



SciencesPo.

Department of Economics

Discussion paper 2014-07

Does housing capital contribute to inequality? A comment on Thomas Piketty's Capital in the 21st Century

**Odran Bonnet
Pierre-Henri Bono
Guillaume Chapelle
Etienne Wasmer**

Sciences Po Economics Discussion Papers

Does housing capital contribute to inequality? A comment on Thomas Piketty's *Capital in the 21st Century*

Odran Bonnet, Pierre-Henri Bono, Guillaume Chapelle et Étienne Wasmer

Economics Department, Sciences Po and LIEPP

April 17, 2014 (English version May 5, 2014)

Abstract—In his book, *Capital in the 21st Century*, Thomas Piketty highlights the risk of an explosion of wealth inequality because capital is accumulating faster than income in several countries including the US and European countries such as France. Our work challenges the conclusions of the author in three steps.

First, the author's result is based on the rise of only one of the components of capital, namely housing capital, and due to housing prices. In fact, housing prices have risen faster than rent and income in many countries. It is worth noting that "productive" capital, excluding housing, has only risen weakly relative to income over the last few decades. Over the longer run, the "productive" capital/income ratio has not increased at all.

Second, rent, not housing prices, should matter for the dynamics of wealth inequality, because rent represents both the actual income of housing capital for landlords and the dwelling costs saved by "owner-occupiers" (people living in their own houses). Logically, to properly measure capital, the value of housing capital must be corrected by measuring it on actual rental price, and not housing prices.

Third, when we apply this change, we find that the capital/income ratio is actually stable or only mildly higher in the countries analyzed (France, the US, the UK, and Canada) except for Germany where it rose.

These conclusions are exactly opposite to those found by

The first and third authors are PhD candidates in economics at Sciences Po. The second and fourth authors are researchers at LIEPP (Laboratory for Interdisciplinary Evaluation of Public Policies), Sciences Po. The fourth author is a professor of economics at Sciences-Po. This work is based on a discussion by Etienne Wasmer on *Capital in the 21st Century* at Sciences Po held on Dec. 12, 2013 at a public debate organized by the MaxPo center with Thomas Piketty. It is the translation of a first note in French (LIEPP's discussion paper 25) mostly addressing the issues raised in the French edition of the book (*Le Capital au XXIe siècle*). We would like to thank Alain Trannoy, Cornelia Woll and Peter Rupert for their very useful suggestions and comments.

Thomas Piketty. However, this does not mean that housing prices do not contribute to other forms of inequality. When housing prices rise, owners of the housing capital hold a higher value that can be transformed into consumption. It is also more difficult for young adults to become homeowners. Housing incomes of owners however do not necessarily increase which casts serious doubt on Piketty's conclusion of a potential explosive dynamics of inequality based on these trends.

I. INTRODUCTION

The issue of capital has always led to the greatest controversies. The most famous of which was between the MIT neo-classical school and the neo-Ricardians of Cambridge, England in the 1960s (see box I). The debate was about possible inconsistencies and tautologies in the measurement of the capital stock and its earnings. *Capital in the 21st Century* may be a new example of a similar controversy. In this remarkable work, Piketty concluded by stating that "*capital is back in France*" and in several other countries around the world. This book has been celebrated for the enormous amount of work it entailed and for the clarity and importance of its conclusions. One of these conclusions, the most striking and perhaps the most salient, is the emergence of a risk of a worldwide explosion in inequality: "*the process by which wealth is accumulated and distributed contains powerful forces pushing toward divergence, or at any rate, toward an extremely high level of inequality*"¹. Divergence

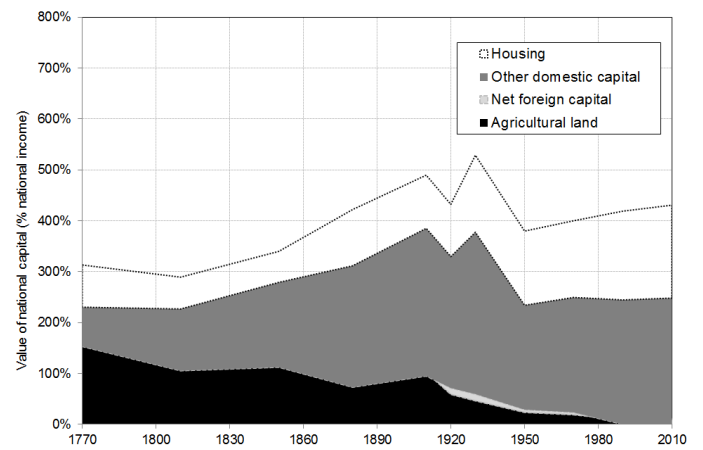
¹p. 27 *Capital in the 21st Century*.

is a dynamic concept that arises from the process of accumulating capital. Capital produces earnings and returns and thus it accumulates and self-develops. This thesis is made explicitly clear in the chapter devoted to the neo-classical model “ $r - g$ ”.

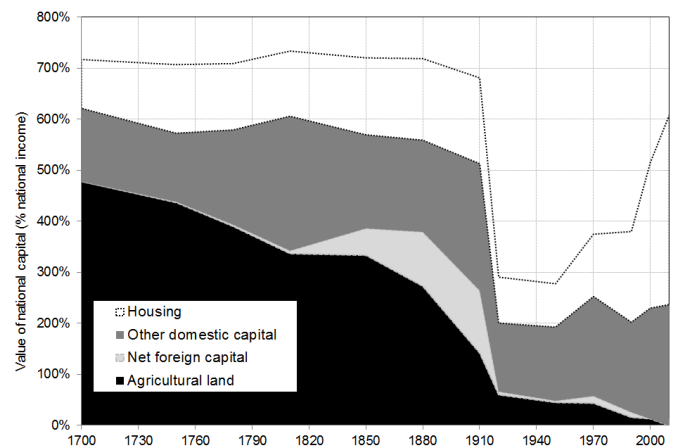
The first chapter describes the logic as follows. First, the higher the capital/income ratio, the higher the earnings of capital relative to labor². Second, if the rate of return on capital (r) is higher than the growth rate of the economy (g), the capital/income ratio will rise, eventually leading to a world where a class of owners would have perpetually increasing income from capital due to rising accumulated wealth. The author documents the strong rise of the capital/income ratio, especially in France, but also provides evidence of a similar trend in other countries. He suggests a worrisome accumulation of wealth in just a few hands and a rise in inequality. This theoretical analysis is the logical follow-up to Solow and Samuelson’s neo-classical approaches.

