016). Remittances, regime durability and economic growth in Sub-Saharan Africa (SSA). *Economic Analysis and Policy*, 50, 1–8. http://doi.org/10.1016/j.eap.2016.01.002

Agostino, G. d', Dunne, J. P. & Pieroni, L. (2016). Corruption and growth in Africa. *European Journal of Political Economy*, 43, 71–88. http://doi.org/10.1016/j.ejpoleco.2016.03.002

Ahamada, I. & Coulibaly, D. (2013). Remittances and growth in sub-saharan african countries: Evidence from a panel causality test. *Journal of International Development*, 25(3), 310–324. http://doi.org/10.1002/jid.2830

Aitymbetov, S. (2006). Emigrant remittances: impact on economic development of Kyrgyzstan. ICEG European Center, *Working Paper* N° 31. http://pdc.ceu.hu/archive/00003286/01/emigrant_remittances.pdf

Akobeng, E. (2016). Out of inequality and poverty: Evidence for the effectiveness of remittances in Sub-Saharan Africa. *The Quarterly Review of Economics and Finance*, 60, 207–223. http://doi.org/10.1016/j.qref.2015.10.008

Alam, M. R., Kitenge, E. & Bedane, B. (2017). Government Effectiveness and Economic Growth. *Economics Bulletin*, 37(1), 222–227. https://ideas.repec.org/a/ebl/ecbull/eb-16-00708.html

Amuedo-Dorantes, C. & Mazzolari, F. (2010). Remittances to Latin America from migrants in the United States: Assessing the impact of amnesty programs. *Journal of Development Economics*, 91(2), 323–335. http://doi.org/10.1016/j.jdeveco.2009.06.006

Ang, A. (2009). Workers' remittances and its impact on rural development in the Philippines. *Asia-Pacific Social Science Review*, 9(2), 63–77. http://doi.org/10.3860/apssr.v9i2.1462

Arellano, M. & Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies*, 58(2), 277–297. http://doi.org/10.2307/2297968

Ayana Aga, G. & Martinez Peria, M. S. (2014). International Remittances and Financial Inclusion in Sub-Saharan Africa. World Bank, *Policy Research Working Paper* N° 6991. http://hdl.handle.net/10986/19383

Barajas, A. & Chami, R. (2009). Do Workers' Remittances Promote Economic Growth*? IMF Working Papers* N° 09. https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Do-Workers-Remittances-Promote-Economic-Growth-23108

Barro, R. J. (1991). Economic Growth in a Cross Section of Countries. *The Quarterly Journal of Economics*, 106(2), 407. http://doi.org/10.2307/2937943

Barro, R. J. & Sala-I-Martin, X. (2003). *Economic Growth : Second Edition*. Cambridge, Massachusetts: The MIT Press.

Barro, R. J. (1996). Determinants of economic growth: a cross-country empirical study. *NBER Working Paper* 5698. http://doi.org/10.3386/w5698

Bekaert, G., Harvey, C. R. & Lundblad, C. (2006). Growth volatility and financial liberalization. *Journal of International Money and Finance*, 25(3), 370–403. http://doi.org/10.1016/j.jimonfin.2006.01.003

Bettin, G. & Zazzaro, A. (2012). Remittances and financial development: Substitutes or complements

in economic growth? *Bulletin of Economic Research*, 64(4), 509–536.
http://doi.org/10.1111/j.1467-8586.2011.00398.x

Blundell, R. & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143.
https://doi.org/10.1016/S0304-4076(98)00009-8

Bollen, K. A. (1995). Structural Equation Models That are Nonlinear in Latent Variables: A Least-Squares Estimator. *Sociological Methodology*, 25, 223–251.
https://www.jstor.org/stable/271068

Bourdet, Y. & Falck, H. (2006). Emigrants' remittances and Dutch Disease in Cape Verde. *International Economic Journal*, 20(3), 267–284.
http://doi.org/10.1080/10168730600879323

Burgess, R. & Haksar, V. (2005). Migration and Foreign Remittances in the Philippines. *IMF Working Papers* 2005/111, 1–18.
http://doi.org/10.5089/9781451861303.001

Calero, C., Bedi, A. S. & Sparrow, R. (2009). Remittances, Liquidity Constraints and Human Capital Investments in Ecuador. *World Development*, 37(6), 1143–1154.
http://doi.org/10.1016/j.worlddev.2008.10.006

Catrinescu, N., Leon-Ledesma, M., Piracha, M. & Quillin, B. (2009). Remittances, Institutions, and Economic Growth. *World Development*, 37(2139), 81–92.
http://doi.org/10.1016/j.worlddev.2008.02.004

Chami, R., Fullenkamp, C. & Jahjah, S. (2005). Are Immigrant Remittances Flows a Source of Capital for Development. *IMF Working Papers* 03/189, 55–81.
http://www.imf.org/external/pubs/cat/longres.aspx?sk=16801

Combes, J.-L. & Ebeke, C. (2011). Remittances and Household Consumption Instability in Developing Countries. *World Development*, 39(7), 1076–1089.
http://doi.org/10.1016/j.worlddev.2010.10.006

Edwards, A. C. & Ureta, M. (2003). International migration, remittances, and schooling: Evidence from El Salvador. *Journal of Development Economics*, 72(2), 429–461.
http://doi.org/10.1016/S0304-3878(03)00115-9

El Qorchi, M., Munzele, M. S. & Wilson, J. F. (2003). Informal Funds Transfer Systems: An Analysis of the Informal Hawala System. *IMF Occasional Paper* N° 222.
https://econpapers.repec.org/RePEc:imf:imfocp:222

El Hamma, I. (2017). Do political institutions improve the effect of remittances on economic growth? Evidence South-Mediterranean countries. *Economics Bulletin*, 37(3), 2133–2148.
https://econpapers.repec.org/RePEc:ebl:ecbull:eb-17-00318

Fayissa, B. & Nsiah, C. (2012). Financial Development and Remittances in Africa and the Americas: A Panel Unit-Root Tests and Panel Cointegration Analysis. *Middle Tennessee State University, Department of Economics and Finance, Working Papers* 201201.
http://ideas.repec.org/p/mts/wpaper/201201.html

Fölster, S. & Henrekson, M. (2001). Growth effects of government expenditure and taxation in rich countries. *European Economic Review*, 45(8), 1501–1520.
http://doi.org/10.1016/S0014-2921(00)00083-0

Giuliano, P. & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, 90(1), 144–152.
https://doi.org/10.1016/j.jdeveco.2008.10.005

Glytsos, N. P. (2005). The contribution of remittances to growth: A dynamic approach and empirical analysis. *Journal of Economic Studies*, 32(6), 468–496.
http://doi.org/10.1108/01443580510631379

Gubert, F. (2002). Do Migrants Insure Those who Stay Behind? Evidence from the Kayes Area (Western Mali). *Oxford Development Studies*, 30(3), 267–287.
http://doi.org/10.1080/1360081022000012699

Guillaumont Jeanneney, S. & Kpodar, K. (2006). Développement financier, instabilité financière et croissance économique. *Economie & prévision*, 174(3), 87–111.
http://www.cairn.info/resume.php?ID_ARTICLE=ECOP_174_0087

Huang, C.-J. (2016). Is corruption bad for economic growth? Evidence from Asia-Pacific countries. *The North American Journal of Economics and Finance*, 35, 247–256.
http://doi.org/10.1016/j.najef.2015.10.013

Imai, K. S., Gaiha, R., Ali, A. & Kaicker, N. (2014). Remittances, growth and poverty: New evidence from Asian countries. *Journal of Policy Modeling*, 36(3), 524–538.
http://doi.org/10.1016/j.jpolmod.2014.01.009

Jongwanich, J. (2007). Workers' Remittances, Economic Growth and Poverty in Developing Asia and the Pacific Countries. United Nation, *UNESCAP Working Paper* N° WP/07/01.
https://books.google.com/books?id=xMq7GS-6MTMC&pgis=1

Khan, Z. S. & Islam, S. (2013). The Effects of Remittances on Inflation: Evidence from Bangladesh. *Journal of Economics and Business Research*, 19(2), 198–208.
http://www.uav.ro/jour/index.php/jebr/article/view/94

Lucas, R. E. B. (2005). *International Migration and Economic Development: Lessons from Low-Income Countries*. Cheltenham, UK and Northampton, MA, USA: Edward Elgar.
https://books.google.com/books?id=5LrJk6KUIwYC&pgis=1

Majeed, M. T. (2015). Poverty Effects of Remittances: A Comparative Analysis. *Journal of International Development*, 27(1), 1–14.
http://doi.org/10.1002/jid.3055

Mundaca, B. G. (2009). Remittances, Financial Market Development, and Economic Growth: The Case of Latin America and the Caribbean. *Review of Development Economics*, 13(2), 288–303.
http://doi.org/10.1111/j.1467-9361.2008.00487.x

Nyamongo, E. M., Misati, R. N., Kipyegon, L. & Ndirangu, L. (2012). Remittances, financial development and economic growth in Africa. *Journal of Economics and Business*, 64(3), 240–260.
http://doi.org/10.1016/j.jeconbus.2012.01.001

Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics*, 22(2), 265–312.
http://doi.org/10.1002/jae.951

Rapoport, H. & Docquier, F. (2005). The Economics of Migrants' Remittances. In: M. Ythier & S. Kolm (Eds.). *Handbook on the Economics of Giving, Reciprocity and Altruism*, pp. 1135–1198. Amsterdam, London: North Holland.
https://doi.org/10.1016/S1574-0714(06)02017-3

Singh, R. J., Haacker, M., Lee, K. W. & Le Goff, M. (2011). Determinants and Macroeconomic Impact of Remittances in Sub-Saharan Africa. *Journal of African Economies*, 20(2), 312–340.
http://doi.org/10.1093/jae/ejq039

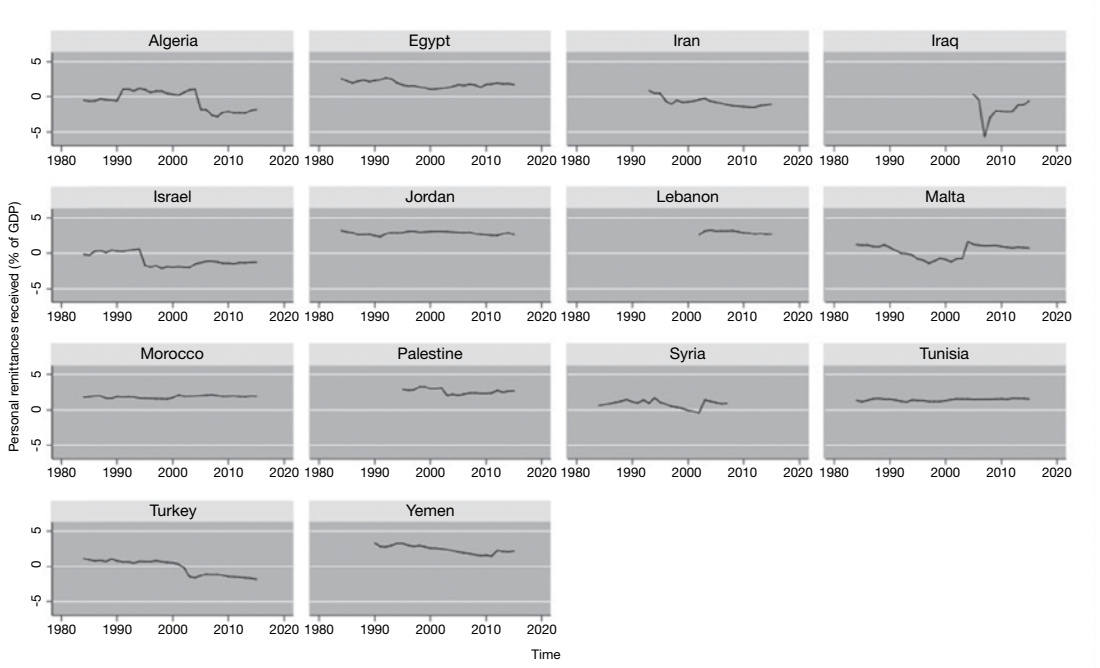
Woodruff, C. & Zenteno, R. (2007). Migration networks and microenterprises in Mexico. *Journal of Development Economics*, 82(2), 509–528.
http://doi.org/10.1016/j.jdeveco.2006.03.006

World Bank (2016). *Migration and Development Brief 23*. Washington, DC: World Bank.
http://pubdocs.worldbank.org/pubdocs/publicdoc/2015/10/848611444756854924/MigrationandDevelopmentBrief23.pdf

World Bank (2018). *Migration and Development Brief 29*. Washington, DC: World Bank.
http://www.knomad.org/publication/migration-and-development-brief-29

Ziesemer, T. H. W. (2012). Worker remittances, migration, accumulation and growth in poor developing countries: Survey and analysis of direct and indirect effects. *Economic Modelling*, 29(2), 103–118.
http://doi.org/10.1016/j.econmod.2011.08.013

Figure A-I
Personal remittances, received (% of GDP) in 2017



Sources: World Bank national accounts data; author's calculations.

