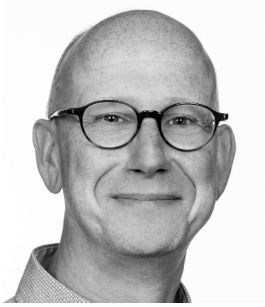


Real estate, QE and mortgage loans

Is there a perfect storm on its way?



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Interest rates are at unseen low levels. This brings us in an economic setting which has never been observed. Belgian residential real estate prices have been boosted by this low interest rates and above average growth rates were recorded over the last decades. The growth in real estate prices occurred without a lot of volatility which misleadingly suggested that real estate is a relatively safe asset. The low cap rates however imply a high interest rate sensitivity. If cap rates would increase in the near future, this is most likely to be due to increasing credit spreads. Pure credit spreads however are unobservable since they have been squeezed by the ECB's QE monetary policy. A sudden increase in credit spreads would affect household wealth, financially weaker corporates as well as banks. The exposure to mortgage loans will be an important factor since these portfolios are large, they have been growing lately at a high speed and their quality has been deteriorating. The commercial margin on mortgage loans is so low that questions can be raised whether (credit) risks have been sensibly priced into the contracts. Notwithstanding reassuring studies from policy makers and monetary economists, a perfect storm cannot be excluded. In due time, financial markets will be the judge.

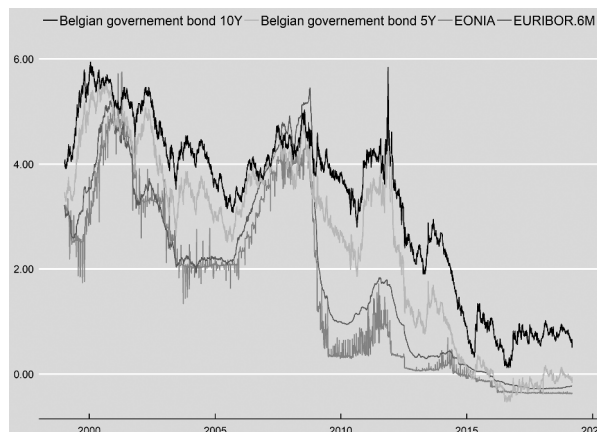
Introduction

Compared to other European countries Belgian households are relatively rich, owning a net wealth which is worth more than 200 percent of the GDP (NBB, 2017, Graph 47). This makes Belgian households cash rich investors but unfortunately the returns professional asset managers project for the near future are perceived to be rather meager. In its 5-year outlook, Robeco for example projects over the 2019-2023 period an expected real return of 4 percent for developed market equities. For emerging market equities an extra expected return of 50 basis points is projected. Euro Government bonds are expected to yield a negative real return of -

1.25 percent (Robeco, 2018). Compared to the long term historical realized real returns, these numbers are low, very low (Annaert and De Ceuster, 2015).

The low yield environment is obviously spurred by the remarkable downward trend in the interest rates over the last decades. Figure 1 illustrates that the Eonia and 6 month Euribor for example, two main European money market rates, have even become negative since 2015. This means banks now have to pay to lend money to another bank which is unprecedented. Yields on Belgian government bonds have reached rock bottom as well with yields of -0.17 percent and 0.5 percent for 5 and 10 year bonds respectively.

Figure 1: Evolution of the Euro Overnight Index Average (EONIA), the 6 month Euribor and the Belgian government bond (5 years and 10 years) yields