Our work is intended to question the relevance of the capital measurement used in the book and to point out an inconsistency between the theory - the model of infinite accumulation of capital through rising earnings relative to national income - and the choice to include housing capital in total capital. Before developing our analysis, we should highlight that, aside from housing capital, the capital income ratio has dropped due to the disappearance of agricultural rent in France. In the US, the net capital income ratio of housing capital was the same in 1770 as it was in 2010 and there is neither a long run trend nor a recent increase of this ratio. See figure 1.

²At constant rates of return. Note also that the measurement of the share of labor in national accounts is in itself a source of empirical debates due to necessary corrections for self-employment, the government sector and, again, ... housing services. See [Rupert \(2012\)](#) and [Gomme and Rupert \(2004\)](#) for an example of a correction that changes the trends in labor shares.



(a) Capital in the United States, 1770-2010



(b) Capital in France, 1700-2010

Sources: *Capital in the 21st Century*, Figures 4.6 & Chart 3.2- see piketty.pse.ens.fr/capital21c.

Figure 1. Secular decline in the capital/income ratio (excluding housing) in France and secular stability in the US.

Housing is a very particular component of capital and its interpretation has always been subject to complex discussions, even within the neo-classical world³. In particular, housing capital does not provide a good measure of actual return on capital. Housing is both a consumption good, the price of which comes from rental or shelter costs, and an investment good, yielding an income corresponding

³For instance, [Buiter \(2010\)](#), in a paper entitled *Housing wealth isn't wealth*, concludes that individual consumption is unchanged if housing prices increase and if the price increase follows the fundamentals (hence the exclusion of bubbles). If there is a housing bubble, there are real effects on consumption due to distortions. These effects are of a second order however and are very different from those described in Thomas Piketty’s book (see below). [Bajari, Benkard, and Krainer \(2005\)](#) concluded that there is no first order impact on the price of existing housing stocks and the welfare of the economy: welfare gains due to the gains of sellers are compensated by welfare losses at the expenses of buyers. These transfers contribute to inequality but do not imply any systematic divergence of wealth since sales occur only once and even sellers need somewhere to live.

to the rent. Only landlords (who represent a relatively small fraction of the population) effectively receive monetary income from their housing capital. Owner-occupiers do not receive any income. However they do save on rent and receive an implicit rent. Returns on housing capital (the key ingredient in the “ r ” part of the “ $r - g$ ” model) are therefore more accurately measured by rent on housing, be it monetary or only implicit.

The valuation of housing capital based on housing prices is actually disconnected from the inequality-generating process that the author wants to establish. For the value of housing capital to be consistent with the underlying theoretical analysis, the value must correspond to an actualized value of rent and not rely on housing prices. The two measures are only equivalent in the absence of a divergence between housing prices and rent. Precisely, this divergence was observed in several countries, especially France, since the late 1990’s. This may have arisen from a bubble in housing prices, but this is not necessarily the case, and the existence of a bubble is not necessary for our argument. When fundamentals (such as real interest rates or the specific utility derived from property) do change, this may also lead to higher prices relative to rent.

When we recalculate the value of housing capital based on rent indices, the rise in the capital/income ratio has been modest over the recent period. In the longer run, we observe *a decline in this ratio rather than a U curve*, contradicting the author’s thesis.

It is also worth noting that long term comparisons of housing capital do not necessarily make sense: currently, homeowners are the majority of households (56% in France, 70% in the UK). In 1950, this proportion was respectively 37% and 30%⁴. This is even further away from Karl Marx’s description of 19th century England where, for 20 million inhabitants, he only counted 36,000 homeowners. It is therefore highly problematic to analyze the dynamics of capital inequality without being very specific about its distribution in the population.

⁴Source: [Trannoy and Wasmer \(2013\)](#).

Box 1. The Cambridge controversy (Cambridge Massachussets. vs Cambridge, Angleterre) **on capital measurement**

Neo-classical theory by Paul Samuelson and Robert Solow (MIT, Cambridge, Mass.) assumes there is equality between the return on capital and its marginal productivity. The return on capital being the product of the rate of return on capital and the stock of capital, the measurement of capital is obtained by dividing the actual return on capital and its return rate. Piero Sraffa and Joan Robinson have challenged this view and have suggested a tautology in this reasoning.

Neo-classical economists use the rate of return on capital to measure the aggregate stock of capital: in order to calculate units of capital of a different nature, such as machine-tools and rolling stock or office space, one must first evaluate the stock of capital based on its market monetary value. More precisely, this value is based on the price of capital. If the rate of return on capital is different across sectors due to the rent capture phenomena and contrary to the central neo-classical assumption, then the return on capital is not going to lead to an accurate value of the capital stock. The value of the capital can therefore not be properly calculated. Sraffa proposed instead to measure the value of capital with the total number of hours needed to produce it. This allowed him to rigorously compare the different units of capital with a common ladder, units of labor.

Without arguing in favor of this measurement of capital based on the hours needed to produce it, our work is inspired by this reasoning that prefers to measure returns on capital based on actual rents because they are precisely the source of the dynamics of accumulation of capital, rather than by using housing prices which have been over their long run value for more than a decade ([Trannoy and Wasmer, 2013](#)).

The rest of the monograph is organized as follows. Section II discusses the right measure of capital in particular housing capital. It provides the measure of capital consistent with a model of capital accumulation, and reaches clear conclusions regarding capital stability in France which also applies to the United Kingdom, the United States and Canada. The capital/income ratio has only risen in Germany over the last few decades. Section III focusses on returns to housing capital and argue that they must necessarily have declined. It show why rising housing prices do not necessarily lead to a rise in the income of homeowners or landlords and accordingly why housing inflation does not trigger a divergent accumulation of wealth by the richest people.