Table A-1
Sources Used for the Variables

Indicator	Source	
GDP per capita growth (annual %)	World Bank national accounts data, and OECD National Accounts data files.	1982-2016
GDP growth (annual %)	World Bank national accounts data, and OECD National Accounts data files.	1982-2016
GDP per capita (current US$)	World Bank national accounts data, and OECD National Accounts data files.	1982-2016
Population growth (annual %)	Derived from total population. Population source: (1) United Nations Population Division. World Population Prospects: 2017 Revision, (2) Census reports and other statistical publications from national statistical offices, (3) Eurostat: Demographic Statistics, (4) United Nations Statistical Division. Population and Vital Statistics Reprot (various years), (5) U.S. Census Bureau: International Database, and (6) Secretariat of the Pacific Community: Statistics and Demography Programme.	1982-2016
GDP per capita (constant LCU)	World Bank national accounts data, and OECD National Accounts data files.	1982-2016
Personal remittances, received (% of GDP)	World Bank staff estimates based on IMF balance of payments data, and World Bank and OECD GDP estimates.	1982-2016
Inflation, GDP deflator (annual %)	World Bank national accounts data, and OECD National Accounts data files.	1982-2016
Trade (% of GDP)	World Bank national accounts data, and OECD National Accounts data files.	1982-2016
Gross fixed capital formation (% of GDP)	World Bank national accounts data, and OECD National Accounts data files.	1982-2016
Age dependency ratio (% of working-age population)	World Bank staff estimates based on age distributions of United Nations Population Division's World Population Prospects: 2017 Revision.	1982-2016
General government final consumption expenditure (% of GDP)	World Bank national accounts data, and OECD National Accounts data files.	1982-2016
Domestic credit provided by financial sector (% of GDP)	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.	1982-2016
Domestic credit to private sector (% of GDP)	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.	1982-2016
Domestic credit to private sector by banks (% of GDP)	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.	1982-2016
Broad money (% of GDP)	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates.	1982-2016
Political Risk Index	International Country Risk: The PRS Group	1984-2013
Low and Order	International Country Risk: The PRS Group	1984-2013
Government Stability	International Country Risk: The PRS Group	1984-2013
Democratic Accountability	International Country Risk: The PRS Group	1984-2013

Table A-2
Summary Statistics

Variables	Mean	Std. Dev.	Min.	Max.	*N*
GDP per capita growth (annual %)	1.8	7.7	-64.9	53.9	417
GDP growth (annual %)	4.2	7.8	-64.1	57.8	417
Personal remittances, received (% of GDP)	6.078	6.7	0.0	26.6	375
GDP per capita (constant LCU)	5,885,703.6	17,384,328.7	890.7	84,729,064	420
Gross fixed capital formation (% of GDP)	23.5	6.1	1.7	42.1	396
Population growth (annual %)	2.2	1.2	-3.1	7.1	441
Human capital (Gross enrollment ratio)	71.7	19.1	39.4	119.1	442
Inflation, GDP deflator (annual %)	15.9	37.8	-26.8	396.4	417
Trade (% of GDP)	79.4	51.9	0.0	326.1	413
Government final consumption expenditure (% of GDP)	17.1	5.5	2.3	35.8	413
Domestic credit to private sector by banks (% of GDP)	40.7	27.6	1.2	124.4	370
Domestic credit provided by financial sector (% of GDP)	68.4	42.2	-16.3	207.3	363
Claims on private sector (A. growth as % of broad money)	11.5	21.7	-75.9	307.7	358
Broad money (% of GDP)	74.9	44.2	20.2	249.5	359
Political Risk Index	57.6	15.1	18	88	238
Low and Order	24.9	28.2	1	75	383
Government Stability	6.2	2.6	1	11	383
Democratic Accountability	5.4	2.9	0	12	383

Sources: See Table A-1; author's calculations.

What Drives Private Non-Financial Sector Borrowing in Emerging Market Economies?

Ramona Jimborean*

Abstract – The last decade has been characterised by a considerable increase in private non-financial sector borrowing. Through a panel data analysis performed with quarterly data over the period 1993-Q1 to 2014-Q3, the article shows that, in emerging market economies (EMEs), the buildup phase of the high private non-financial borrowing is associated with: an increase in credit demand; real currency appreciation; accommodative monetary policy stance and reduced macroeconomic vulnerabilities complemented by a healthy and large domestic banking system. In addition, global factors, such as the US dollar appreciation, high global financial market volatility and the US monetary policy stance, are found to explain the recent increase in private non-financial sector borrowing in EMEs.

JEL Classification: F34, G15, G21
Keywords: emerging market economies, cross-border borrowing

* *Banque de France (ramona.jimborean@banque-france.fr)*

I would like to thank Andrei Zlate, Muhamed Zulkhibri, Katharina Steiner and Mihaljek Dubravko, as well as the audience of the 2017 ERMAS conference, the 2017 Annual AFSE Congress, the 2016 Meeting of the World Finance Conference (New York) and the 13th Emerging Market Workshop (at the Oesterreichische Nationalbank) for helpful discussions and comments. Lauren Diaz provided excellent research assistance. The opinions expressed in this paper are those of the author and do not necessarily reflect the views of the Banque de France or the Eurosystem.

Received on 16 October 2017, accepted after revisions on 1st October 2018

To cite this article: Jimborean, R. (2018). What Drives Non-Financial Sector Borrowing in Emerging Market Economies? *Economie et Statistique / Economics and Statistics*, 503-504, 143–161. https://doi.org/10.24187/ecostat.2018.503d.1962

Why should we care about private non-financial sector (NFS) indebtedness in emerging market economies? The overall picture is that of a significant increase in private NFS debt over the last decade all over the world. In emerging market economies (EMEs) this raises concerns given that the large majority of previous emerging market financial crises have been preceded by rapid leverage growth (as documented among others by Kaminsky & Reinhart, 1999; Gourinchas *et al*., 2001). Moreover, the buildup of corporate leverage has often been associated with boom-bust cycles (Mendoza & Terrones, 2008) and, more generally, with financial turbulences (Elekdag & Wu, 2011; Schularik & Taylor, 2012). Today, the perspectives are of an economic (persistent) slowdown in EMEs and of a tightening of the US monetary policy stance that would trigger more restrictive global funding conditions. In this context, questions arise related to the potential risk of financial instability in EMEs in the near future.

As underlined by Acharya *et al*. (2015) the non-financial corporations (NFC) face four categories of risks: maturity mismatches (i.e. funding being shorter term than investment); currency mismatches (i.e. liabilities being denominated in different currencies as opposed to revenues); rollover risk caused by a fickle investor base; and transaction risks caused by speculative activities. A shock of stress/failure in a global NFC will affect not only the domestic economy and the domestic financial system, but will also have cross-border effects. For the domestic economy the consequences will be: a decrease in aggregate demand and investment that would potentially trigger the recession; additional pressure on sovereign; and contagion to sectors/industries through production chains. As regards the domestic financial system, the main effects of a stress in a global NFC are: impaired banking system assets through losses associated with loans and securities issued domestically; a run on banking system liabilities,[1] especially where there is a strong reliance on corporate deposits for the wholesale funding; and an increase in bank funding from banks (i.e. higher interconnectedness among banks). As for the cross-border spillover effects, they are related, among others, to losses associated with cross-border loans and securities issued abroad.

The issue of non-financial corporates (NFC) debt in EMEs has been largely debated lately, given its implications, both in terms of financial stability and of economic growth. The G-20 recommended the examination of factors that "shape the liability structure of corporates focusing on its implications for financial stability". An interim report[2] on "Corporate funding structures and incentives" has been prepared, showing that the structure of corporate funding is affecting both the resilience and the decision-making of individual corporates[3] and, at the aggregate level, the stability of the financial system. In addition, the IMF has addressed the issue of corporate leverage in emerging markets in its October 2015 Global Financial Stability Report. The IMF analysis concludes that corporate leverage is explained by a higher role of global factors and, as a consequence, stresses the need for emerging markets to prepare for the implications of global financial tightening.

This paper adds to the recent work of international organisations and seeks to assess the drivers of private NFS borrowing in EMEs. Furthermore, this work complements the existing empirical literature on the determinants of foreign bank lending to EMEs that uses the BIS (Bank for International Settlements) statistics. Its contribution consists in examining the drivers of the bank-related components of private NFS indebtedness, while considering all its forms: domestic, bank and non-bank, and cross-border. I carry out the analysis from the perspective of recipient EMEs and focus on: 1) domestic bank credit; 2) cross-border bank lending to private NFS; and 3) their borrowing from all sectors (bank and non-bank). While international debt securities are equally a part of the overall indebtedness of private NFS they are not included in the analysis mainly because of data availability reasons; an additional reason is that of the predominance of bank financing in EMEs and the rather low development of their capital markets.

I use the BIS long series on total credit and domestic bank credit to private NFS and the BIS Consolidated Banking Statistics, the only existing databases at the international level that allow cross-country analyses. I apply a panel regression framework with quarterly data. The main results are that of private NFS

1. Corporates proceed to withdrawals so as to meet their obligations vis-à-vis creditors.

2. The report has been prepared by the FSB Secretariat, based on the contributions made by the staff of IMF, OECD, BIS, IOSCO and World Bank.

3. The corporate sector's sensitivity to macroeconomic and financial shocks increases in case of higher debt loads and lower debt-servicing capacity (IMF, 2015b).

borrowing in EMEs being explained, over the period 1993-Q1 to 2014-Q3, by local factors like a high credit demand, real currency appreciation, an accommodative monetary policy stance, reduced macroeconomic vulnerabilities, a healthy and large domestic banking system; and global factors like the high global financial market volatility and the US monetary policy stance.

The remainder of the paper is organised as it follows. The next sections presents some stylised facts, then an overview of the literature. The third section describes the econometric model and the data, as well as the empirical results. A final section summarises the main conclusions.

Private Sector Borrowing in EMEs: Stylised Facts

As emphasized in the introduction, a key challenge for EMEs is the increase in the indebtedness of private NFS, driven by a combination of low yields in international debt markets and strong demand from international investors.

A first issue is that of stress on corporate balance sheets that could rapidly spill over into other sectors, inflicting losses on the corporate debt holdings of global assets managers, banks and other financial institutions. This could be a source of powerful feedback loops in response to interest rate and/or exchange rate shocks, especially if credit risk concerns prevent the rollover of existing bank or bond market funding.

