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Is demographics the housing cycle?

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This Rue de la Banque *provides evidence of the strong cyclical impact of demographics on housing investment. The common wisdom is that population growth affects the housing stock in the long run. However, in the short run, the growth rate of the age-group (20-49 years old) influences the demand for new dwellings: it is cyclical and correlated with the cycle of the ratio of housing investment to GDP. There is a causal effect in this correlation. Demographic changes are a better predictor of the residential investment rate than any macroeconomic or financial variable we control for. These new findings offer an original perspective on the role of migration and demographics in the housing boom that preceded the 2007-2008 crisis in OECD countries. Finally, if current population projections are right, except if migration were to support population growth, housing investment will grow at a slower pace than GDP and contribute to slowing down GDP growth in the next 15 years.*

From 2007 to 2015, the level of housing investment in the Euro Area decreased by 24%. On the contrary, the level of GDP is currently roughly equal to its 2007 level, which implies that the fall of housing investment led to a fall of the housing investment rate (i.e. housing investment divided by GDP) from 6.6% in 2007 to 5% in 2015.

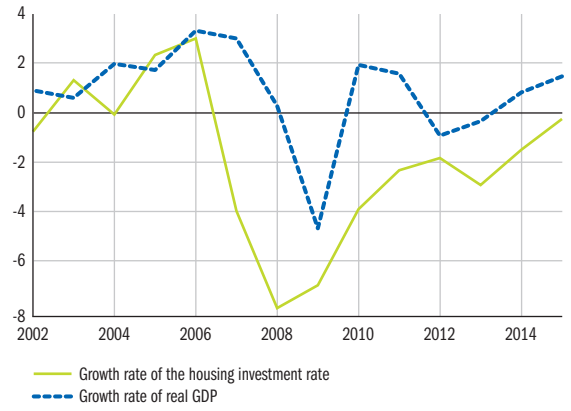
This is in striking contrast with the pre-crisis situation, between 2002 and 2007, when housing investment grew on average by 2.6% a year, and GDP by 2%.[1] Overall, as seen on Chart 1, the changes in the housing investment rate are in fact closely associated with the growth rate of GDP. The strong link between GDP growth and the fluctuations of housing investment (as well as the fact that housing investment is more volatile than consumption, non-residential investment and GDP), urged Edward Leamer to claim in his 2007 Jackson Hole paper that "housing is the business cycle" (Leamer, 2007 ; see also Kydland et al. 2012).

In a panel of 20 OECD countries since 1980 (Monnet and Wolf, 2016), we observe that on average, GDP growth is higher when the housing investment rate increases

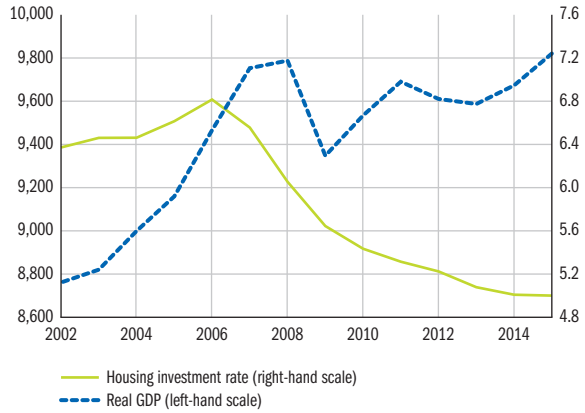
1 *European figures are even more dramatic if we exclude Germany, which has been notoriously experiencing an opposite cycle: the German housing investment rate decreased until 2008, and is increasing since then (in line with the growth of the 20-40 age group).*

G1 The housing investment rate and real GDP in the Euro Area

a) Evolution of Eurozone housing investment rate and GDP
(in %)



b) Level of Eurozone housing investment rate and GDP
(GDP in EUR billions) *(rate in % of GDP)*



Source: Eurostat.
Note: The housing investment rate corresponds to the ratio housing investment/GDP.

(see Table 1). During the years when the housing investment rate increased, the average contribution of this investment to GDP growth was 0.49 percentage point, and the average GDP growth was 2.95%. On the contrary, during the years when the housing investment rate decreased, the contribution of this investment to GDP growth was –0.31 percentage point and average GDP growth was only 1.66%.