However, we would like to make it very clear that we do not deny that the rise in housing price has had real consequences on access to housing and inequality. It has had *bona fide* consequences on the wealth trajectories of individuals and dy-

nasties: in particular, it is increasingly difficult for an individual without initial wealth to become a homeowner in France. These consequences, which are analyzed in greater detail in Sections IV and V, are real. They are however very different from the alleged explosive dynamics of wealth accumulation and should not be considered first order.

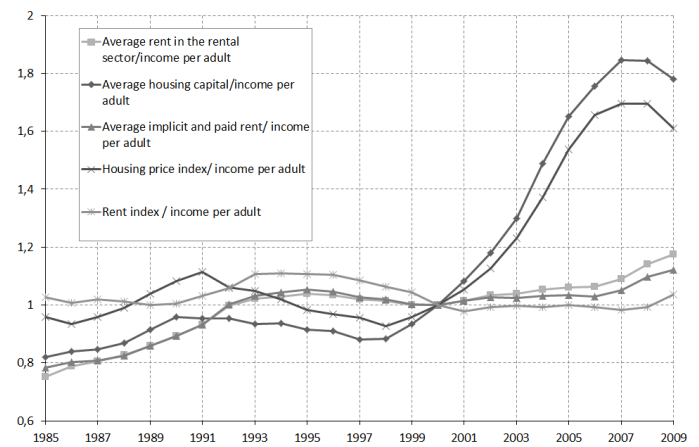
II. THE VALUE OF HOUSING CAPITAL MUST BE BASED ON RENTS, NOT ON HOUSING PRICES

The author defines and describes capital in several countries over the long run and includes housing capital as well as returns from agricultural lands as capital (buildings, equipment, machinery, patents, etc.) as well as net foreign capital.

A. In most countries, national accounts value housing capital on housing prices

The data used in *Capital in the 21st Century* are based on national accounts. The method is typically applied as follows: housing capital is the sum of buildings and land with constructs. For instance, in France, housing capital is estimated through a first step of estimating the total stock and value of housing in a reference year (1998) by INSEE, the French Institute of Statistics. INSEE then follows over time the evolution of the number of buildings from aggregate housing investments, deflated by the housing construction index; and the evolution of land with constructs using the evolution of the surface area covered by housing units and the development of the surface area covered by houses. To get the year-by-year value of housing capital stock, the above-described volume is multiplied by the price index of existing housing. Furthermore, new buildings were also evaluated at the price of existing housing units. Hence, housing capital follows year-to-year evolutions of housing prices, by construction.

Though this method of calculation makes sense for national accounting, it does not lead to any implication regarding the dynamic accumulation of capital. As discussed in the introduction section, housing capital produces a real return for landlords, from rent. It also produces an implicit return as rent “saved” by the owner-occupiers. On both accounts, the value of real estate capital must be based on rent and not on the evolution of housing prices.



Sources: Friggit, <http://www.cgedd.developpement-durable.gouv.fr/prix-immobilier-evolution-1200-a1048.html>. “Compte du logement 2013”. On the graph, we compare the changes of real estate prices, of average rents and indices. Average values take into account trends in the quality of housing, while indices do not correct for quality changes.

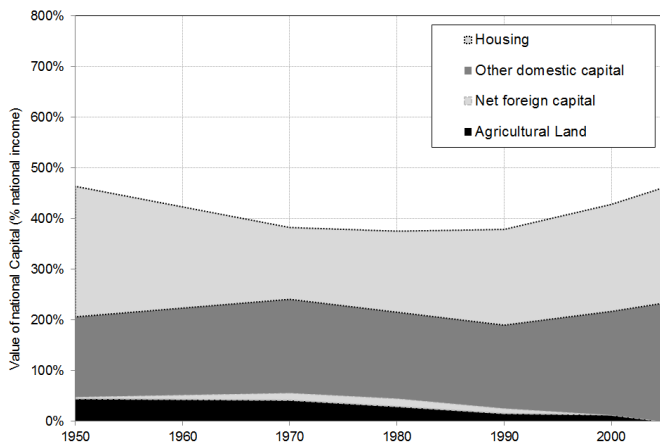
Figure 2. Evolution of housing prices and rental prices in France since 1984

B. The difference matters in France: housing prices rose and rent indices remained quite stable

The most remarkable fact about the housing market over the last decade is that there was a 60% rise in the ratio of housing prices relative to the disposable income of households. This large increase is all the more striking because it was not accompanied by a rise in rents during that period, which remained stable relative to income over the same period (see figure 2). We will not try to explain why housing prices went up quickly here, but rather we will attempt to understand the consequences this has on income and savings for homeowners and households in the rental sector

The value of housing capital must be corrected: we did this by multiplying the initial housing capital by the the rent-to-price ratio. Doing so, the recent trend in housing capital is replaced with a very modest evolution (figure 3)⁵.

⁵Note that the strong increase over the last period in Thomas Piketty’s book is in part an artifact: the very last observation is for one year only (2010), as compared to earlier observations which are evolutions over decades. This single observation which we left on the figure to compare to the source should be placed on the horizontal scale is closer than previous period (2000-2009) by half compared to the typical 10 years intervals of other observations. This changes the apparent rise of the capital/income ratio, which may actually further be limited by a decline in the series which appears after 2011.



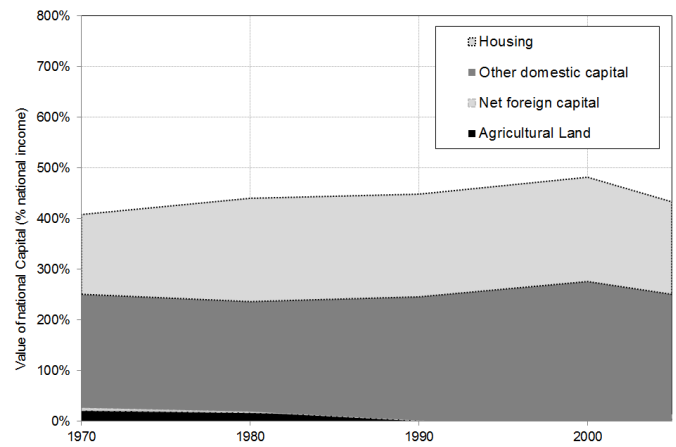
Sources: National accounts (decennial average), data from Thomas Piketty (figure 3.2 - see <http://piketty.pse.ens.fr/en/capital21c>) after correcting the value of capital (authors' calculations). Housing capital is deflated from the housing price index and multiplied by the index of rental prices. Indices are chosen to represent 1 in 1998, which corresponds to a 'neutral year', this is where indexes of price and rents relative to income are in their long term average or "regularity area" (Friggii, 2014): in 1998, the rent-to-price ratio is close to its long-run average and we assume that prices are then proportional to rents, as a present discounted value of these rents. The choice of a base year different than 1998 would vary the level of the corrected capital/labor ratio, but would not affect the relative evolutions after correction. The last year in this figure and next figures is 2010, but it should not be compared to other periods in this graph for the reasons given in footnote 5.