Second, there is the issue of the high sensitivity of corporates to macroeconomic and financial shocks associated with the recent increase in corporate debt levels and lower debt-servicing capacity in some countries (Giroud & Muller, 2015). In addition, the high private-sector debt can have a negative impact on economic growth (Liu & Rosenberg, 2013), and can potentially reinforce recessions (through a reduction in aggregate demand) and hamper recovery.

As illustrated by private sector credit developments data,[4] financial deepening and boom-bust episodes took place in EMEs, similar to advanced economies. Regional differences can be noted though: while in Emerging Asia private NFS indebtedness is large (higher than 120 percent of GDP at 2014-Q2), in Latin America and Emerging Europe it has continuously increased since early 2000 (but remained lower than 90 percent of GDP at 2014-Q2, countries like Mexico lagging behind).

As regards the role of banks in the financing of private NFS, intuitively, one would expect domestic banks to become a less important source of financing along with the deepening of financial intermediation. If this applies to advanced economies, the intuition is less clear-cut in the case of EMEs. On one hand, in Latin America, domestic and cross-border banks have become more important providers of credit over time, especially in Argentina and Brazil where the ratio of bank credit to total credit to private NFS is superior to 90 percent. On the other hand, in Asian economies, the role of banks (domestic and cross-border) has considerably diminished in China, Hong Kong SAR and South Korea (to roughly 65-80 percent), while it continued to be high in India, Indonesia, Malaysia, Singapore and Thailand (superior to 85 percent in 2014-Q2). As for Emerging Europe, domestic and cross-border bank credit plays a lower role, with less than 70 percent of total credit to private NFS. One common feature that emerges is that of the persistence of domestic and cross-border bank credit as main sources of financing of the private NFS in EMEs (Figure I).

The analysis by sector[5] shows that, overall, NFC borrowing from all sectors has largely overpassed that of households (HHs) (Figure II). There are, however, several exceptions: Thailand (where HHs borrowing has overpassed that of NFCs since the 2007 global financial crisis); and South Africa (with persistent larger HHs borrowing).

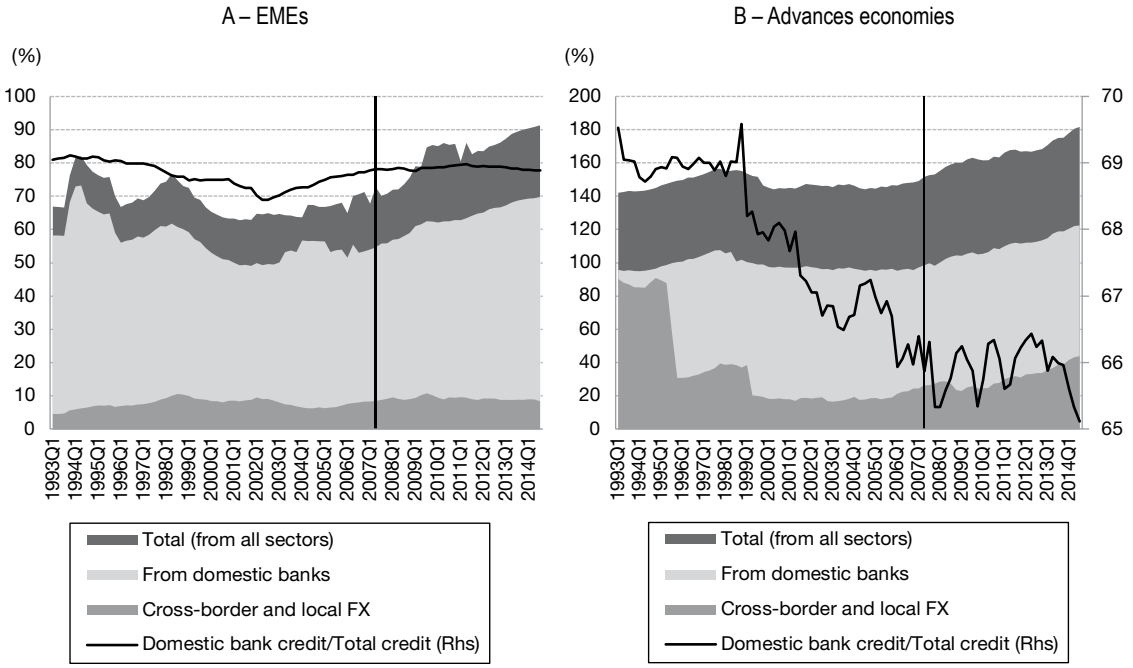
Related to the other sources of financing, NFCs have kept on increasing the issuance of debt securities in recent years. However, the overall quantities are reduced given the rather low initial level of corporate bond issuance in EMEs (Figure III), as also illustrated by Acharya *et al.* (2015) and the IMF (2015a).[6] A common

4. I use the BIS long series on total credit and domestic bank credit to private NFS. 17 out of the 40 economies covered by this database are EMEs. The series account for credit from all sources, not only that extended by domestic banks; thus, securitized credits held by the non-bank financial sector and cross-border lending are equally taken into account. Trade credit (as well as other accounts payable and receivable) is excluded from the new total credit series given the poor quality of the underlying data.

5. Missing data for Argentina, Brazil, Malaysia and Russia.

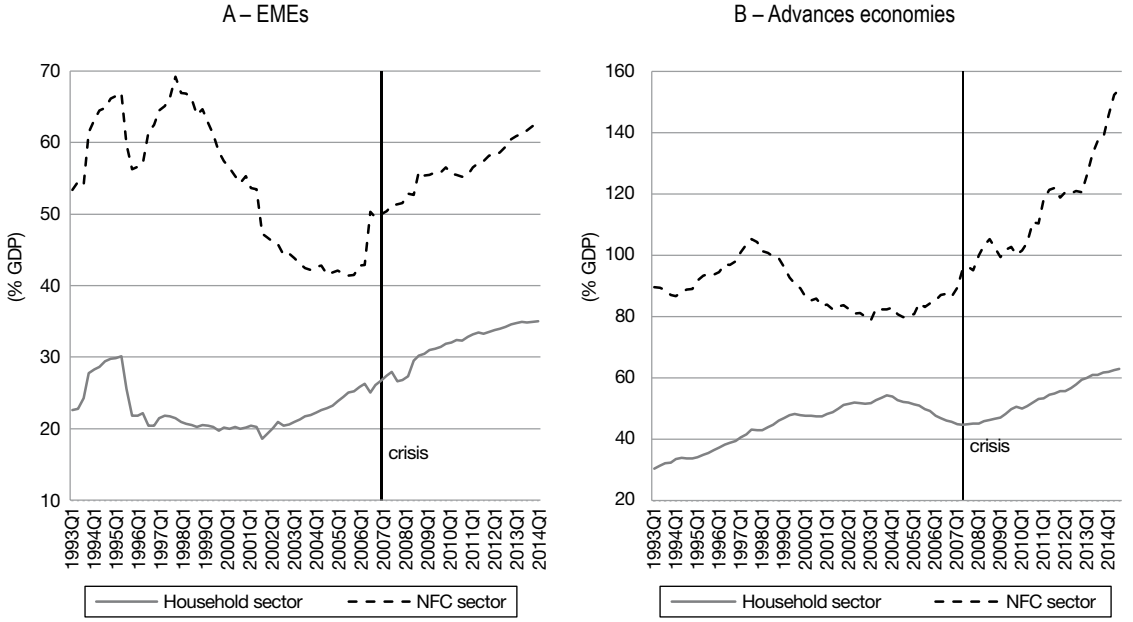
6. While the expansion of corporate bond markets presents overall benefits for the funding of the real economy through a diversification of the ways of financing even when the banking sectors are distressed (FSB, 2015), it equally has the drawback of firms being exposed to more volatile funding conditions.

Figure I
Developments in Private NFS Borrowing (% of GDP): Emerging Market vs. Advanced Economies



Note: Crisis (vertical line) corresponds to 2007-Q2.
Sources: BIS and national sources data; author's calculations.

Figure II
Developments in Private NFS Borrowing by Sector (% of GDP): Emerging Market vs. Advanced Economies



Note: Crisis (vertical line) corresponds to 2007-Q2.
Sources: BIS and national sources data; author's calculations.

feature is that of highly predominant domestic securities issuance (IMF, 2015a) of different magnitudes across EMEs, sign of different degrees of development of their financial markets; in Asia-Pacific NFC domestic issuances are 6 times larger than in Latin America and 21 times larger compared to Emerging Europe. In addition, in Emerging Asia the corporate sector has been the largest issuer of foreign currency bonds in recent years (Acharya *et al.*,

2015). While NFCs have become highly exposed to interest rate and exchange rate risks through the issuance of debt securities in both foreign and domestic currencies, according to CGFS (2014), the main relevant issues for EME corporates are the interest rate and roll-over risks.

Brief Overview of Literature

My paper adds to the recent work on NFC borrowing in EMEs. It has the particularity of analyzing not only the domestic but also the cross-border bank lending of the private NFS. I therefore make reference, in this section, to some existing recent studies on private sector indebtedness and cross-border bank lending in EMEs, as well as on credit growth drivers.

On Private Sector Indebtedness

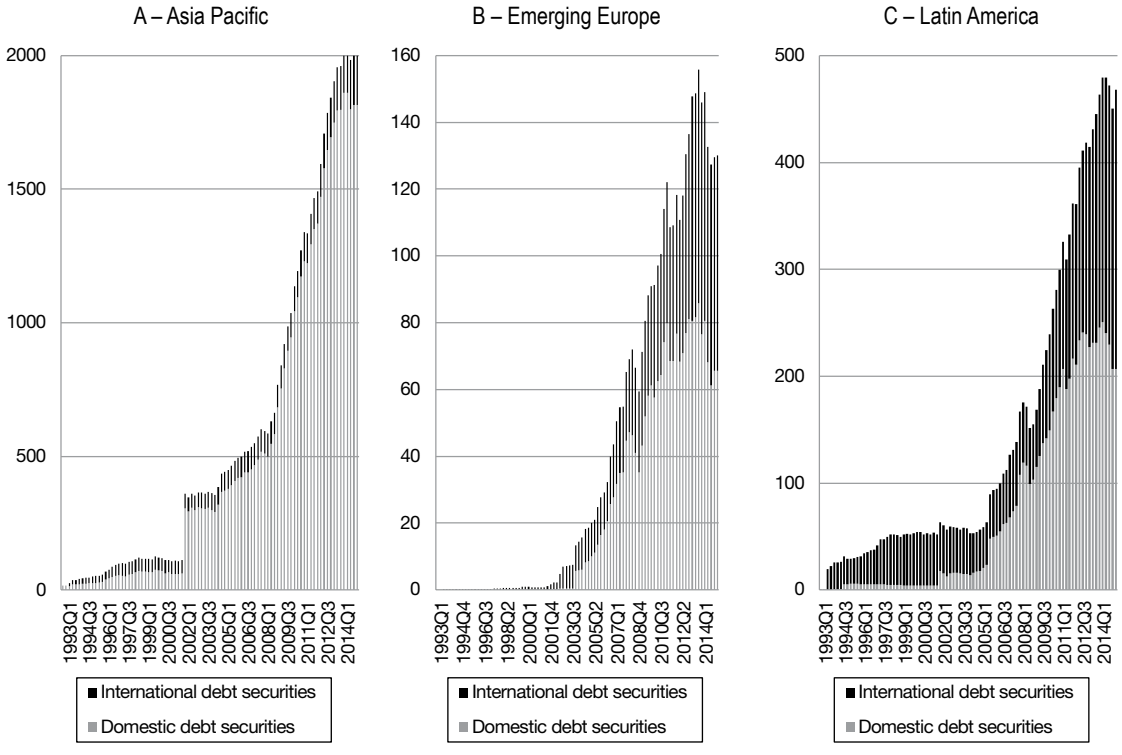
Chui *et al.* (2014) have examined the risks related to EME corporate balance sheets and their possible implications for the broader financial system, underlining the difficulty of assessing EME corporate vulnerabilities, especially in a cross-country context.[7] They illustrate two channels as potential scope for spillovers: the liability-side exposures (i.e. high exposure of local institutions relying on corporate deposits for their wholesale funding); and the asset-side exposures (i.e. direct credit exposures of banks to corporates via lending and bond holdings).