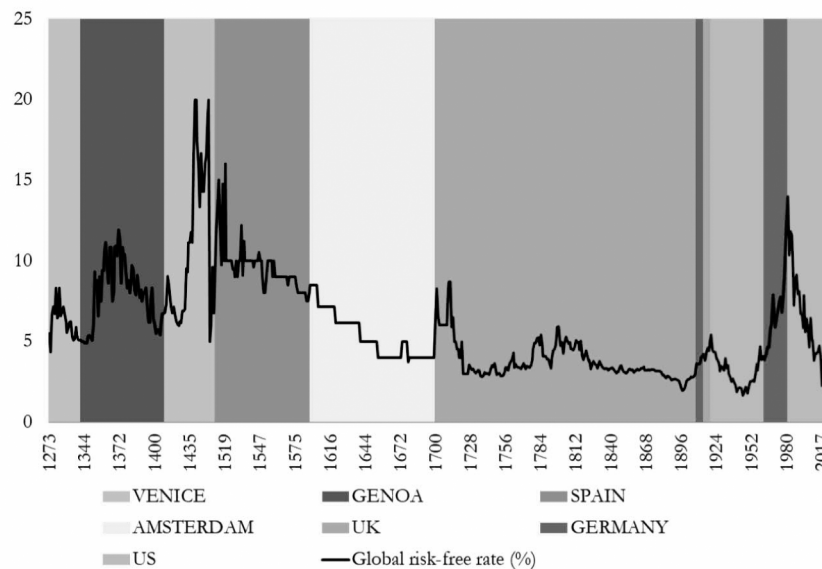


Data sources: Bundesbank, 2019; Nationale Bank van België, 2019.

How unusual these facts are, becomes clear if we cast these findings in a very long term perspective. Schmelzing (2017) highlights how extraordinary the current nominal interest rate levels really are by stitching together multiple historical datasets in order to construct an eight century time series of the global risk free rate (Figure 2). In July

2016, the nominal risk free yield reached its lowest level since recording started in 1273. Haldane (2015) makes an even bolder statement. According to him the current interest rate level is the lowest it has been in 5000 years, since the start of civilized society.

Figure 2: Evolution of the global nominal risk free rate (1273-2017)



Source: Schmelzing (2017).

The conclusion of these simple facts is that investors, borrowers, financial intermediaries and monetary policy makers all are in unknown territory! Historically the homo sapiens has never lived in an economic environment resembling ours. The available data do not contain evidence generated in a similar economic setting in the past. This sole fact should caution financial decision makers not to rely too heavily on models. Models – by definition – have difficulties in predicting extreme variation which has not been observed previously. This leaves us vulnerable to a so called peso problem. Some economists have questioned whether these extremely low interest rates might cause instability in the financial system. Given the high uncertainty on the economic and political scene, black swans (i.e. extreme events that are deemed to be very improbable) may show up on the horizon.

The low interest environment has casted cash rich households and professional investment managers in the land of TINY and TINA. There is no yield (TINY) and there does not seem to be an alternative (TINA). The Belgian National Bank observed that households as a response tilted their portfolios towards more risky financial assets i.c. equity related products (Nationale Bank van België, 2017). Moreover, investors more actively start to explore

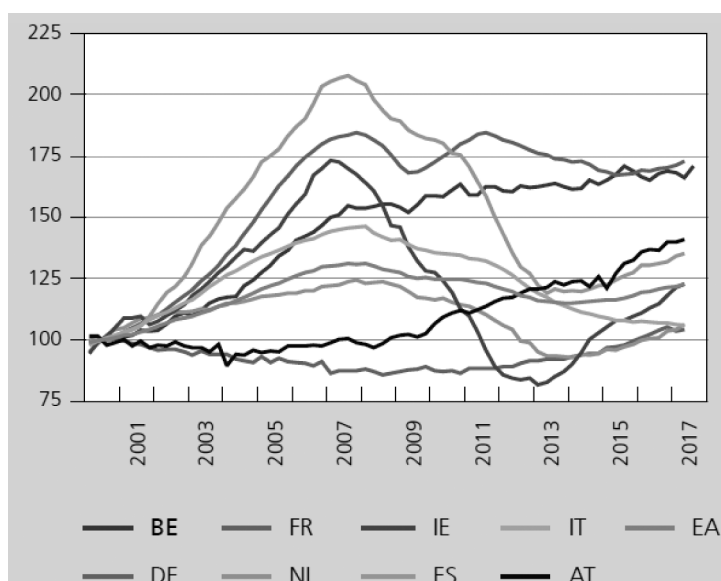
other asset classes than the traditional cash, bonds and equities. Real estate is being marketed (and is being perceived by many investors) as a virtually riskless investment that yields higher returns without bearing (too much) risk. Du Caju (2017) shows that the proportion of real estate which is held as an investment is booming. Belgian households – as a herd – seem to have discovered residential real estate as an alternative yield generating asset (Du Caju, 2017). As we know, crowds can be wise (Surowieckie, 2005), but they can also exhibit madness (Mackay, 1995).