Figure 3. Capital in **France** with housing capital correctly measured, based on rent series

C. The difference also matters in most countries: capital/income ratios remained stable or increased considerably less than before correction of capital, except in Germany

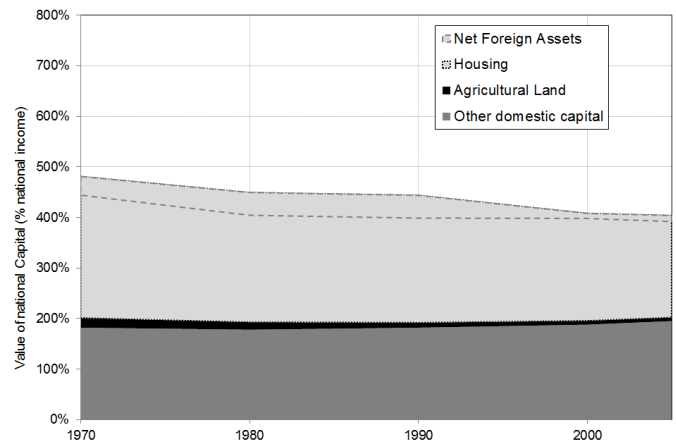
The correction method is applied to other countries where prices and rent data are available. For these countries, we used series of the price over rent ratio, available for the US, the UK, Canada and Germany, as displayed in figure 10 in Appendix. Note that we do not take a stance here on whether there is a bubble in any on these countries, France included. Our argument is simply that if rent and housing price diverge, the value of capital should be measured from rent indices.

This is what we do next: we recalculate housing capital and obtain capital/income ratios which better measures the evolution of returns on capital. Aside from Germany, where this ratio appears to be lower than in other countries (Germans do not own as frequently as in other countries), the ratio of capital over income has remained stable in the other countries. Germany is an interesting case where real estate prices have generally declined over the period relative to rents which has raised the corrected capital income ratio. Germany is reputed to be a country where social cohesion is high and where income inequality is regarded as low yet its capital over income ratio rose. Does this mean that



Sources: National accounts (decennial average), Thomas Piketty's database (figure 4.10 of the French edition of the book- See <http://piketty.pse.ens.fr/en/capital21c>) modified after the correction discussed in the text. Here, housing capital is calculated based on rents. The value of housing capital is deflated from a price index of real estate and then multiplied by an index of rents (index = 1 in 2010) from OECD data. The choice of a base year different from 2010 would not affect the relative evolutions after correction.

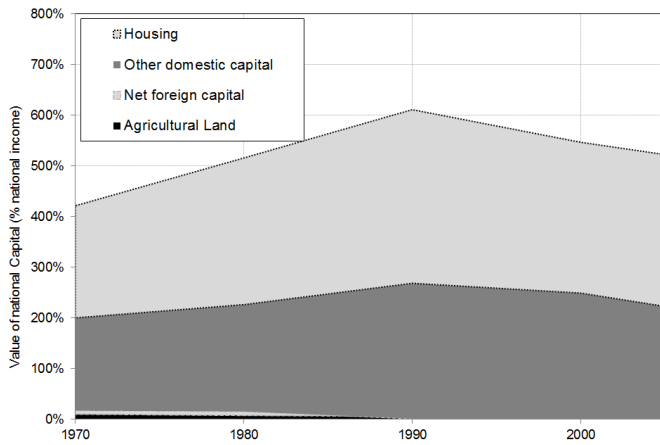
Figure 4. Capital in **the United States** with a corrected measure of housing capital based on rental price of housing



Sources: National accounts (decennial average), Thomas Piketty's database (figure 4.9 of the French edition of the book- See <http://piketty.pse.ens.fr/en/capital21c>) modified after the correction discussed in the text. Here, housing capital is calculated based on rents. The value of housing capital is deflated from a price index of real estate and then multiplied by an index of rents (index = 1 in 2010) from OECD data. The choice of a base year different from 2010 would not affect the relative evolutions after correction.

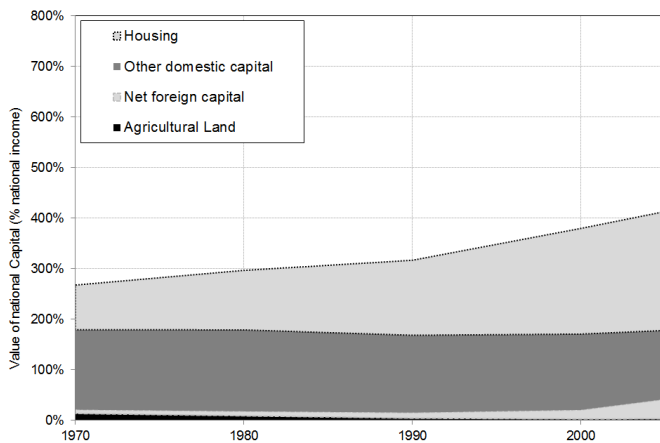
Figure 5. Capital in **Canada** with a corrected measure of housing capital based on the rental price of housing

in this country, an explosion of wealth inequality is on its way? The answer is no, as we will point out below: the capital income ratio is in itself not a very precise measure of wealth inequality, because it ignores the distribution of capital in the population.



Sources: National accounts (decennial average), Thomas Piketty's database (figure 3.1 of the French edition of the book- See <http://piketty.pse.ens.fr/en/capital21c>) modified after the correction discussed in the text. Here, housing capital is calculated based on rents. The value of housing capital is deflated from a price index of real estate and then multiplied by an index of rents (index = 1 in 2010) from OECD data. The choice of a base year different from 2010 would not affect the relative evolutions after correction.