T1 Average values of several economic variables when the housing investment rate increases or decreases

(in % of GDP or percentage points)

	Growth of the residential investment rate	Decline of the residential investment rate
Residential investment		
Growth	8,56	-5,68
Contribution to the GDP growth	0,49	-0,31
Consumption		
Growth	2,61	1,72
Variation of the share in GDP	-0,24	0,05
Non-residential investment		
Growth	3,59	2,10
Variation of the share in GDP	0,12	0,03
GDP growth	**2,95**	**1,66**

Source: Ameco.
Note: Mean value of country-year pooled data for the 20 OECD countries between 1980 and 2014.

Given the striking consequences of the pattern of the housing investment rate for GDP growth, it is crucial to identify its determinants. In other words, why does housing investment vary differently from the other components of GDP?

Demographic cycle is the key

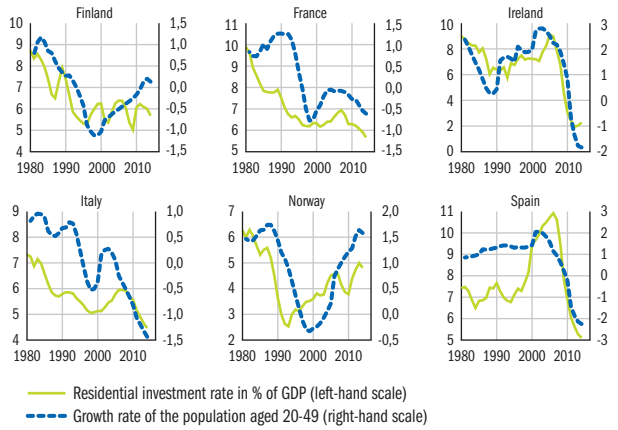
The experience of some European countries in the early 2000s as well as the well-documented relationship between housing prices and credit (Favara and Imbs, 2015; Jorda, Schularick and Taylor, 2015) might suggest that financial conditions are the main determinants of the level of the housing investment rate. Contrary to this hypothesis, we find that demographic changes are actually the main drivers of the housing investment rate (Monnet and Wolf, 2016). More specifically, numerous estimations and robustness checks on a panel of 20 OECD countries since 1980 show that the growth rate of the age group 20-49 (which is the main determinant of housing demand – cf. Mankiw and Weil, 1989) is significantly and positively correlated with the housing investment rate. A 1% increase of the 20-49 age-group is correlated with a 1 percentage point increase in the housing investment rate. On the contrary, housing prices, credit, disposable income or interest rates are not significant explanatory variables or explain very little of the within variation of the housing investment rate. The robust correlation between the housing investment rate and the growth rate of the 20-49 age group is actually observed on simple graphs like the

ones displayed for six countries (see Chart 2). According to our estimations, this effect of the 20-49 age group is indeed specific to the housing investment rate: it is not found when we look at the consumption to GDP ratio or the non-residential investment to GDP ratio. Interestingly, the growth rate of the 20-49 age group is not correlated to real housing prices, which we view as an additional evidence of the disconnect between the growth of new construction and housing prices (Leamer, 2007; Glaeser and Gyourko, 2015).

The novelty of our argument relies on the observation that the growth rate of the age group which is affecting housing demand (because it is the age when household formation takes place) actually experiences pronounced medium-term cycles which are themselves creating cycles in the housing investment rate. The cycles of this age group (observed on Chart 2) are caused both by current net migration and by past fluctuations of birth rates (natural balance). They may have little effect on the long-run population growth rate, but they are striking short or medium-term demographic phenomena. Thus, the flow of new people entering the housing market is far from being constant overtime, which has a major influence on the share of housing investment in GDP, because these young adults spend relatively more of their revenue on housing than on consumption or on other investments. This argument is different from the well-known and obvious long-run relationship between population and the housing stock, as well as from the relationship between ageing and the housing market (Mankiw and Weil, 1989; Lindh and Malmberg, 2008). The dependency ratio (ratio of the young divided by the old), or the share of the 20-49 in total population, are experiencing a downward trend in the OECD since the early 1990s because of an ageing population. However, the number of new people entering the housing market every year still varies a lot. Hence, the evolution of the dependency ratio is unable to explain the rise of the housing investment rate that occurred in the early 2000s in most countries of our sample, whereas the growth rate of the age group 20-49 is systematically associated with this rise. Moreover, the well-known decrease of the household size since the 1970s also shows a trend pattern which is affecting the long-run evolution of the housing stock but is not able to explain the fluctuations of the housing investment rate.[2]

G2 The housing investment rate and the growth rate of population aged 20-49, for six countries

(in %)



Source: Eurostat.
Note: The housing investment rate corresponds to the ratio housing investment/GDP.