Avdjiev *et al.* (2014) have presented evidence of an increase in capital flows to EMEs associated with NFC over the past few years through three channels: a surge in transfers between firms' headquarters and their offshore affiliates; a significant increase in "non-bank" trade credit flows; and a considerable increase of the amount of external loan and deposit financing provided by non-banks.

Acharya *et al*. (2015) have published a report on financial risks associated with the increase in corporate debt in EMEs. They concluded on the need of ensuring that financial intermediaries

7. Internationally comparable measures of corporate sector leverage are hard to compute due to the lack of financial accounts data at the national level for many EMEs.

Figure III
Debt Securities Issued by NFC Over the Period 1993-Q1 - 2015-Q2 (Amounts Outstanding, USD Billions)



Sources: BIS securities statistics; author's calculations.

are sufficiently resilient to withstand a substantial shock to their capital and liquidity.

The IMF (2015a) has addressed the issue of corporate leverage in EMEs, with a focus on NFC leverage, bond issuance and spreads, through an analysis over the period 2004-2014, based on country, bond and firm-specific indicators.[8] Three main findings are that, in recent years: the role of firm and country-specific characteristics in explaining corporate leverage growth has diminished, while global factors played a larger role; the increase in leverage took place mainly in more cyclical sectors (the construction sector benefiting of the highest increase); the issuance of bonds by emerging market firms took place in better terms (lower yields and longer maturities) triggered by favorable financial conditions.

The IMF (2015b) has analyzed the balance sheet risks in emerging market corporates using annual firm level balance sheet information[9] from 16 EMEs. A sensitivity analysis was conducted in a stressed scenario of a 30 percent increase in borrowing costs, a 20 percent decline in earnings and an exchange rate depreciation of 30 percent against the dollar. The combination of the three shocks was found to significantly increase debt at risk,[10] especially in countries with high shares of external debt and low natural hedges. Moreover, shocks to earnings, interest rate and exchange rates were found to affect commodities related firms and state owned enterprises. In addition, a 15 percent default on total debt at risk owed to banks would lead to an important deterioration of banks' buffers in the large majority of countries in the sample.

On Cross-Border Bank Lending in EMEs

The most exhaustive data on national banking systems' cross-border positions is provided by the BIS international banking statistics.

McGuire and Tarashev (2008) have studied the way the health of individual national banking systems affected foreign lending to EMEs, with the use of BIS consolidated data. They show that in the past, negative shocks to bank health were associated with slowdowns in credit growth. McGuire and von Peter (2009) have used the BIS international banking statistics (both consolidated and locational) to identify cross-country and counterparty funding patterns for the largest banking systems and to assess the causes of US shortage during the critical phases of the crisis.

Takáts (2010) has used the BIS locational data for analyzing the key drivers of cross-border bank lending to EMEs. The sharp drop in cross-border bank lending during the financial crisis was shown to be due to both demand and supply factors, with a stronger impact for the latter. Avdjiev *et al.* (2012) have combined the locational data by residence with the consolidated data and showed that the 2011 contraction in cross-border bank lending to EMEs was largely connected to the deterioration of the euro area banks' health. Avdjiev and Takáts (2014) have analyzed the drivers of the sharp slowdown in cross-border bank lending to EMEs during the tapering tantrum. By using the BIS newly available data,[11] they showed that EMEs' specific factors explained the bulk of the variation of the slowdown across lender-borrower pairs.

On Drivers of Credit Growth

Mendoza and Terrones (2008) have proposed a methodology for measuring credit booms in emerging and industrial economies over the past four decades. Based on macro data, they found a systematic relationship between credit booms and economic expansions, rising asset prices, real appreciations, widening external deficits and managed exchange rates. As for micro data, a strong association was shown between credit booms and firm-level measures of leverage, firm values, external financing, and bank-level indicators of banking fragility. According to their findings, credit booms and the related macro and micro fluctuations are larger in EMEs, particularly in the nontradables sector. They also show that not all credit booms end in financial crises, but most EMEs crises were associated with credit booms, and credit booms in EMEs are often preceded by large capital inflows.

Elekdag and Wu (2011) have proceeded to a comprehensive event study focusing on

8. Thomson Reuters Worldscope (for publicly listed firms) and Orbis (for unlisted small and medium-sized enterprises).

9. The sample consisted of 40,000 firms and included public and private, large and small companies. The coverage of firms' total assets was around two thirds of total GDP of the sample countries. The dataset used was Orbis.

10. Debt at risk is defined as the debt of firms with interest coverage ratios below 1.5.

11. The new data (i.e. the recently implemented Stage 1 Enhancements to the BIS international banking statistics) contain three dimensions: the nationality of the lending bank, the location of the borrower and the currency composition of the claims.

99 credit booms, 60 of which originated in EMEs. Their results show that: loose monetary policy stance has contributed to the build-up of credit booms; domestic policy rates were low during the pre-peak phase of credit booms and fueled macroeconomic and financial imbalances; for EMEs, despite the increasing importance of external factors (such as global liquidity conditions), domestic factors (especially monetary policy) were found to be important drivers of real credit growth.

Bruno and Shin (2014) have investigated the global factors associated with bank capital flows through a theoretical model of the international banking system where global banks interact with local banks; the bank leverage cycle is shown to be a key driver of the transmission of financial conditions across borders, through banking sector capital flows. Moreover, local currency appreciation was shown to be associated with higher leverage of the banking sector. The key predictions of their model were supported by a panel study on 46 countries (both developed and EMEs) with the use of BIS locational banking statistics.

Finally, Igan and Tan (2015) have investigated the association between capital inflows and credit growth by exploiting a granular panel dataset[12] of 33 countries over the period 1980-2011. Non-FDI capital inflows were found to boost credit growth and increase the likelihood of credit booms in both household and corporate sectors. According to their findings, for household credit growth, the composition of capital inflows appeared to be more important than financial system characteristics. In contrast, for corporate credit growth, both the composition and the financial system were found to matter. In addition, regardless of sectors and financial systems, net other inflows were found to be always linked to rapid credit growth. These findings were confirmed by firm-level data, hinting at a causal link: net other inflows were related to more rapid credit growth for firms relying more heavily on external financing. Further explorations on how capital flows translated into more credit has shown that both demand and supply side factors played a role.

Empirical Exercise

Data

The analysis is undertaken for a sample of 15 emerging economies (Argentina, Brazil, China, Czech Republic, Hungary, Korea, India, Indonesia, Malaysia, Mexico, Poland, Russia, Thailand, Turkey and South Africa)[13] over the period 1993-Q1-2014-Q3, with quarterly data. The definitions and the sources of indicators, as well as the summary of the statistics related to each indicator are presented in Appendix (Tables A-1 and A-2).

Estimating the Drivers of Private NFS Borrowing in EMEs

The regression estimated is similar to bank capital flows regressions in Bruno and Shin (2014):

$$\Delta L_{i,t} = \alpha + \beta_j Local\ Factor(i,j)_{t-1} + \gamma_w Global\ Factor(w)_{t-1} + \delta_i + \theta_t + \varepsilon_{i,t} \quad (1)$$

where

- $\Delta L_{i,t}$ is the growth in private NFS borrowing in country *i* and in quarter *t,* as given by the quarterly growth rates in the outstanding amount of private NFS borrowing (both from all sectors and from domestic banks);

- $Local\ Factor(i,j)_{t-1}$ is the local factor *j* in country *i*. Here I consider several indicators: the real GDP growth rate, the nominal exchange rate against the US dollar, the funding conditions (i.e. the monetary policy rate), the macroeconomic conditions (some common-used indicators for assessing macroeconomic vulnerabilities are considered, namely the unemployment rate and the external debt ratio[14]), bank-specific characteristics (indicators used for assessing financial vulnerabilities, namely the ratio of non-performing loans (NPLs) to total loans and the quarterly difference of size of the banking sector[15] are considered);

- $Global\ Factor(w)_{t-1}$ is the global factor *w* that encompass the global financial market conditions and the US monetary policy stance.

---

12. Capital inflows were broken down into FDI, portfolio and other categories. Moreover, a distinction was made between credit to the household sector and to the corporate sector.

13. The reason behind the choice of the sample is that the BIS database on total credit and domestic bank credit to private NFS covers only 17 EMEs. The two additional countries are Hong Kong SAR and Singapore. We choose not to include them in the analysis given their specific features, as financial centers.

14. I use the quarterly difference of the external debt to GDP ratio. In a previous version, the current account balance has been taken into account. Given the rather scarce availability of this indicator, it was dropped out.

15. The size of the banking sector is defined as the ratio of total assets to GDP.

These variables are introduced in the regression in levels for the US monetary policy rate and, respectively, in difference for VIX;

- δ_i are country-specific fixed effects, θ_t are time-specific fixed effects, and $\varepsilon_{i,t}$ is the error term.

In addition, a dummy variable ($crisis_{07}$) is included in equation (1) to consider the occurrence of the 2007 global financial crisis. Given the use of quarterly data in the analysis, I apply the Brunnermeier (2009) definition;[16] thus, $crisis_{07}$ takes the value 1 over the period 2007-Q2 - 2009-Q2 and 0 otherwise.

Top and bottom 1% observations of all variables are winsorized so as to avoid the problems caused by the presence of outliers.

Before proceeding to the empirical estimations, I test the stationarity of the variables in order to choose the right specification model.[17] I compute the Fisher Augmented Dickey Fuller (ADF) (Choi, 2001) panel data unit root tests.[18] According to the results (see Table A-3 in Appendix), nominal exchange rate against the US dollar, total assets over GDP, the ratio of external debt over GDP and the global financial market conditions (VIX) follow I(1) processes and their first difference forms follow I(0) processes. As a consequence, I use these variables in first difference, while the others are used in levels.

The feasible general least squares (FGLS) technique is applied to account for both the heteroskedastic error structure between panels and the panel-specific autocorrelation.[19] According to the Hausman test, computed to differentiate between random and fixed effects, the fixed effects model is the most appropriate. As a robustness check exercise, I perform the two-step efficient generalized method of moments estimator.[20] In addition, in order to mitigate reverse causality problems, all the explicative variables are lagged by one quarter.

Results

As mentioned before, private NFS borrowing is captured by two different indicators: private NFS borrowing from domestic banks and, respectively, from all sectors (banks and non-banks), in all currencies. A third dependent variable is used to consider that private NFS equally borrows from abroad; it takes the form of international claims vis-à-vis private NFS, proxied by the international claims of BIS reporting bank vis-à-vis the non-bank sector.

I consider important assessing lending to domestic economy (here private NFS) provided by foreign banks from abroad. Indeed, the assessment of a country's domestic credit conditions should include credit provided cross-border and special attention should be given to the monitoring of cross-border flows, from the point of view of recipient countries and of the global system as a whole (Cerutti, 2013; Hills & Hoggarth, 2013; Schoenmaker & Wagner, 2013).

In the BIS data, the "non-bank sector" makes reference to NFCs, households and non-bank financial institutions. Given that, in EMEs, claims on non-bank financial institutions are less than 3% of cross-border claims (Avdjiev *et al.*, 2015), this variable could indeed be used as a proxy for international claims vis-à-vis private NFS. Another issue related to BIS international banking statistics is that international claims represent the sum of consolidated cross-border claims in all currencies and of local claims in foreign currencies. It would have been interesting to use only the cross-border component so as to gauge solely borrowing from abroad; unfortunately, this split of data (cross-border versus local claims in foreign currencies) is unavailable.