Figure 6. Capital in the United Kingdom with a corrected measure of housing capital based on rental price of housing



Sources: National accounts (decennial average), Thomas Piketty's database (figure 4.1 of the French edition of the book- See <http://piketty.pse.ens.fr/en/capital21c>) modified after the correction discussed in the text. Here, housing capital is calculated based on rents. The value of housing capital is deflated from a price index of real estate and then multiplied by an index of rents (index = 1 in 2010) from OECD data. The choice of a base year different from 2010 would not affect the relative evolutions after correction.

Figure 7. Capital in Germany with a corrected measure of housing capital based on rental price of housing

III. THE RISE OF HOUSING CAPITAL DOES NOT IMPLY A RISE IN THE RETURNS IN CAPITAL: QUITE THE CONTRARY

A. As a matter of fact, the share of capital in total income has stagnated since 1948 in France, and has declined since 1900

One way to rephrase what has been argued so far is to make a distinction between the value of housing capital at the current housing price and its return as a percentage, which is precisely the value of rent divided by the price. If the latter

has increased quickly due to the rise of housing prices, the former must necessarily decrease with constant rent and the total return (the product of the two quantities) will show an ambiguous trend either positively or negatively.

This is important to understanding the logic of this note. In *Capital in the 21st Century*, the author insists on the strong positive trend of the capital/income ratio over the last three decades in France as seen from figure 1 where we also considered housing capital represented with the dashed line. The author cites the “first fundamental law of capitalism”: if the return to capital is r , and the share of income to capital in total income is β , then:

$$\alpha = r \times \beta.$$

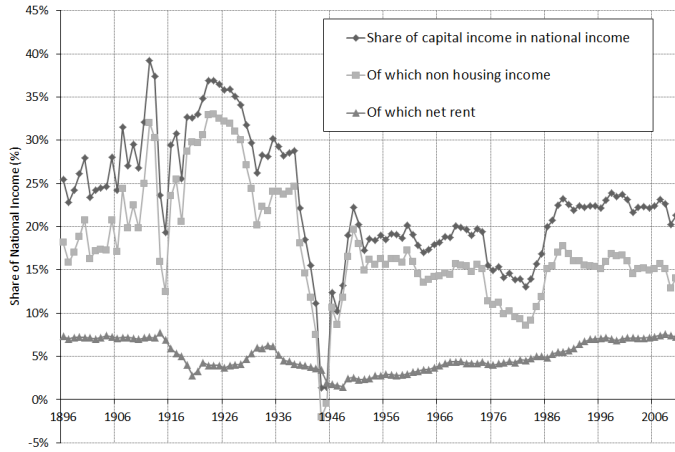
The rise in β could lead us to think that the share of capital in total income must have increased as well. This is not the case however as can be seen in figure 8⁶, which shows the contrary, a secular decline in returns to capital in France (upper curve), a secular decline of the returns to other capital and a moderate increase in net rents in national income since 1948, mostly a return to the values at the beginning of the 20th century which compensates for the decline of the returns to physical capital (not housing)⁷.

The value of housing capital (β) estimated at the price of housing is therefore not necessarily correlated with the share of income it generates in national income (α). In fact, if β has rapidly progressed in several countries over the last decades, α has only progressed slowly in the most extreme cases, or remained stable as in France, or even decreased as in Japan⁸. As a matter of fact, a good measure of the returns to housing capital if taxation was constant would be given by the rent-to-price ratio of Appendix figure 10, which, except

⁶Note that the implicit income of homeowners (56% of the population) is estimated based on rental and shelter costs of tenants in the private rental sector (20%) and does not take into account residents in the social housing sector (17%). Their rents are clearly lower than those in the private sector and the implicit income of homeowners is most likely already over evaluated.

⁷Also note that returns to capital series for France used in *Capital in the 21st Century* are based on rents estimated from the 2002 French Enquête Logement, which has been known to artificially overestimate the level of rent over the recent period. A correction in the 2006 Enquête Logement led to a downward reevaluation of this increase in the share of rents in national revenue over the last period. Figure 8 uses the rent data corrected for this revision of national accounts. We thank Jacques Friggit for enlightening us on this point.

⁸<http://piketty.pse.ens.fr/files/capital21c/pdf/supp/TS6.3.pdf>



Sources: INSEE and Piketty (<http://piketty.pse.ens.fr/en/capital21c>).
 Note: The upper series is the addition of implicit and monetary rents (lowest series) and non housing capital income (intermediate series). From the 1990s, we can see a decrease in capital income which is compensated by a rise in the amount of rents.

Figure 8. Decomposition of the share of capital income in French national income

for Germany, declined in all countries.

B. Housing prices are therefore disconnected from the share of income from housing in national income

This apparent paradox is relatively simple to understand. The rise in ratio β is only a consequence of housing capital. Yet, the share of capital income in total income depends on the returns to different assets. In the following equation:

$$\begin{aligned}\alpha_{total} &= \alpha_{\text{other capital}} + \alpha_{\text{housing capital}} \\ &= r_{\text{other capital}} \times \frac{\text{other capital}}{\text{income}} \\ &\quad + r_{\text{housing capital}} \times \frac{\text{housing capital}}{\text{income}}\end{aligned}$$

More precisely, we define the value of housing capital over income as the product of its price per unit of housing - taking into account quality - and the volume - in quality units - of the housing stock represented by a function F not made more explicit here :

$$\frac{\text{housing capital}}{\text{income}} = \frac{\text{Housing price} \times F(\text{quantity}; \text{quality})}{\text{income}}$$

while

$$r_{\text{housing capital}} = \frac{\text{value of rents}}{\text{Housing price}}$$

Combined, we obtain:

$$\frac{\text{value of rents}}{\text{Housing price}} \times \frac{r_{\text{housing capital}} \times \frac{\text{housing capital}}{\text{income}}}{\text{Housing price} \times \frac{F(\text{quantity}; \text{quality})}{\text{income}}} = \quad (1)$$

The housing price therefore cancels out in equation (1). In a purely accounting sense, a rise in housing prices has no direct impact on the share of capital income in total incomes. This share depends only on rent and on the quantity and quality of housing. If the housing capital relative to income follows housing prices, the share of its revenues in total income follows rent indices. More precisely, since prices and rents have diverged, it is unsurprising that β (evaluated at the housing price as in Piketty) has increased while α (based on rents) remained stable.