Residential real estate prices

The evolution of Belgian real estate prices is remarkable. The real residential real estate price index shows an average growth rate of 3.3 percent (Figure 3). Together with France (FR), Belgium (BE) turns out to be a European champion over (almost) the last two decades. To put the 3.3 percent growth rate in perspective, one can compare this growth rate with the growth rate that has been realized in Amsterdam (Herengracht) over a long historical period of 350 years: a mere 0.2 percent! (Eicholz, 1997 and Shiller, 2006) In the very long run, real estate seems to preserve wealth but as Keynes reminded us, “in the long run we’re all dead”.



Figure 3: Evolution of real residential real estate prices in some European countries (base 100 = 2000)



Source: NBB.

Unlike France and many other European countries, the Belgian index hardly shows any volatility. Belgian households were spared from huge swings in real estate value, a luxury Spanish (ES) and Irish (IE) households did not experience. Figure 3 overwhelmingly shows the risk households bear when investing in the residential real estate market. Wealthy families that can hold real estate for generations are not bothered by temporary swings in real estate prices. Poor families that do not own real estate neither. But for many households, the family home being their most important asset, real estate has a tremendous overweight in their wealth portfolio. This leaves a lot of households very exposed to evolutions of the real estate market. Ownership hedges the volatility risk on the rental market (Sinai and Souleles, 2005), but it exposes them to a serious – but often neglected – asset price risk (Case and Shiller, 1988).

Most people are overly optimistic with respect to the holding period of their real estate. On average Belgians are very reluctant to move but in some cases they will be obliged to sell their property at a random moment inflicted upon them by a divorce, a disablement, the passing away of one of the partners, the need to scale down after retirement, ... Figure 3 shows that the “safe” real estate investment, actually bears enormous risks. Spanish households that bought their house in 2007 and had to sell it in 2013 lost approximately 40 percent of their family wealth. An absolute disaster for those unfortunates.

Some determinants of real estate prices

The dynamics on the residential real estate market are complex. Residential real estate provides owners-occupants with a home. However, more than ever residential real estate has become an investment class and hence the forces that drive real estate prices are to a large extent “financialized”. Investors compare the return on real estate with the return on alternative assets. A comprehensive conceptual model was advanced by Baugnet *et al.* (2003) and further popularized by De Ceuster and De Vos (2018). They point to a multitude of real estate price drivers such as disposable income, financial wealth, availability of credit, tax advantages, demographic evolutions, environmental and spatial policies and last but not least interest rates.