In what follows, I estimate the equation (1) for each of the three dependent variables and seek to detect whether the determining factors have a different impact depending on whether private NFS borrows domestically or abroad. The results are presented in Tables (1) to (3) below.

---

16. Fratzscher (2012) and Brunnermeier (2009) provided valuable evidence in this respect. The 2007 crisis went from 7 August 2007 till 15 March 2009 according to Fratzscher (2012), and, respectively, from the 2nd quarter of 2007 till the 2nd quarter of 2009 according to Brunnermeier (2009).

17. I thank one anonymous referee for underlying this issue.

18. These tests do not require strongly balanced data; they conduct unit-root tests for each panel individually, and then combine the p-values from these tests to produce an overall test.

19. The overall and inter-individuals heteroscedasticity, as well as the presence of contemporaneous correlation between individuals and the autocorrelation within have been tested. The presence of both heteroscedasticity and panel-specific autocorrelation that were revealed by the tests has been corrected for with the FGLS method (Wooldridge, 2002; Ouellet, 2005).

20. I thank one anonymous referee for pointing me in this direction. I control for endogeneity issues by using the instrumental variables method and apply the panel data twostep efficient GMM estimator. The efficiency gains of the GMM estimator relative to the traditional IV/2SLS estimator derive from the use of the optimal weighting matrix, the overidentifying restrictions of the model, and the relaxation of the i.i.d. assumption.

Real GDP is used as a proxy for credit demand. Its coefficient is statistically significant and positive, as expected. Stronger GDP growth in a given EME implies higher borrowing for the private NFS from domestic banks (see Table 1), from all sectors including non-banks (see Table 2) and equally higher cross-border borrowing (see Table 3). Indeed, higher levels of output require more credit, including from all sources. This result is in line with Avdjiev *et al.* (2012). According to the findings, on average, a 1% increase in real GDP growth will generate an increase in NFS borrowing from domestic banks between 0.26 and 0.35 percent (see Table 1), between 0.18 and 0.27 percent for NFS borrowing from all sectors (see Table 2) and, respectively between 0.34 and 0.54 percent for private NFS borrowing from abroad (see Table 3).

Another indicator of country-specific macroeconomic conditions is the nominal exchange rate against the US dollar. As expected, the appreciation of the US dollar is found to be negatively related to cross-border bank lending. As a matter of fact, the dollar appreciation increases the value of dollar debt and, as a consequence, it triggers a decrease in the indebtedness capacity of private NFS. It should be equally mentioned that, in the case of foreign currency borrowing, exchange rate depreciation will engender rollover risks for

Table 1
The Drivers of Private NFS Borrowing from Domestic Banks in EMEs

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Local factors							
GDP growth rate$_{t-1}$	0.288*** (0.032)	0.348*** (0.031)	0.342*** (0.032)	0.353*** (0.032)	0.266*** (0.029)	0.306*** (0.038)	0.328*** (0.034)
ΔNominal exchange rate$_{t-1}$	0.002*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.008*** (0.003)	0.005*** (0.002)	0.006*** (0.001)
Funding conditions							
Monetary policy rate$_{t-1}$	0.011 (0.023)	-0.007 (0.029)	0.013 (0.023)	-0.006 (0.028)	-0.076 (0.050)	0.004 (0.035)	-0.030 (0.029)
Macroeconomic conditions							
Unemployment rate$_{t-1}$	-0.15** (0.070)	-0.141** (0.070)		-0.143** (0.069)	0.230*** (0.087)	-0.138* (0.080)	-0.166** (0.068)
Δ External debt (% GDP)$_{t-1}$						-0.088** (0.040)	
Banking characteristics							
Δ Total assets (% GDP)		0.006 (0.010)	0.008 (0.010)	0.006 (0.009)			0.004 (0.009)
NPLs$_{t-1}$					-0.231*** (0.045)		
Global factors							
Global funding conditions (Δ VIX)				-0.011 (0.008)	0.003 (0.008)	-0.009 (0.012)	-0.011 (0.008)
US monetary policy rate$_{t-1}$							0.201*** (0.063)
Dummy 2007 crisis	0.667** (0.260)	0.793*** (0.236)	0.735*** (0.244)	0.856*** (0.242)	0.319 (0.263)	1.270*** (0.303)	0.610** (0.252)
Observations	679	622	729	622	360	465	622
Number of country	15	15	15	15	14	13	15
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Cross-sectional time-series FGLS regression, correcting for heteroscedasticity across panels and autocorrelation within panels. The dependent variable is the quarterly growth in the stock of private NFS borrowing from domestic banks. Standard errors in parentheses. *, **, *** denotes significance at 10%, 5%, 1% level. External debt data missing for China and South Africa. NPLs data missing for China. All regressions include a constant and country dummies that are not reported.
Sources: See Table A-1; author's estimations.

NFC.[21] Thus, one unit increase in the nominal exchange rate against the US dollar (i.e. a depreciation of domestic currencies) generates a decrease in cross-border borrowing by 0.07 percent (see Table 3). As regards borrowing from domestic banks and from all sectors, the exchange rate depreciation is found to have a positive and significant effect; a one unit increase in the nominal exchange rate is associated to a relatively low increase in the borrowing from domestic banks, of 0.002 to 0.008 percent (Table 1), as well as in the borrowing from all sectors, of 0.005 to 0.008 percent (see Table 2).

The funding conditions are proxied by the monetary policy rate. Usually, its increase, signal of more restrictive funding conditions, is associated with a reduction in private NFS borrowing. According to my findings, an increase in monetary policy rate does not have a statistically significant impact on NFS borrowing, be it from domestic banks, from all sectors or cross-border. In only one equation this indicator is statistically significant: a 1% increase in the monetary policy rate triggers a

21. Data on currency composition of cross-border bank lending is unavailable.

Table 2
The Drivers of Private NFS Borrowing from All Sectors, in All Currencies in EMEs

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Local factors							
GDP growth rate$_{t-1}$	0.195*** (0.032)	0.252*** (0.034)	0.273*** (0.034)	0.254*** (0.034)	0.220*** (0.034)	0.184*** (0.039)	0.239*** (0.037)
ΔNominal exchange rate$_{t-1}$	0.005*** (0.001)	0.008*** (0.001)	0.008*** (0.001)	0.008*** (0.001)	0.009*** (0.003)	0.008*** (0.002)	0.008*** (0.001)
Funding conditions							
Monetary policy rate$_{t-1}$	0.047** (0.023)	0.007 (0.028)	0.034 (0.023)	0.008 (0.028)	-0.061 (0.059)	0.036 (0.034)	-0.007 (0.029)
Macroeconomic conditions							
Unemployment rate$_{t-1}$	-0.27*** (0.072)	-0.252*** (0.075)		-0.252*** (0.075)	0.166 (0.104)	-0.265*** (0.087)	-0.262*** (0.074)
Δ External debt (% GDP)$_{t-1}$						-0.015 (0.045	
Banking characteristics							
Δ Total assets (% GDP)		0.017* (0.009)	0.016* (0.009)	0.017* (0.009)			0.016* (0.009)
NPLs$_{t-1}$					-0.239*** (0.048)		
Global factors							
Global funding conditions (Δ VIX)				-0.002 (0.008)	0.011 (0.009)	-0.007 (0.012)	-0.002 (0.008)
US monetary policy rate$_{t-1}$							0.131** (0.063)
Dummy 2007 crisis	0.739*** (0.271)	0.802*** (0.244)	0.924*** (0.254)	0.822*** (0.249)	0.343 (0.291)	1.126*** (0.336)	0.682*** (0.261)
Observations	678	622	730	622	360	465	622
Number of country	15	15	15	15	14	13	15
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Cross-sectional time-series FGLS regression, correcting for heteroscedasticity across panels and autocorrelation within panels. The dependent variable is the quarterly growth in the stock of private NFS borrowing from all sectors (banks and non-banks). Standard errors in parentheses. *, **, *** denotes significance at 10%, 5%, 1% level. External debt data missing for China and South Africa. NPLs data missing for China. All regressions include a constant and country dummies that are not reported.
Sources: See Table A-1; author's estimations.

slight increase, of 0.04 percent in NFS borrowing from all sectors (Table 2, column 1). This positive effect is equally found when using the two-step GMM estimator (see Table A-6 in the Appendix).

Domestic macroeconomic vulnerabilities are equally influencing the borrowing behavior of private NFS. Unemployment is found to present a statistically significant and negative coefficient, as the higher the share of unoccupied population, the lower is their demand and consumption and, therefore, the lower will be their borrowing. Thus, a 1% increase in unemployment triggers a decrease in borrowing of 0.13 to 0.16 percent when coming from domestic banks (cf. Table 1), of 0.25 to 0.27 percent when coming from all sectors (see Table 2) and, respectively, of 0.34 percent in the case of cross-border borrowing (see Table 3).

Additionally, a negative link is found between external debt and borrowing from domestic banks (Table 1), with a 1% increase in external debt being associated to a decrease of 0.08 percent in NFS borrowing. In addition, in the case of cross-border borrowing (Table 3), a 1% increase in external debt is associated with

Table 3
The Drivers of International Claims of BIS Reporting Banks Vis-à-Vis the Private NFS in EMEs

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Local factors							
GDP growth rate$_{t-1}$	0.371*** (0.078)	0.509*** (0.082)	0.543*** (0.078)	0.521*** (0.083)	0.346*** (0.092)	0.442*** (0.091)	0.368*** (0.086)
ΔNominal exchange rate$_{t-1}$	0.001 (0.001)	0.002 (0.002)	0.002 (0.002)	0.002 (0.002)	-0.069*** (0.011)	-0.007 (0.004)	0.002 (0.002)
Funding conditions							
Monetary policy rate$_{t-1}$	0.068 (0.043)	0.015 (0.052)	0.042 (0.041)	0.016 (0.052)	0.215 (0.178)	0.064 (0.053)	-0.063 (0.049)
Macroeconomic conditions							
Unemployment rate$_{t-1}$	-0.347** (0.174)	-0.236 (0.175)		-0.237 (0.175)	0.045 (0.313)	0.079 (0.189)	-0.272 (0.166)
Δ External debt (% GDP)$_{t-1}$						0.669*** (0.097)	
Banking characteristics							
Δ Total assets (% GDP)		0.337*** (0.039)	0.307*** (0.037)	0.335*** (0.039)			0.322*** (0.038)
NPLs$_{t-1}$					0.287** (0.146)		
Global factors							
Global funding conditions (Δ VIX)				-0.025 (0.029)	-0.058* (0.032)	-0.026 (0.033)	-0.027 (0.029)
US monetary policy rate$_{t-1}$							0.753*** (0.155)
Dummy 2007 crisis	0.198 (0.689)	0.189 (0.650)	0.385 (0.646)	0.304 (0.662)	-0.422 (0.923)	1.394* (0.772)	-0.551 (0.673)
Observations	675	618	726	618	358	462	618
Number of country	15	15	15	15	14	13	15
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Cross-sectional time-series FGLS regression, correcting for heteroscedasticity across panels and autocorrelation within panels. The dependent variable is the quarterly growth in the stock of international claims of BIS reporting banks vis-à-vis private NFS. Standard errors in parentheses. *, **, *** denotes significance at 10%, 5%, 1% level. External debt data missing for China and South Africa. NPLs data missing for China. All regressions include a constant and country dummies that are not reported.
Sources: See Table A-1; author's estimations.

an increase in NFS borrowing from abroad of 0.67 percent. External debt is found to have no statistically significant impact on borrowing from all sectors. In light of our findings, external debt in EMEs looks like being financed abroad.