This leaves us with one item to discuss: the rise in housing price leads to capital gains which were ignored in the previous analysis. Most capital gains are used by sellers, not to consume more, but to buy a new dwelling. For homeowners increasing the size of their house, the rise in prices leads to a decline in well-being, despite larger capital gains from selling their old house. The analysis given in the following section clarifies this issue by investigating the various redistributive effects of a housing price increase and the distribution of capital gains in the population.

IV. HOW DO RENTS AND REAL ESTATE PRICES AFFECT INEQUALITY?

The increase in housing prices affects the distribution of wealth in the population. The following explanation details these consequences. However, we would like to emphasize that they have nothing to do with the conclusion reached by Thomas Piketty and that this increase will not create an explosive increase in the dynamics of inequality.

A. Four profiles: tenants, first time owners, owner-occupiers and landlords

Let's consider four different profiles:

- A tenant, who pays a rent L ,
- An owner-occupier, who owns his main residence and who has already repaid his loan or who did not take out a loan⁹,
- A first time owner, who pays an amount I within the period given to repay his loan,
- A landlord who owns two housing goods (people who occupy one and rent the other for an amount L).

In order to investigate the impact of housing price increases on the different profiles, we assumed that their other characteristics were the same. At the beginning of the period therefore, they all have the same amount of financial capital K , which yields rK for each period, where r is the return on capital. They also earn the same wage w and pay taxes T . Tenants pay a rent L . The value of housing is equal to H_0 at the beginning of the period and to $H_1 = H_0(1 + g_H)$ at the end, where g_H stands for the growth rate of housing prices. Homeowners also pay maintenance costs and property taxes that we considered, for simplicity's sake, to be proportional to the initial value H_0 with a proportional coefficient of a . How does this affect our profiles at the end of the period? They will consume a quantity C , possibly different for each group, and save the difference between their incomes and their expenses. At the end of the period, the tenant will have a financial capital y_{ten} of:

$$y_{ten} = (w - T - C - L) + K(1 + r) \quad (2)$$

and no housing capital.

The owner-occupier will have a financial capital $y_{own-occ}$ of

$$y_{own-occ} = (w - T - C - aH_0) + K(1 + r) \quad (3)$$

and a housing capital H_1 .

The first time owner will have a financial capital $y_{first-time-own}$ of :

$$y_{first-time-own} = (w - T - C - I - aH_0) + K(1 + r) \quad (4)$$

and a housing capital H_1 .

⁹This category of owner-occupiers also includes households who have sold their dwelling and who have used the capital gain to purchase another residence without taking out a loan.

The landlord will have a financial capital $y_{landlord}$ de :

$$y_{landlord} = (w - T - C + L - aH_0) + K(1 + r) \quad (5)$$

and a housing capital $2H_1$.

We found that the difference in financial capital between these categories does not depend on housing price, but on rent, which has a negative impact on tenants, a positive impact on landlords and no impact at all on first time owners or on owner-occupiers. *Our first lesson is that, for a given consumption, homeowners only save rent (and maintenance costs) relative to tenants, regardless of housing prices.* The increase in house prices has no impact on disposable income.

In other words, it is not because our house cost 100,000 dollars when we bought it and that it is now worth 500,000 dollars that we are able to consume more or save more money. As long as we live in our house, our disposable income remains the same.

In contrast, the housing capital of owners will have risen. Let us suppose from now on, that there exists a second period where owners could sell their housing goods in order to increase their consumption.

B. The impact of a housing price increase on the different profiles

The price increase impacts various agents depending on their occupation status during the increase. By detailing these effects, we find the following typology:

- For first time owners and owner-occupiers who sell their house and become tenants, the increase in housing price enables them to increase their consumption and fosters a rise in inequality. However, becoming a tenant after being an owner is rare (as discussed in Section V)
- For first time owners and owner-occupiers who are buying another housing unit, either their consumption of housing goods decreases and their consumption of other goods increase, or their consumption of housing and non-housing goods remains stable. The increase in housing prices has no impact on inequality here
- Landlords benefit from a house price increase only if they sell one of their goods

- Tenants who would like to become owners face higher interest payments. This should reduce their consumption and increase inequality for owners. However, this statement should be qualified. The increased loan cost is mitigated if interest rates decrease, or to a lesser extent, if the loan's maturity is lengthened (because it allows households to reallocate consumption to the first years of their loan thereby increasing their well-being). It happens that both of these trends have been observed over the last few decades in France. Therefore, the reasoning above only applies to the share of the increase in housing price which is neither due to the decrease in interest rates nor due to an increase in maturities. These two trends contribute to the increase in price according to Friggit (2011).

C. A limited impact which does not create explosive dynamics of inequality

The impact of an increase in housing prices seems to be very limited. Only landlords who sell their goods would increase their consumption. The other owners, if they sell, will have to find new accommodations and therefore, also face the increased housing price. The “real” housing price, that is the price of purchase deflated by the price of repurchasing an equivalent good, is simply equal to 1. This real price is however not 1 for people willing to accept becoming a tenant, and therefore who can afford increased consumption. Similarly, tenants who wish to buy a house will instead suffer from the housing price increase, but only for a share of this increase.

The increase in housing prices is therefore not neutral. It also creates life cycle effects: there is a transfer of wealth from households who become owners to former owners or to people who have inherited from prior owners¹⁰. In contrast, the rise in housing prices is neutral in terms of inequality if we consider dynasties that transfer across generations the housing goods they occupy or those who sell them to occupy another one. If a young successor inherits an amount of money coming from the sale of a housing good and buys another housing good

by means of this legacy, it is the same as if prices had not increased. Here again, *the real price of housing is 1* if we think in terms of dynasties. Only when a dynasty transfers housing capital which is sold in order to buy financial capital, the increase in housing prices enables an increase in consumption for the next generation. However, this housing price increase only has an impact once, at the time of the sale. The housing price increase creates a store of value for owners. As we will show in section V, this type of legacy will not be used to increase consumption, because they will most likely not be selling their housing good (or if they do, they will probably buy a new one). However, these savings will be useful for their children or for themselves if they should run out of money. The increase in housing prices creates an insurance against social risks for owners: in case of money problems, it is possible to sell the property and become a tenant. This mechanism is very different from an explosive dynamics; the “store of value” argument does not create a dynamic process of inequality accumulation.