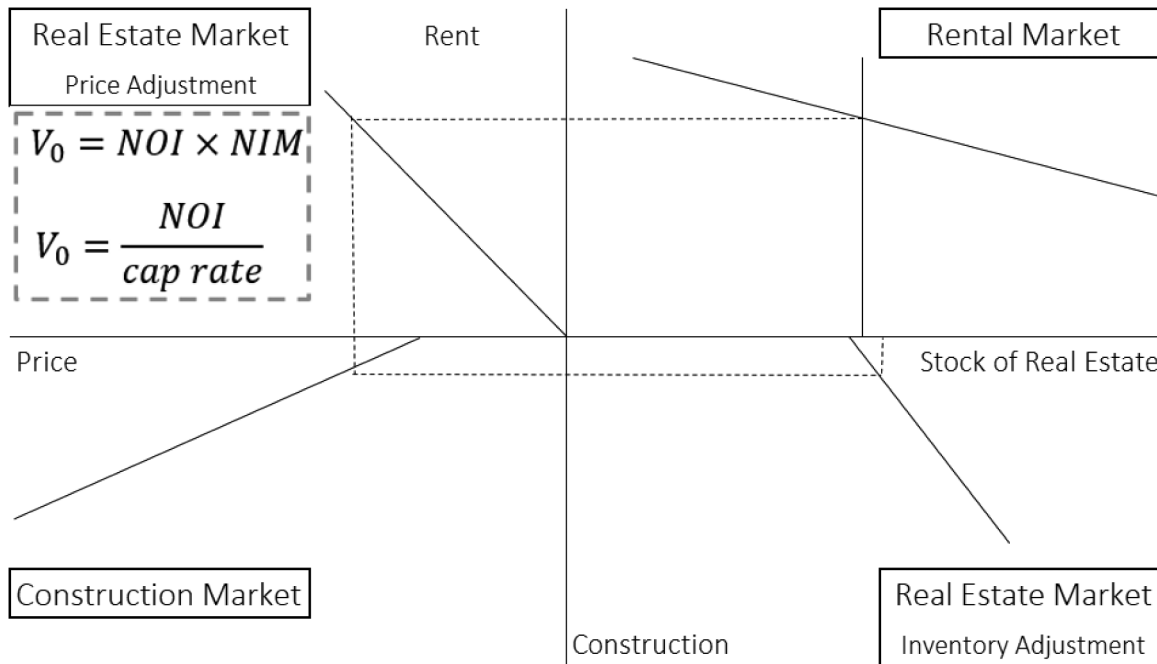
The four quadrant model of DiPasquale and Wheaton (1992) depicted in Figure 4 explicitly links the real estate markets with the financial markets. The price for real estate use is reflected in the rent. The upper right quadrant shows that the supply of real estate is inelastic in the short run (i.e. the vertical curve). The level of rents will hence be determined by a number of demand factors. The equilibrium rent is converted to an equilibrium price in the upper left quadrant. Although the model used is simple, it is often used by real estate professionals. The International Valuation Standards and the standards of the Royal Institute of Chartered Surveyors (RICS) define market value as “the estimated amount for which an asset or a liability should exchange on the valuation date between a willing buyer and a willing seller in an arm’s length transaction after proper marketing and where the parties had each

acted knowledgeably, prudently and without compulsion". This amount is often estimated by using a multiple of some real estate productivity measure. For investors, the net operating income (NOI) is the most relevant measure of effective net income the property can generate.

One of the easiest valuation models will relate the (market) value of comparable properties with their *NOI*. Based on an average net income multiplier (*NIM*) – deter-

mined based on comparable properties – the market value of any property can be determined. Notice that this *NIM* (say 20) can alternatively be written as the reciprocal “yield” (i.e. $1/20 = 5$ percent). This “yield” is called the cap rate (or the capitalization rate). A low cap rate implies a high net income multiplier and hence relatively more expensive real estate.

Figure 4: The four quadrant model



Source: DiPasquale and Wheaton (1992) as adjusted by De Ceuster and De Vos (2018).

The level of the real estate prices will determine construction activity. The lower left quadrant depicts the call option that developers have to develop new real estate and which they will only exercise if the price level is sufficiently higher than the strike price (i.e. the construction cost). The fourth quadrant closes the loop. Real estate that is not used anymore will decrease the stock of real estate, whereas new construction will increase it. The net inventory change will change the short term supply which will impact the rent level.

This four quadrant model clearly links real estate markets with the financial markets. The cap rate is the connecting factor. The second formula in Figure 4 can be given an interpretation in terms of discounted cash flows. If the *NOI* is a pure cash flow (which it is if appropriately defined) this formula can be given the interpretation of the present value of a perpetuity. In real estate we do not expect to encounter constant perpetuities but the rent indexation can be perfectly mimicked by a growing perpetuity. From basic finance text books we know that the

present value of a growing perpetuity can be obtained by dividing the cash flow expected to receive over the first period by the difference of the overall yield (*y*) and the (constant) growth rate in the cash flows (*g*):

$$V_0 = \frac{NOI}{y - g}$$

We clearly see that in this type of simplifying model, the cap rate depends on the yield and on the growth rate. The growth rate reflects the expected increase in the cash flows, the yield represents the conditions on financial markets.