The performance of the banking system is proxied by each national banking system' size and the ratio of NPLs to total loans. The ratio of NPLs to total loans is a backward-looking measure of bank risk that captures the asset risk of banks. According to the findings, a 1% increase in NPLs ratio, signaling the deterioration in banks' health, is associated with slower credit growth to EMEs, i.e. a decrease of 0.23 percent in NFS borrowing from domestic banks (cf. Table 1) and from all sectors (cf. Table 2) and, respectively, of 0.28 percent in cross-border borrowing (cf. Table 3).[22] In addition, the increase in NPLs generates more losses associated with loans to firms and securities issued by firms, thus impairing the banking system assets.

As for the size of the banking sector, the results show a statistically significant and positive coefficient, signaling that the larger the change in the size of banking system in terms of GDP, the higher would be borrowing of private NFS be it from all sectors or from cross-border. Thus, a 1% increase in total assets over GDP triggers an increase in NFS borrowing of 0.016 to 0.017 percent if the borrowing comes from all sectors (cf. Table 2), and, respectively, of 0.30 to 0.33 percent if the borrowing comes from abroad (cf. Table 3). No statistically significant impact is found for borrowing from domestic banks.

The global financial market volatility is proxied by the quarterly difference in volatility of S&P 500 financial index (VIX, which is usually used as a global supply factor). Volatility tends to be higher in periods of stress, being negatively related to credit supply. Lower volatility in financial asset prices reduce banks' measured market risk and the amount of capital they need to hold to meet regulatory requirements; thus, lower volatility is expected to be associated with higher credit supply. According to the findings, the higher the volatility on the global financial market, the lower the borrowing of private NFS from abroad. A one unit increase in VIX will trigger a decrease of 0.05 percent in cross-border NFS borrowing (cf. Table 3). In the case of domestic borrowing and of borrowing from all sectors, the coefficient of VIX is not statically significant even though it presents the expected negative sign.

Another global factor taken into account is the US monetary policy. The US monetary policy stance has indeed global implications; its changes will affect liquidity conditions in global financial markets through changes in term premiums, exchange rates and risk aversion. According to my findings, the US monetary policy rate change affects only the three forms of borrowing of private NFS). Thus, a 1% increase in the US monetary policy rate triggers a 0.2 percent increase in domestic borrowing (cf. Table 1), a 0.13 percent increase in borrowing from all sectors (cf. Table 2) and, respectively, a larger increase, of 0.75 percent in cross-border borrowing (cf. Table 3).

The occurrence of the 2007 global financial crisis has been equally controlled for. The results show that private NFS borrowing was not affected by the 2007 crisis. On the contrary, over the period 2007-Q2 - 2009-Q2, borrowing from domestic banks has increased on average by 0.61 to 1.27 percent (cf. Table 1), while borrowing from all sectors has increased on average by 0.68 to 1.12 percent (cf. Table 2). As regards cross-border borrowing, the 2007 crisis seems not to have had any impact. The robustness of the results is checked by applying the two-step GMM estimator (see Tables A-4 to A-6 in the Appendix).

Overall, as shown by the results, there is no difference in the key drivers when NFS borrows domestically from banks or from all sectors. It should be however stressed that, according to my findings, global factors like the change in the global funding conditions have an impact only on cross-border bank borrowing (cf. Table 3). Moreover, cross-border borrowing from BIS reporting banks is found not to be affected by domestic factors like domestic funding conditions and unemployment. The analysis presents some limitations: First, it focusses on the broad category of "private NFS" given that the distinction between sectors (households and NFCs, respectively) is not available for all the countries in the sample. Another limitation is that of not considering the currency composition of borrowing (decomposition that is not available in the BIS data). However, the findings presented here are in line with Cetorelli and Goldberg (2012),

22. These findings should be treated with caution given the rather scarce availability of data on NPLs.

according to which lending by global banks is likely to be more insulated from domestic liquidity shocks, and Cerutti *et al*. (2015) that have illustrated the sensitivity to push factors for countries relying on global banks.

* *
*

In this paper I assess the drivers of private NFS borrowing in EMEs, through a panel data analysis carried out with quarterly data for a sample of 15 economies over the period 1993-Q1 - 2014-Q3. It is important to improve our understanding of the role played by domestic and global factors in its recent dynamics, especially from the perspective of financial vulnerabilities. In addition, it is paramount to assess the risks posed by the increased indebtedness of the private NFS and the consequences for a country's financial system and economy in case these risks materialize.

According to my findings, the increase in private NFS borrowing in EMEs has been associated, over the period 1993 to 2014, with an increase in credit demand, real currency appreciation, reduced macroeconomic vulnerabilities, a healthy and large domestic banking system. As regards global factors, the appreciation of the US dollar, the high global financial market volatility and the US monetary policy stance are found to have had an influence on private NFS borrowing in EME.

Once these risks and spillovers detected, what should be done from a policy point of view? To date, the existing policy responses are conceived and implemented at the domestic level and take the form, among others, of fiscal policy measures and macroprudential tools. As regards the fiscal policy measures, in the presence of financial frictions in the corporate sector, the governments will limit the amount of tax revenue that can be raised domestically.[23] As far as macroprudential tools are concerned, instruments expected to mitigate and prevent excessive credit growth and leverage are the most appropriate (i.e. countercyclical capital buffers, sectoral capital requirements, macroprudential leverage ratio, loan-to-value requirements, or loan-to-income/debt service-to-income requirements). In addition to policy responses, an important aspect that should not be ignored is that of cross-border spillovers. In this respect, a key issue is the need of coordinating the policies implemented at the national level, so as to consider their potential spillover effects. □

23. The two-way contagion channel between government and firms should be kept in mind. The probability of corporations default could be amplified by higher taxes set by the government to respond to a debt crisis, thus increasing forms' borrowing costs. Moreover, the ability of the government to issue debt on international financial markets will be affected by financial frictions in the corporate sector, thus lowering the level of sovereign debt and making it more sustainable.

BIBLIOGRAPHY

Acharya, V., Cecchetti, S. G., Gregorio, J. de, Kalemli-Őzcan, S., Lane, P. R. & Panizza, U. (2015). Corporate debt in emerging economies: A Threat to Financial Stability? *Committee on International Economic Policy and Reform*, The Brookings Institution and the Centre for International Governance Innovation, September 2015.
https://www.brookings.edu/research/corporate-debt-in-emerging-economies-a-threat-to-financial-stability/

Avdjiev, S., Kuti, Z. & Takáts, E. (2012). The euro area crisis and cross-border bank lending to emerging markets. *BIS Quarterly Review*, December 2012, 37–47.
https://www.bis.org/publ/qtrpdf/r_qt1212f.htm

Avdjiev, S. & Takáts, E. (2014). Cross-border bank lending during the taper tantrum: the role of emerging market fundamentals. *BIS Quarterly Review*, September 2014, 49–60.
https://www.bis.org/publ/qtrpdf/r_qt1409g.htm

Avdjiev, S., Chui, M. & Shin, H. S. (2014). Non-financial corporations from emerging market economies and capital flows. *BIS Quarterly Review*, December 2014, 67–77.
https://www.bis.org/publ/qtrpdf/r_qt1412h.htm

Avdjiev, S., McGuire, P. & Wooldridge, P. (2015). Enhanced data to analyse international banking. *BIS Quarterly Review*, September 2015, 53–68.
https://www.bis.org/publ/qtrpdf/r_qt1509f.htm

BIS. Long series on total credit and domestic bank credit to the private non-financial sector. Documentation on data.

Brunnermeier, M. K. (2009). Deciphering the Liquidity and Credit Crunch 2007- 2008. *Journal of Economic Perspectives,* 23(1), 77–100.
https://doi.org/10.1257/jep.23.1.77

Bruno, V. & Shin, H. S. (2014). Cross-Border Banking and Global Liquidity. *BIS Working Paper* N° 458, August 2014.
https://www.bis.org/publ/work458.htm

Cerutti, E., Claessens, S. & Puy, D. (2015). Push Factors and Capital Flows to Emerging Markets: Why Knowing Your Lender Matters More than Fundamentals. *IMF Working Paper* N° 15/127.
https://www.imf.org/external/pubs/ft/wp/2015/wp15127.pdf

Cerutti, E. (2013). Banks' Foreign Credit Exposures and Borrowers' Rollover Risks: Measurement, Evolution and Determinants. *IMF Working Paper* N° 13/9.
https://ideas.repec.org/p/imf/imfwpa/13-9.html

Cetorelli, N. & Goldberg, L. S. (2012). Banking Globalization and Monetary Transmission. *The Journal of Finance*, 67(5), 1811–1843.
https://doi.org/10.1111/j.1540-6261.2012.01773.x

CGFS (2014). *Summary: Joint CGFS-FSB-SCAV Workshop on Risks from Currency Mismatches and Leverage on Corporate Balance Sheets*.
http://www.fsb.org/2014/09/r_140923a/

Choi, I. (2001). Unit root tests for panel data. *Journal of International Money and Finance*, 20(2), 249–272.
https://doi.org/10.1016/S0261-5606(00)00048-6

Chui, M., Fender, I. & Susko, V. (2014). Risks related to EME corporate balance sheets: the role of leverage and currency mismatch. *BIS Quarterly Review,* September 2014, 35–47.
https://ssrn.com/abstract=2498630

Dembiermont, C., Drehmann, M. & Muksakunratana, S. (2013). How much does the private sector really borrow? A new database for total credit to the private non-financial sector. *BIS Quarterly Review*, March 2013, 65–81.
https://www.bis.org/publ/qtrpdf/r_qt1303h.htm

Elekdag, S. & Wu, Y. (2011). Rapid credit growth: boon or boom-bust. *IMF Working Paper* N° 11/241.
https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Rapid-Credit-Growth-Boon-or-Boom-Bust-25305

Financial Stability Board (2015). Corporate funding structures and incentives. *Interim Report*, 8 June.

Fratzscher, M. (2012). Capital flows, push versus pull factors and the global financial crisis. *Journal of International Economics*, 88(2), 341–356.
https://doi.org/10.1016/j.jinteco.2012.05.003

Giroud, X. & Mueller, H. M. (2015). Firm Leverage and Unemployment During the Great Recession. *NBER Working Paper* N° 21076.
https://ssrn.com/abstract=2593655

Gourinchas, P. O., Vales, R. & Landerretche, O. (2001). Lending booms: Latin America and the World. *Economia – The Latin American and Caribbean Economic Association*, 1(2), 47–89. https://ideas.repec.org/a/col/000425/008707.html

Gruić, B., Hattori, M. & Shin, H. S. (2014). Recent changes in global credit intermediation and potential risks. *BIS Quarterly Review*, September 2014, 17–18. https://www.bis.org/publ/qtrpdf/r_qt1409w.htm

Hills, B. & Hoggarth, G. (2013). Cross-border bank credit and global financial stability, *Bank of England Quarterly Bulletin*. 53(2), 126–136. https://www.bankofengland.co.uk/quarterly-bulletin/2013/q2/cross-border-bank-credit-and-global-financial-stability

Igan, D. & Ta, Z. (2015). Capital Inflows, Credit Growth and Financial Systems. *IMF Working Paper* N° 15/193. https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Capital-Inflows-Credit-Growth-and-Financial-Systems-43207

IMF (2014). S*pillover Report*. https://www.imf.org/en/Publications/Policy-Papers/Issues/2016/12/31/2014-Spillover-Report-PP4881

IMF (2015a). Corporate Leverage in Emerging Markets – A Concern? In: International Monetary Fund, *Global Financial Stability Report – Vulnerabilities, Legacies, and Policy Challenges,* pp. 83–114. Washington, DC: IMF.

IMF (2015b). *Balance Sheet Risks in Emerging Market Corporates*. Monetary and Capital Markets Department, August 12, 2015.