To sum up this section, the increase in housing prices creates a transfer from new owners to older owners or to the next generation, but as previously stated, these effects are of a second order (redistributive effects) and they are mitigated (cf. *infra*). Unlike what was suggested in *Capital in the 21st Century*, the increase in housing prices does not lead to first order effects, that is to say an explosive dynamic of inequality that would benefit households with significant housing capital, except for a small share of landlords at the beginning of the increase who chose to sell their good at the end of the increase.

V. THE HOUSING CAPITAL OF FRENCH HOUSEHOLDS

A. When there are more homeowners, the housing capital is more evenly distributed

Whatever the value of the capital/income ratio, the dynamics of inequality over the last 200 years seems hard to understand without first looking at the distribution of capital among the population. This is particularly important since the manner in which capital is distributed has a direct impact on the distribution of income. As a consequence, even when the value of the housing capital is calculated from

¹⁰Rents and Housing prices: CGEDD (Notaires-Insee, Friggit 2007 ; http://www.cgedd.developpement-durable.gouv.fr/rubrique.php?id_rubrique=1).

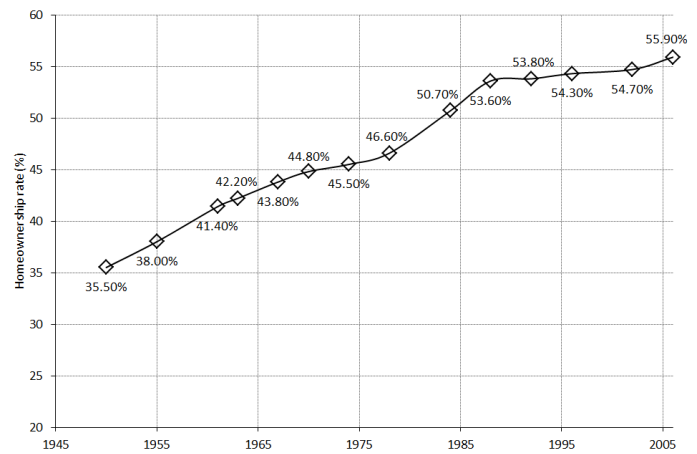
rent and not from housing prices, any conclusion in terms of inequalities is hard to infer.

There has been a dramatic change in the distribution of housing capital among households over the last century. For example, Marx and Engels described the British housing market in the 19th century as follows:

“The census for England and Wales in 1861 gives the total population as 20,066,224 and the number of house owners as 36,032, the proportion of the owners to the number of houses and to the population would take on a very different aspect, if the great house owners were placed on one side and the small ones on the other.” (The capital – Volume III – Chapter 37)

This type of situation, where a small share of the population owns most of the housing capital, appears to be far from the current situation of developed countries where the homeownership rate varies between 40% and 70%. The diffusion of homeownership is likely to slow or even reverse the rise of inequality regardless of trends in housing prices.

As the French example illustrates, homeownership rates have dramatically increased since the 1950s (Fig 9). Currently, approximately 56% of households own their house, 20% rent in the for-profit sector and 17% benefit from publicly subsidized social housing. It is worth noting that an increase in rent levels in the for-profit sector would only change the situation of tenants of the private sector and their landlords with respect to the other households (20% of the housing capital). The existence of a significant social housing sector (1/5 the housing stock) would therefore mitigate the distributive impact of such a phenomenon. The income generated by housing capital is less likely to increase inequality than it was in the beginning of the 19th century since the diffusion of homeownership has contributed to more evenly spread housing capital.



Sources: Rates from 1955 (38 %) to 2006 (55.9 %) were calculated by Jacques Friggit from the French Housing Survey. They were harmonized to fit the 2002 definition of homeownership (Friggit, 2010). The 1950 data point came from Cahen (1957).

Figure 9. Evolution of the homeownership rate in France between 1950

Distribution of homeowners per level of income

Year	1st decile	low	high	highest decile	total
		middle class	middle class		
1984	7	36	45	11	100
2006	4	33	51	12	100

Sources: 1984 and 2006 Enquêtes Logement de l'INSEE

Note: The 10% poorest represented 7% of the homeowners in 1984 and 4% in 2006.

Table I

DISTRIBUTION OF HOMEOWNERS ACCORDING TO INCOME

B. Residential trajectories in the life cycle: home sweet home

As suggested in section 2, the accumulation of housing capital due to a change in price does not generate additional income until the capital is sold. Though it seems rational for seniors to sell their house, few households do so. Several empirical studies have shown that the elderly tend to remain homeowners both in France and in the US. The homeownership rate increases steadily with the age of the reference person in the household, reaching its peak between the ages of 65 and 74 with the rate decreasing marginally afterwards. These figures suggest that only a small share of homeowners sell their home as they age. The reason for these transactions are more related to unexpected events (death of a spouse, health condition, etc.) than

Country	55-64 yrs	65-74 yrs	75-84 yrs
Germany (2007)	55.97	50.91	47.55
United State (2007)	80.69	82.12	79.72
Canada (2004)	78.03	76.65	67.94
Spain	90.01	89.12	86.26
Australia (2003)	81.42	81.82	82.31
Luxembourg (2004)	77.20	84.21	81.6
France (2006)	70.32	73.50	71.07

Sources : Andrews and Sánchez (2011) and 2006 French Enquête logement

TABLE II
SHARE OF HOMEOWNERS BY AGE GROUP (%)

for economic reasons. Chiuri and Jappelli (2010) who further suggested that the generation effect could lead us to underestimate homeownership rates amongst the elderly whereas a lower mortality rate among homeowners could lead us to underestimate it.

These findings are similar to those of several studies conducted in the United States.¹¹ Several hypotheses could explain this phenomenon. Access to homeownership is usually considered an achievement and returning to the rental sector could be considered a drop in status. Additionally, seniors can be attached to their homes as well as their direct environments. They may also consider their home as a reserve of value or a legacy for their children.