Yield decomposition after QE

The required overall yield or the rate of return (*y*) is traditionally seen as the sum of a risk free rate (*r*) and some risk premium (*RP*). The risk free rate compensates the investor only for postponing his consumption. However, it should

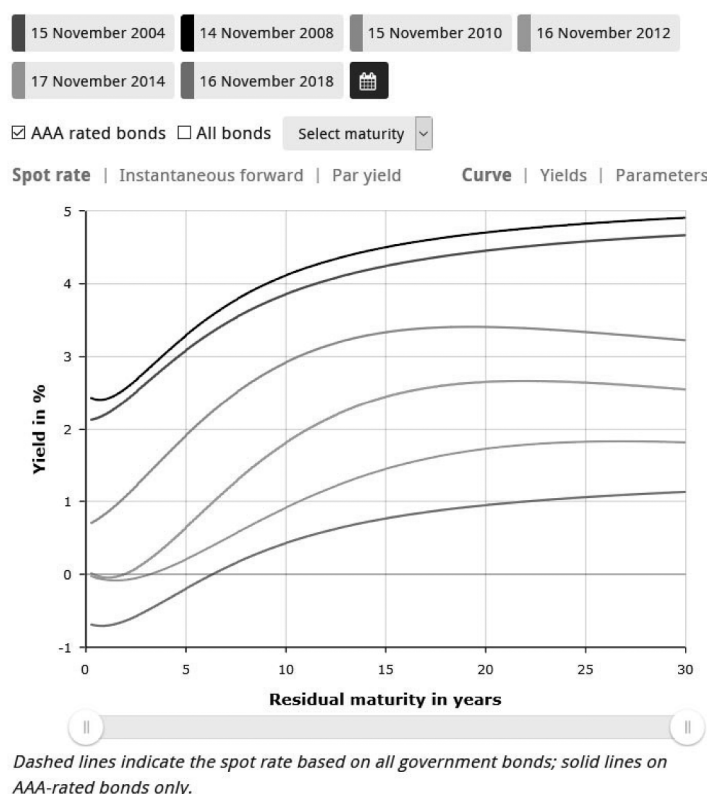


not be taken for granted that the investor will get his money back (i.e. the return of his money). Hence investors demand a risk premium to compensate for any potential credit risk (RP_{CR}). Investors in real estate also face liquidity risk. Their investment is very illiquid and it will take months to dispose of direct real estate. Also for this liquidity risk, investors will ask compensation, a liquidity risk premium (RP_{LR}):

$$y = r + RP = r + RP_{CR} + RP_{LR}$$

Disentangling the risk premia is a very cumbersome task which, without sophisticated modelling, is not possible. Even if we cannot disentangle the risk premia, equation (2) still is useful because in some markets the total risk premium, RP , is observable. In the corporate bond market e.g. it can be estimated by subtracting the yield on government bonds (as proxies of the risk free rate) from the yield of corporate bonds. As such the level of the risk premium is informative about the risk appetite/tolerance of investors.

Figure 5: Evolution of the term structure of interest rates on European government bonds



Source: www.ecb.europa.eu/stats/financial_markets_and_interest_rates/euro_area_yield_curves/html/index.en.html.

However, due to the ECB monetary policy this interpretation changed drastically. Figure 5 shows that the ECB has pushed the term structure of (risk free) interest rates down to historically low levels. All the available monetary policy instruments were used, including quantitative easing (QE) (i.e. massively buying bonds on the secondary markets). The extra demand for bonds drives up the prices and pushes down the whole term structure of interest rates. The idea is that the economy needs lower interest rates in order to stimulate the economy. In corporate finance parlance, the ECB is helping to make projects with barely positive internal rates of return financially feasible (at least in the short run). Of course, Figure 5 only shows

the risk free part of the yield (i.e. the r). In some markets, the risk premia however were also directly¹ affected! As Figure 6 illustrates, the ECB has also bought corporate sector fixed income instruments. These kinds of purchases will push credit risky yields to lower levels and hence the decomposition of the yield becomes:

$$y = r + RP = r + RP_{CR} + RP_{LR} + RP_{QE}$$

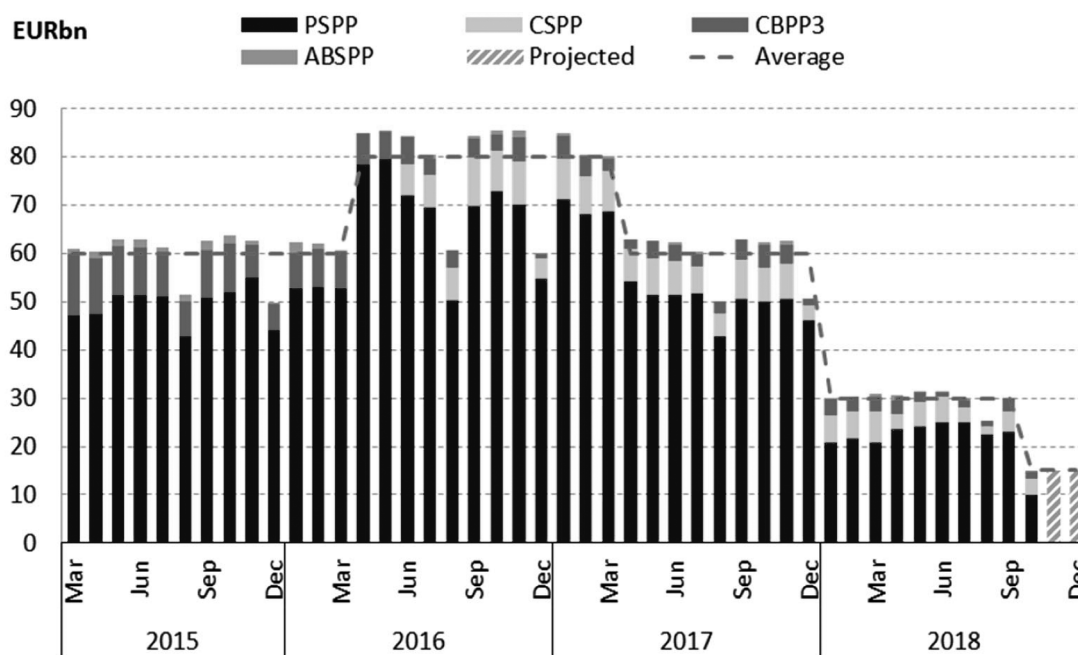
We already know that disentangling the risk premia is a cumbersome exercise but now it has even become more challenging. The total risk premium (RP) becomes the sum of three components. $RP_{CR} + RP_{LR}$ reflect the risk tolerance of investors, but this factor is not measurable

1. The real estate market has not been affected directly, but in a highly financialized world, it is hard to imagine that credit spread squeezes in one market would not affect the credit spreads in other alternative investment markets such as real estate.

anymore because of the negative QE premium, $-RP_{QE}$. Consequently, financial markets have lost one of their key functions as providers of measures of investor appetite?

Financial market participants have lost an important compass, but still have to continue their journey. Hopefully a safe one with no unexpected casualties.

Figure 6: Implementation of QE



Source: ECB.

In the light of these observations, we can summarize that (1) there is indeed no yield and (2) correct risk premia have become unobservable. The search for yield draws investors to investments that earn a little bit more than the risk free rate, but it is very likely that they are ignorant of the substantial extra risk they have to take in order to harvest a tiny reward. Compared to the historical averages of credit spreads on corporate bonds reported by Hennink (2016) over the 1919-2014 period for various rating categories, the current “credit spreads” are again extremely low. For borrowers, the access to leverage has never been cheaper. Unfortunately, leverage brings along risk, as we all (should) know.

Real estate price sensitivity to changes in the cap rate

As we have seen, using a perpetual growth model, the cap rate is the difference between the overall yield and the growth rate of the net operating income. Cap rates determine multipliers and hence they are extremely important market indicators. In a world of extremely low interest rates, real estate value is very sensitive to any increase in the cap rate, as we can numerically illustrate with a back of the envelope calculation. Suppose the *NOI* equals 100 and has to be capitalized at a cap rate of 4 percent. These

parameters would result in a real estate value of 2500. An increase of the cap rate to 5 percent would lower the multiplier to 20 and hence produce a real estate value of 2000. This results in a drop in real estate value of 20% (i.e. $2000/2500 - 1$)! Increases in the cap rate come about by either a mounting overall yield or by a drop in the growth rate of the *NOI*. To compensate the negative valuation effect of an increasing yield, the *NOI* growth rate needs to augment by an equally large amount. Good luck! Unfortunately, an increase of only 100 basis points in the cap rate is still a mild scenario.