Kaminsky, G. L. & Reinhart, C. M. (1999). The Twin Crises: The Causes of Banking and Balance-of-Payments Problems. *American Economic Review*, 89(3), 473–500. https://www.jstor.org/stable/117029

Liu, Y. & Rosenberg, C. (2013). Dealing with private debt stress in the wake of the European Financial Crisis. *IMF Working Paper* N° 13/44. https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Dealing-with-Private-Debt-Distress-in-the-Wake-of-the-European-Financial-Crisis-A-Review-of-40326

McGuire, P. & Tarashev, N. (2008). Bank health and lending to emerging markets. *BIS Quarterly Review*, December 2008, 67–80. https://www.bis.org/publ/qtrpdf/r_qt0812g.htm

McGuire, P. & Peter, G. von, (2009). The US dollar shortage in global banking. *BIS Quarterly Review*, March 2009, 47–63. https://www.bis.org/publ/qtrpdf/r_qt0903f.pdf

Mendoza, E. G. & Terrones, M. E. (2008). An Anatomy of Credit Booms: Evidence from Macro Aggregates and Micro Data. *NBER Working Paper* 14049. https://ideas.repec.org/p/nbr/nberwo/14049.html

Ouellet, E. (2005). *Guide d'économétrie appliquée pour Stata*. Montreal: University of Montreal. https://docplayer.fr/8148651-Guide-d-econometrie-appliquee-pour-stata-pour-ecn-3950-et-fas-3900.html

Schoenmaker, D. & Wagner, W. (2013). Cross-border banking in Europe and financial stability, *International Finance*, 16(1), 1–22. https://doi.org/10.1111/j.1468-2362.2013.12026.x

Schularik, M. & Taylor, A. M. (2012). Credit booms gone bust: monetary policy, leverage cycles, and financial crises, 1870-2008. *American Economic Review*, 102(2), 1029–1061. https://www.aeaweb.org/articles?id=10.1257/aer.102.2.1029

Takáts, E. (2010). Was is credit supply? Cross-border bank lending to emerging market economies during the financial crisis. *BIS Quarterly Review*, June 2010, 49–56. https://www.bis.org/publ/qtrpdf/r_qt1006g.htm

Wooldridge, J. M. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge, Massachusetts: The MIT Press.

Table A-1
Data Sources

Variable	Sources	Definition
NFS borrowing from domestic banks	BIS Long series on total credit and domestic bank credit to the private nonfinancial sector	Private non-financial sector borrowing from banks, domestic; end of period, adjusted for breaks; billions, local currency.
NFS borrowing from all sectors	BIS Long series on total credit and domestic bank credit to the private nonfinancial sector	Private non-financial sector borrowing from all sectors; end of period, adjusted for breaks; billions, local currency.
International claims vis-à-vis non-bank private sector of country *i*	BIS Consolidated Banking Statistics (Table 9A: Consolidated claims of reporting banks, immediate borrower basis)	International claims vis-à-vis the non-bank private sector of country *i*; end of period outstanding amounts; millions, USD.
GDP growth rate	Datastream / National sources	Real gross domestic product growth rate, %.
Nominal exchange rate	Datastream, IMF-IFS/Reuters	National currency unit to USD - market rate; end of period
Monetary policy rate	Datastream / National sources	Central bank policy rate; end of period percent per annum. The target rate used by the central bank to conduct monetary policy. The monetary policy instrument varies across countries.
Unemployment rate	Datastream / IMF-IFS	The concept of unemployment conforms to the recommendations adopted by the ILO: Thirteenth International Conference of Labor Statisticians, Geneva, 1982. For the euro area, EUROSTAT provides the data.
External debt	World Bank / National Sources	Gross external debt (% of GDP).
Size of the banking system	Authors calculations, based on national sources.	The ratio of total assets of the banking system to GDP, %.
NPLs	National sources, IMF Financial Stability Indicators	Non-performing loans (overall) / Total loans; %.
Global financial market volatility	Datastream / Chicago Board Options Exchange (CBOE)	CBOE SPX volatility VIX; price index.
US monetary policy rate	Datastream/ National sources	US Central bank policy rate; end of period; percent per annum.

Notes: NFS stands for non-financial sector, GDP for gross domestic product, NPL for non-performing loans, US for United States. IMF-IFS refers to International Financial Statistics of the International Monetary Fund.

Table A-2
Summary Statistics for Key Variables

Variables	No. of obs.	Mean	St. dev.	Min	Max
NFS borrowing from domestic banks (quarterly growth)	1,389	4.180	4.102	-5.730	22.959
NFS borrowing from all sectors (quarterly growth)	1,388	4.212	4.068	-6.213	21.320
International claims of BIS banks vis-à-vis private NFS (quarterly growth)	1,430	3.027	6.959	-15.209	27.428
GDP growth rate (level)	1,035	4.137	4.005	-9.9	12.6
Nominal exchange rate (quarterly difference)	1,443	6.367	146.214	-1959	3675
Monetary policy rate (level)	1,310	11.131	12.429	.5	76.93
Unemployment rate (level)	1,015	8.203	5.280	.9	26.4
External debt (% GDP) (quarterly difference)	615	.15	2.84	-15.969	22.830
Total assets (% GDP) (quarterly difference)	991	.669	5.738	-35.388	30.262
Non-performing loans (% total loans) (level)	457	5.286	4.593	.570	37.01
Global financial market volatility (VIX) (quarterly difference)	1,455	-.120	7.073	-22.05	29.58
US monetary policy rate (level)	1,500	3.345	2.380	.25	8.25

Table A-3
Fisher ADF Panel Data Unit Root Test Results

Variables	Level	Difference
GDP growth rate	0.023	-
Nominal exchange rate	0.972	0.000
Monetary policy rate	0.000	-
Unemployment rate	0.000	-
External debt (% GDP)	0.308	0.000
Total assets (% GDP)	0.865	0.000
Non-performing loans (% total loans)	0.000	-
Global financial market volatility (VIX)	0.959	0.000
US monetary policy rate	0.000	-

Notes: H0: All panels contain a unit root. Ha: At least one panel is stationary. Observation: p-values reported.

Table A-4
The drivers of private NFS borrowing from domestic banks in EMEs

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Local factors							
GDP growth rate$_{t-1}$	0.457*** (0.104)	0.554*** (0.095)	0.625*** (0.091)	0.553*** (0.097)	0.313*** (0.092)	0.460*** (0.105)	0.482*** (0.109)
ΔNominal exchange rate$_{t-1}$	0.005*** (0.001)	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.014** (0.006)	0.007*** (0.002)	0.006*** (0.002)
Funding conditions							
Monetary policy rate$_{t-1}$	0.079* (0.042)	0.033 (0.048)	0.051 (0.044)	0.036 (0.048)	0.036 (0.086)	0.068 (0.051)	0.023 (0.052)
Macroeconomic conditions							
Unemployment rate$_{t-1}$	-0.069 (0.093)	-0.134 (0.082)		-0.133 (0.082)	0.218* (0.129)	-0.132 (0.105)	-0.158* (0.087)
Δ External debt (% GDP)$_{t-1}$						0.008 (0.053)	
Banking characteristics							
Δ Total assets (% GDP)		-0.106 (0.073)	-0.138 (0.087)	-0.109 (0.074)			-0.127* (0.072)
NPLs$_{t-1}$					-0.249*** (0.059)		
Global factors							
Global funding conditions (Δ VIX)				-0.027* (0.014)	0.001 (0.013)	-0.009 (0.017)	-0.023 (0.014)
US monetary policy rate$_{t-1}$							0.046 (0.106)
Dummy 2007 crisis	1.124*** (0.316)	1.253*** (0.317)	1.096*** (0.318)	1.377*** (0.318)	-0.029 (0.385)	1.387*** (0.366)	1.270*** (0.378)
Underidentification[(a)]	0.000	0.005	0.008	0.006	0.000	0.000	0.003
Sargan[(b)]	0.108	0.108	0.124	0.108	0.469	0.101	0.169
Endogeneity[(c)]	0.073	0.043	0.006	0.049	0.106	0.046	0.095
Observations	616	565	644	565	336	431	565
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Panel data two-step efficient generalized method of moments (GMM) estimator. The dependent variable is the quarterly growth in the stock of private NFS borrowing from domestic banks. Standard errors in parentheses. *, **, *** denotes significance at 10%, 5%, 1% level. External debt data missing for China and South Africa. NPLs data missing for China. All regressions include a constant and country dummies that are not reported.
(a) p-value corresponding to the Kleibergen-Paap (2006) rk LM statistic. A rejection of the null indicates that the matrix is full column rank, i.e., the model is identified.
(b) The joint null hypothesis is that the instruments are valid instruments and that the excluded instruments are correctly excluded from the estimated equation.
(c) We test the endogeneity of monetary policy rate, GDP growth rate and total assets (% of GDP). Under the null hypothesis, the specified endogenous regressors can actually be treated as exogenous.

Table A-5
The Drivers of Private NFS Borrowing from All Sectors, in All Currencies in EMEs

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Local factors							
GDP growth rate$_{t-1}$	0.406*** (0.107)	0.447*** (0.100)	0.551*** (0.095)	0.450*** (0.101)	0.291*** (0.094)	0.410*** (0.115)	0.371*** (0.115)
ΔNominal exchange rate$_{t-1}$	0.008*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.014** (0.005)	0.012*** (0.002)	0.011*** (0.001)
Funding conditions							
Monetary policy rate$_{t-1}$	0.104*** (0.036)	0.062 (0.040)	0.066* (0.040)	0.061 (0.040)	0.072 (0.103)	0.076 (0.051)	0.039 (0.043)
Macroeconomic conditions							
Unemployment rate$_{t-1}$	-0.167 (0.109)	-0.224** (0.104)		-0.224** (0.105)	0.132 (0.143)	-0.230* (0.119)	-0.257** (0.104)
Δ External debt (% GDP)$_{t-1}$						0.035 (0.064)	
Banking characteristics							
Δ Total assets (% GDP)		-0.050 (0.065)	-0.090 (0.082)	-0.054 (0.067)			-0.081 (0.065)
NPLs$_{t-1}$					-0.256*** (0.069)		
Global factors							
Global funding conditions (Δ VIX)				-0.011 (0.016)	0.013 (0.014)	0.004 (0.017)	-0.006 (0.015)
US monetary policy rate$_{t-1}$							0.112 (0.107)
Dummy 2007 crisis	1.133*** (0.351)	1.156*** (0.349)	1.173*** (0.358)	1.210*** (0.354)	0.027 (0.462)	1.201*** (0.402)	0.975** (0.418)
Underidentification[(a)]	0.000	0.005	0.011	0.006	0.000	0.000	0.003
Sargan[(b)]	0.105	0.164	0.108	0.101	0.308	0.107	0.161
Endogeneity[(c)]	0.037	0.040	0.043	0.039	0.043	0.036	0.049
Observations	615	564	643	564	336	430	564
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Panel data two-step efficient generalized method of moments (GMM) estimator. The dependent variable is the quarterly growth in the stock of private NFS borrowing from domestic banks. Standard errors in parentheses. *, **, *** denotes significance at 10%, 5%, 1% level. External debt data missing for China and South Africa. NPLs data missing for China. All regressions include a constant and country dummies that are not reported.
(a) p-value corresponding to the Kleibergen-Paap (2006) rk LM statistic. A rejection of the null indicates that the matrix is full column rank, i.e., the model is identified.
(b) The joint null hypothesis is that the instruments are valid instruments and that the excluded instruments are correctly excluded from the estimated equation.
(c) We test the endogeneity of monetary policy rate, GDP growth rate and total assets (% of GDP). Under the null hypothesis, the specified endogenous regressors can actually be treated as exogenous.