VI. CONCLUSION

Our text has alluded to the fact that housing as measured in national account could in part an illusion as housing prices may return to lower values. To better see this point, let us ask two questions. First, what inequality would there be if each household owned one painting and kept it throughout its lifetime? The wealthiest households might own a pricey Manet or Kandinsky. The

¹¹Venti and Wise (1990) highlighted the fact that aged homeowners didn't sell their house to take advantage of the capital gain due to the price increase during the 1970s. Even if some dissensions exist among scholars, most of them recognize that retired households don't decrease their housing wealth when ageing. For example, Skinner (1996) showed that, when moving, retired households were as likely to increase their housing wealth (buying a more expansive home) as to decrease it (buying a smaller house or renting).

poorest might own a painting by a local artist. Now, if the price of art increased uniformly, would this contribute to an explosion of inequality in the sense of a divergent and exponential accumulation of capital? The answer is clearly it would not. Even if the paintings could be rented and generate some income for the owners, this revenue would need to increase proportionally to the selling price and faster than the labor earnings for capital to increase faster than total income.

Second, in the same line of thought, do we really believe that a drop in the price of housing (as occurred in Spain and Ireland) would be excellent news, leading to a compression of wealth inequality? Again, the answer is clearly not. These two questions show the fragility of this line of reasoning that is exclusively based on a rise in the value of housing capital due to the rise in its purchase price, especially when this price diverges from the rental price - as was the case in France and other countries over the past 15 years.

Our analysis led us to conclude (more optimistically, or perhaps just less pessimistically) that long-run trends in wealth inequality are not dramatic. In the United States, the stock of capital has decreased relative to total income over the last century and has remained stable since the 1970s. Additionally, income inequality has increased but it is due to a more unequal distribution of wages and rising returns of human capital. This dramatic rise in inequality in the US has little to do with capital. As discussed in Paul Krugman's review¹², it is hard to explain the evolution of the top 1% earnings with a story based on physical capital accumulation. In continental Europe, income inequality has decreased or been contained.

The capital/income ratio has therefore increased only because of the choice made to measure the value of capital as indexed on the housing price and not indexed on rental price. A shallow reading of Thomas Piketty's book could lead us to believe in an explosion of inequality but this dramatic trend in wealth inequality is not in the data. Our work shows

¹²“For the fact is that the most conspicuous example of soaring inequality in today's world—the rise of the very rich one percent in the Anglo-Saxon world, especially the United States—doesn't have all that much to do with capital accumulation, at least so far. It has more to do with remarkably high compensation and incomes.”, New York Review of Books, <http://www.nybooks.com/articles/archives/2014/may/08/thomas-piketty-new-gilded-age/>

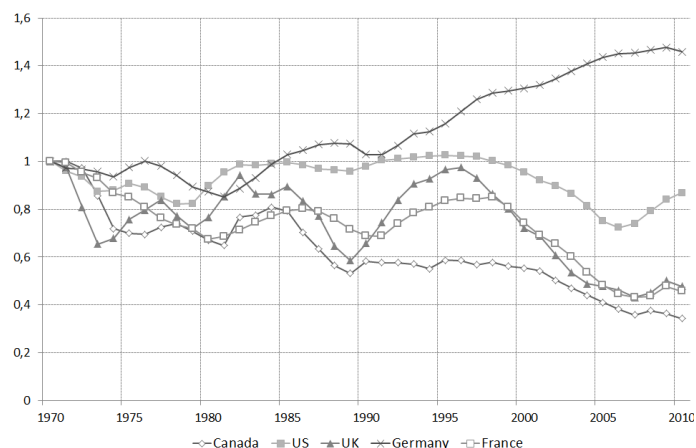
that this is not confirmed by the analysis. This is by no means a denial of the considerable interest of the data collection and the interest of the historical perspective it brings.

REFERENCES

- Dan Andrews and Aida Caldera Sánchez. The evolution of homeownership rates in selected oecd countries: Demographic and public policy influences. *OECD Journal: Economic Studies*, 2011/1:207–243, 2011.
- Patrick Bajari, Lanier C. Benkard, and John Krainer. House prices and consumer welfare. *Journal of Urban Economics*, 58(3):474–487, 2005.
- Willem Hendrik Bui. Housing wealth isn't wealth. *Economics-The Open-Access, Open-Assessment E-Journal*, 4(22):1–29, 2010.
- Lucienne Cahen. Evolution des conditions de logement en france depuis cent ans. *Etudes et conjoncture-Institut national de la statistique et des études économiques*, 12(10-11):985–1376, 1957.
- Maria Concetta Chiuri and Tullio Jappelli. Do the elderly reduce housing equity? an international comparison. *Journal of Population Economics*, 23(2):643–663, 2010.
- Jacques Friggit. Les ménages et leurs logements depuis 1955 et 1970, quelques résultats sur longue période extraits des enquêtes logement, 2010. URL http://www.cgedd.developpement-durable.gouv.fr/IMG/pdf/menage-logement-friggit_cle03e36d.pdf.
- Jacques Friggit. Quelles perspectives pour le prix des logements après son envolée? *Regards croisés sur l'économie*, (1):14–32, 2011.
- Jacques Friggit. Prix de l'immobilier d'habitation sur le long terme, 2014.
- Paul Gomme and Peter C. Rupert. Measuring labor's share of income. *FRB of Cleveland Policy Discussion Paper*, (7), 2004.
- Peter C. Rupert. Measuring labor's share of income, October 2012. URL <http://econsnapshot.com/2012/10/16/is-labors-share-of-income-declining/>.
- Jonathan S. Skinner. Is housing wealth a sideshow? In *Advances in the Economics of Aging*, pages 241–272. University of Chicago Press, 1996.
- Alain Trannoy and Étienne Wasmer. Les prix de l'immobilier et les politiques inflationnistes. Technical report, CAE, 2013.
- Steven F. Venti and David A. Wise. But they don't want to reduce housing equity. In *Issues in the Economics of Aging*, pages 13–32. University of Chicago Press, 1990, 1990.

APPENDIX

A. Rent to price ratios in various OECD countries



Sources: OECD, Economic Outlook Database and Main Indicators database.

Figure 10. Rent-to-price ratios in various OECD countries