The intermediate conclusion is that owner-occupants and households who are looking for alternative (and more yielding) assets such as real estate are exposing themselves to potentially large swings in the real estate prices. Belgian households have not observed large swings in the recent past, but may the force be with them in the future.

The role of mortgage loans

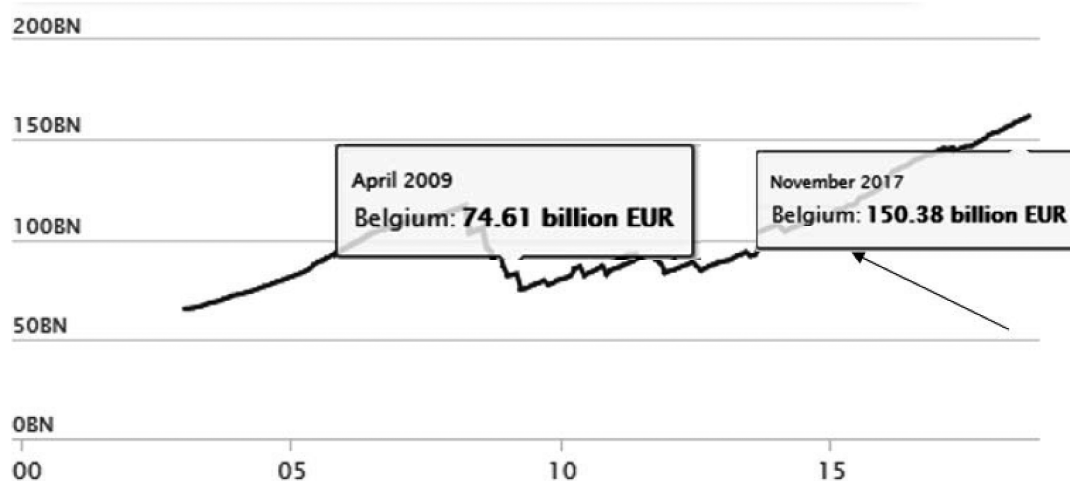
Based on the Household Finance and Consumption Surveys, Du Caju (2016) observed that households increased the proportion of real estate held for investment purposes from 16.8% to 19.3% between 2010 and 2014. Also the use of debt financing increased to the extent that



the Belgian National Bank sent out warnings that almost half of the Belgians borrow with a loan to value ratio of above 80 percent. Figure 7 shows that over the period

2009-2017, the growth rate in the mortgage loans outstanding is a staggering 8.6 percent per annum!