Table A-6
The Drivers of International Claims of BIS Reporting Banks Vis-à-Vis the Private NFS in EMEs

Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Local factors							
GDP growth rate$_{t-1}$	0.821*** (0.193)	0.821*** (0.158)	0.888*** (0.152)	0.825*** (0.158)	0.960*** (0.172)	0.725*** (0.176)	0.720*** (0.160)
ΔNominal exchange rate$_{t-1}$	-0.001 (0.002)	-0.002 (0.003)	-0.004 (0.003)	-0.002 (0.003)	-0.065*** (0.020)	-0.012** (0.005)	-0.001 (0.003)
Funding conditions							
Monetary policy rate$_{t-1}$	-0.066 (0.072)	-0.108 (0.075	-0.092 (0.074)	-0.109 (0.075)	0.324 (0.218)	-0.058 (0.082)	-0.164** (0.080)
Macroeconomic conditions							
Unemployment rate$_{t-1}$	-0.157 (0.218)	-0.169 (0.206)		-0.171 (0.206)	0.782** (0.385)	0.038 (0.246)	-0.254 (0.200)
Δ External debt (% GDP)$_{t-1}$						0.680*** (0.132)	
Banking characteristics							
Δ Total assets (% GDP)		0.352** (0.160)	0.162 (0.185)	0.338** (0.165)			0.335** (0.159)
NPLs$_{t-1}$					-0.494*** (0.146)		
Global factors							
Global funding conditions (Δ VIX)				-0.022 (0.033)	-0.068* (0.036)	-0.036 (0.036)	-0.024 (0.033)
US monetary policy rate$_{t-1}$							0.504*** (0.190)
Dummy 2007 crisis	1.395 (0.852)	1.044 (0.853)	1.028 (0.882)	1.160 (0.881)	-0.264 (1.199)	1.649* (0.902)	0.461 (0.895)
Underidentification[(a)]	0.000	0.002	0.003	0.002	0.000	0.000	0.001
Sargan[(b)]	0.108	0.181	0.104	0.183	0.533	0.447	0.265
Endogeneity[(c)]	0.016	0.040	0.021	0.039	0.016	0.030	0.029
Observations	612	562	641	562	334	427	562
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Panel data two-step efficient generalized method of moments (GMM) estimator. The dependent variable is the quarterly growth in the stock of international claims of BIS reporting banks vis-à-vis private NFS. Standard errors in parentheses. *, **, *** denotes significance at 10%, 5%, 1% level. External debt data missing for China and South Africa. NPLs data missing for China. All regressions include a constant and country dummies that are not reported.
(a) p-value corresponding to the Kleibergen-Paap (2006) rk LM statistic. A rejection of the null indicates that the matrix is full column rank, i.e., the model is identified.
(b) The joint null hypothesis is that the instruments are valid instruments and that the excluded instruments are correctly excluded from the estimated equation.
(c) We test the endogeneity of monetary policy rate, GDP growth rate and total assets (% of GDP). Under the null hypothesis, the specified endogenous regressors can actually be treated as exogenous.

N °500-501-502 – 2018

LOGEMENT ET MARCHÉS DU LOGEMENT / *HOUSING AND HOUSING MARKETS*

• Introduction – Le logement : un bien espace-temps / *Housing: A space-time good*

SYSTÈMES DE LOGEMENT DANS L'OCDE / *HOUSING SYSTEMS IN THE OCDE*

• Construire une typologie des systèmes de logement pour éclairer les politiques des États membres de l'OCDE et de l'UE / *Building a typology of housing systems to inform policies in OECD and EU member States*

• Commentaire – Sur la construction de typologies des systèmes de logement dans l'OCDE / *Comment – On building typologies of housing systems in the OECD*

OFFRE, DEMANDE ET PRIX SUR DIFFÉRENTS MARCHÉS DU LOGEMENT / *SUPPLY, DEMAND AND PRICES ON HOUSING MARKETS*

• Délivrer des permis de construire pour diminuer le coût du foncier ? Une estimation par la demande de terre constructible en France / *Does issuing building permits reduce the cost of land? An estimation based on the demand for building land in France*

• Pourquoi les indices des prix des logements évolueraient-ils différemment dans le neuf et dans l'ancien ? Une analyse sur la France / *New or old, why would housing price indices differ? An analysis for France*

• Accessibilité, pollution locale et prix du logement : le cas de Nantes Métropole, France / *Accessibility, local pollution and housing prices. Evidence from Nantes Métropole, France*

ACCESSION À LA PROPRIÉTÉ, MOBILITÉ RÉSIDENTIELLE - DYNAMIQUES A MOYEN TERME / *ACCESS TO HOME OWNERSHIP, RESIDENTIAL MOBILITY: DYNAMICS IN THE MEDIUM-TERM*

• Hausse des inégalités d'accès à la propriété entre jeunes ménages en France, 1973-2013 / *Rising inequalities in access to home ownership among young households in France, 1973-2013*

• Dynamisation et vulnérabilité du marché des logements occupés par leurs propriétaires aux Pays-Bas. Une analyse de 1986 à 2012 / *The dynamisation and subsequent vulnerability of the Dutch owner-occupied sector. An analysis of 1986-2012*

• Consommation, patrimoine des ménages et marché immobilier en France / *Consumption, household portfolios and the housing market in France*

ÉVALUATIONS D'IMPACT ET MÉTHODES / *EVALUATIONS OF IMPACT AND METHODS*

• L'impact de la hausse des droits de mutation immobiliers de 2014 sur le marché du logement français / *The impact of the 2014 increase in the real estate transfer taxes on the French housing market*

• L'information aux acheteurs affecte-t-elle le prix de vente des logements ? L'obligation d'information et le modèle de prix hédoniques – un test sur données françaises / *Does information to buyers affect the sales price of a property? Mandatory disclosure and the hedonic price model – A test on French data*

• Évaluation des méthodes utilisées par les pays européens pour le calcul de l'indice officiel des prix des logements / *An evaluation of the methods used by European countries to compute their official house price indices*

N° 499 – 2018

MÉLANGES / *VARIA*

CROISSANCE ET PRODUCTIVITÉ DANS LES COLLECTIVITÉS FRANÇAISES DU PACIFIQUE / *GROWTH AND PRODUCTIVITY IN THE FRENCH PACIFIC TERRITORIES*

• Croissance économique et productivité en Polynésie française : une analyse sur longue période / *Economic growth and productivity in French Polynesia: A long-term analysis*

• Productivité sectorielle du travail et compétitivité de l'économie de la Nouvelle-Calédonie / *Sectoral labour productivity and economic competitiveness in New Caledonia*

• Commentaire – La productivité sur longue période dans les collectivités françaises du Pacifique / *Comment – Long-term productivity in French Pacific territories*

MOBILITÉ SOCIALE À L'ÉCOLE, PERFORMANCES SCOLAIRES ET PARCOURS UNIVERSITAIRES / *SOCIAL MOBILITY AT SCHOOL, SCHOOL PERFORMANCES AND EDUCATIONAL CAREER PATHS*

• Une comparaison internationale des systèmes scolaires basée sur la mobilité sociale / *An international comparison of school systems based on social mobility*

• 50 % à la licence... mais comment ? Les jeunes de familles populaires à l'université en France / *50% to the bachelor's degree... but how? Young people from working-class families at university in France*

Economie et Statistique / Economics and Statistics

Objectifs généraux de la revue

Economie et Statistique / Economics and Statistics publie des articles traitant de tous les phénomènes économiques et sociaux, au niveau micro ou macro, s'appuyant sur les données de la statistique publique ou d'autres origines. Une attention particulière est portée à la qualité de la démarche statistique et à la rigueur des concepts mobilisés dans l'analyse. Pour répondre aux objectifs de la revue, les principaux messages des articles et leurs limites éventuelles doivent être formulés dans des termes accessibles à un public qui n'est pas nécessairement spécialiste du sujet de l'article.

Soumissions

Les propositions d'articles, en français ou en anglais, doivent être adressées à la rédaction de la revue (redaction-ecostat@insee.fr), en format MS-Word. Il doit s'agir de travaux originaux, qui ne sont pas soumis en parallèle à une autre revue. Un article standard fait environ 11 000 mots (y compris encadrés, tableaux, figures, annexes et bibliographie, non compris éventuels compléments en ligne). Aucune proposition initiale de plus de 12 500 mots ne sera examinée.

La soumission doit comporter deux fichiers distincts :

- Un fichier d'une page indiquant : le titre de l'article ; le prénom et nom, les affiliations (maximum deux), l'adresse e-mail et postale de chaque auteur ; un résumé de 160 mots maximum (soit environ 1 050 signes espaces compris) qui doit présenter très brièvement la problématique, indiquer la source et donner les principaux axes et conclusions de la recherche ; les codes JEL et quelques mots-clés ; d'éventuels remerciements.
- Un fichier anonymisé du manuscrit complet (texte, illustrations, bibliographie, éventuelles annexes) indiquant en première page uniquement le titre, le résumé, les codes JEL et les mots-clés.

Les propositions retenues sont évaluées par deux à trois rapporteurs (procédure en « double-aveugle »). Les articles acceptés pour publication devront être mis en forme suivant les consignes aux auteurs (accessibles sur https://www.insee.fr/fr/information/2410168). Ils pourront faire l'objet d'un travail éditorial visant à améliorer leur lisibilité et leur présentation formelle.

Publication

Les articles sont publiés en français dans l'édition papier et simultanément en français et en anglais dans l'édition électronique. Celle-ci est disponible, en accès libre, sur le site de l'Insee, le jour même de la publication ; cette mise en ligne immédiate et gratuite donne aux articles une grande visibilité. La revue est par ailleurs accessible sur le portail francophone Persée, et référencée sur le site international Repec et dans la base EconLit.

Main objectives of the journal

Economie et Statistique / Economics and Statistics publishes articles covering any micro- or macro- economic or sociological topic, either using data from public statistics or other sources. Particular attention is paid to rigor in the statistical approach and clarity in the concepts and analyses. In order to meet the journal aims, the main conclusions of the articles, as well as possible limitations, should be written to be accessible to an audience not necessarily specialist of the topic.

Submissions

Manuscripts can be submitted either in French or in English; they should be sent to the editorial team (redaction-ecostat@insee.fr), in MS-Word format. The manuscript must be original work and not submitted at the same time to any other journal. The standard length of an article is of about 11,000 words (including boxes if needed, tables and figures, appendices, list of references, but not counting online complements if any). Manuscripts of more than 12,500 words will not be considered.

Submissions must include two separate files:

- A one-page file providing: the title of the article; the first name, name, affiliation-s (at most two), e-mail et postal addresses of each author; an abstract of maximum 160 words (about 1050 characters including spaces), briefly presenting the question(s), data and methodology, and the main conclusions; JEL codes and a few keywords; acknowledgements.
- An anonymised manuscript (including the main text, illustrations, bibliography and appendices if any), mentioning only the title, abstract, JEL codes and keywords on the front page.

Proposals that meet the journal objectives are reviewed by two to three referees ("double-blind" review). The articles accepted for publication will have to be presented according to the guidelines for authors (available at https://www.insee.fr/en/information/2591257). They may be subject to editorial work aimed at improving their readability and formal presentation.

Publication

The articles are published in French in the printed edition, and simultaneously in French and in English in the online edition. The online issue is available, in open access, on the Insee website the day of its publication; this immediate and free online availability gives the articles a high visibility. The journal is also available online on the French portal Persée, and indexed in Repec and EconLit.

N° 503-504 - 2018

Economie ET Statistique

Economics AND Statistics

Au sommaire
du prochain numéro :
Big data
et statistiques

Forthcoming:
Big Data
and Statistics

ISBN 978-2-11-151209-2 - ISSN 0336-1454 - ECO 503-504
Parution janvier 2018 - PRIX : 17,20 €