Is the effect of demography on housing causal?

Are demographic effects causal? It may not be, if some people are more likely to immigrate to a country where the economy and the housing sectors are booming. To account for this potential endogenous effect of housing conditions on demographic changes, we use past demographic data and predict the growth rate of the age group 20-49 that would be caused only by the natural balance (i.e. without migration).[3] The rationale of this instrument is that demographic data determined 20 years before is unlikely to be affected by the current housing cycle. This instrumental variable is weak in countries where migration was high, but strong in others. In the latter case, we can obtain a precise estimation of the effect of the 20-49 age group growth on the housing investment rate, free of any endogenous effect that could be due to migration. Overall, according to our instrumental variable estimates, we find that a 1% increase in the population aged 20-49 increases the residential investment rate by 1.3 percentage points.[4] The potential effect of these

2 *There might be short-term changes in the household size because of economic conditions (unemployment, high level of housing prices), but these would be captured by the controls in our estimations.*

3 *To be more specific, we instrument the growth rate of the 20-49 age group. We have to use this method to decompose between migration and natural balance, because national statistics do not publish migration by age groups.*

4 *A 1% increase of the 20-49 age group purely due to migration is correlated with an increase of the housing investment rate by 0.85 percentage point (but the interpretation cannot be proven to be causal in this case).*

demographic changes on the housing investment rate is important since the within standard error of the growth rate of the age group 20-49 is 0.77 in our sample.

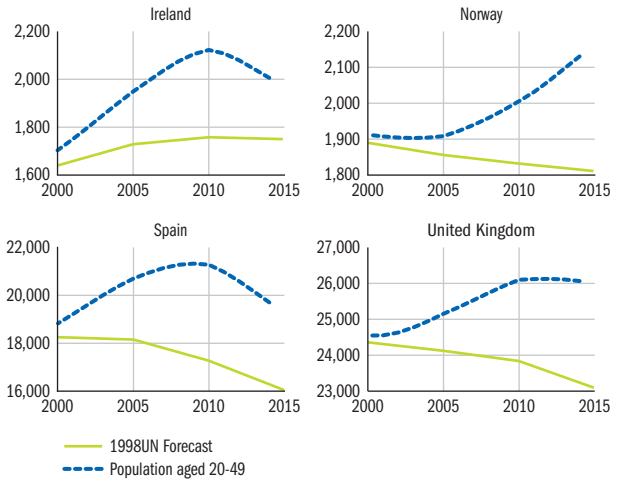
Conclusion and implications

In more intuitive terms, a conclusion of our study is that demographic changes contributed greatly to the housing construction cycle of the 2000s in Europe and OECD countries, both to these constructions boom of the early 2000s and to the bust of the late 2000s. They would also have been predictable using past demographic data, except in countries where migration was so high that it made such predictions impossible (demographic trends being changed significantly because of migration). This qualification is worth mentioning: in half of the countries of our sample, population forecasts of the late 1990s were unable to predict the growth rate of the 20-49 age group that actually occurred in the early 2000s because of migration. This was strikingly the case in countries such as Spain, the United Kingdom or Ireland (see Chart 3) where housing investment experienced exceptional growth rates between 2000 and 2007.

Our study of 20 OECD countries since 1980 does not identify a significant correlation between the housing investment rate and financial factors (interest rates and credit) but obviously does not deny that financial factors played a major role in some cases. For example, the Spanish and US housing investment rate increased more in the early 2000s than what our simple model would predict. We emphasize, however, that the up and down fluctuations of housing investment do not come from nowhere, and that it is key to take into account demographic cycles when discussing housing cycle, potential housing construction booms and busts.

G3 Comparison between UN 1998 forecasts and actual figures of the population aged 20-49

(in thousands)



Source: United Nations, Demographic Yearbook *1998.*

A last note should be on future prospects. Since current population projections point to a negative growth rate of the 20-49 age groups in European (and OECD) countries in the next decades, we should not expect an increase in the housing investment rate in the years to come, according to our model. The *UN World Population Prospects* 2015 state that the population aged 20-49 in the Euro Area will decrease by 18% between 2015 and 2050. Given the stylized fact that GDP growth is much lower during periods of decreasing housing investment rates (consistent with the "housing is the business cycle" perspective of Leamer, 2007, 2015), these population forecasts are not good news for future economic growth. Are Europeans going to make these projections lie, as they did in the early 2000s? This is one of the key economic issues of the current debate on migration.

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