Figure 7: Evolution of the loans to Belgian households for house purchase

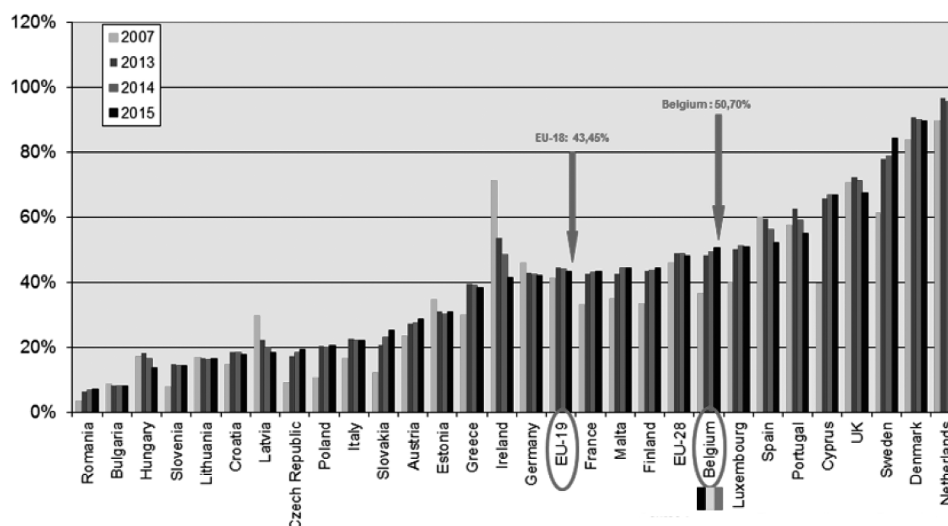


Source: www.euro-area-statistics.org/banks-balance-sheet-loans?cr=bel&lg=en&page=0&charts=M.N.A.A22.A.1.U2.2250.Z01.E+M.N.A.A23.A.1.U2.2250.Z01.E+M.N.A.A23.A.1.U2.2250.Z01.E&template=1

As figure 8 shows, when we measure household debt relative to GNP, Belgian households are in the top ten of most indebted households in the European Union. By making a

deep dive in the HFSC data, Du Caju (2016) illustrated that those vulnerable are the usual suspects: single parents with children and young families in low income brackets.

Figure 8: Mortgage loans outstanding as a percentage of GNP



Source: Hypostat – European Mortgage Federation.

Is the perfect storm coming?

Nobody really knows the true answer but the facts and figures that we presented should at least launch a number of serious warning signals.

The fact that observed risk premia are distorted is alarming. Buying government paper lowers the level of the “risk free” rate but buying corporate paper is impacting

the “credit spread”. The credit spread by definition is the risk premium an investor harvests for taking risk. By squeezing the credit spread, the remuneration for taking risk has been reduced although e.g. the credit losses will still have to be borne by the investors. The big question is whether investors and banks alike are at the moment picking up dimes in front of the arriving steam roller. Time will tell.

For households, real estate is presented as a higher yielding asset that is deceptively safe. We have illustrated that the current growth rate of real estate is very high compared to very long term time series. Real estate dynamics can only be observed when considering a very long period. Large swings occur and these can seriously hurt owner-occupiers that have to sell their house or owner-investors. The ECB signals that interest rates will remain low in the near future. However, real estate investments are risky investments that carry a positive risk premium. The risk premia have been squeezed by the implementation of QE but in the end investor confidence will be the driving factor behind the level of the risk premium. In a world with large political uncertainty this confidence can be lost easily which will then result in extreme upward jumps in risk premia leading to serious decreases in house prices.

For companies the story is mixed. The cheap access to leverage allows credit worthy companies to refinance themselves at much lower rates. Shareholders will be happy and will be grateful towards the ECB. However, under the guise of stimulating entrepreneurship, QE policy also allowed mediocre projects to be launched. An upward shock in the funding cost of these companies will inevitably result in financial problems.

Finally for banks, the current low interest environment poses a multitude of challenges. One of the most important is of course the downward pressure on the interest margin. In particular for mortgage loans, the level of the rates has decreased to the range 1.5-1.7 percent (end 2018). Competition is ruthless and even a CEO of a large Belgian bank admitted that the revenue from mortgage loans hardly covers capital costs (De Standaard, 16 november 2018). Data from the Belgian National Bank show that also the overall quality of the mortgage portfolios is decreasing as well (Nationale Bank van België, 2017, Figure 49). So what would happen if credit spreads, for whatever reason, would suddenly make an upward jump? Real estate prices would, due the mechanics of the discounting mechanism, drop (or plunge whatever wording you prefer). It is very unlikely that the growth in NOIs would keep the cap rate stable. Quite some middle class households would be hit. At the same time this would increase the LTV ratios. This would have an impact both on the quality of the loan books and on the required regulatory capital. For sure credit losses would also increase.

Mainstream macro and monetary economists believe that QE has had a positive effect on the economy and that the

huge bond portfolios on the central bank balance sheets can be unwinded without jeopardizing the financial system. The spectacular growth of the money supply did however not show up in the inflation figures. Asset inflation however might be less noticeable but by definition has to be present given the low interest rates. As a general rule in economics, what goes up too much must come down, it is only a matter of time.

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