Recent changes in saving behaviour by Belgian households: the impact of uncertainty

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Introduction

The saving behaviour of Belgian households has undergone important changes in recent years. Expressed as a percentage of gross disposable income, their saving increased significantly in the run-up to and during the great recession, from slightly more than 15% in the middle of the previous decade to 18.4% in 2009. Quarterly statistics indicate that the saving ratio even peaked at more than 19% in the first quarter of that year. After the great recession, the household saving ratio gradually dropped, to reach a historical low of, on average, 13.5% of disposable income in 2013.

While the household saving ratio in the euro area to some extent exhibits the same pattern – rising before the great recession, falling afterwards –, the swings were clearly more important in Belgium. However, the positive differential with the euro area household saving ratio has declined systematically since 2009.

Clearly, different factors of a structural and cyclical nature account for changes in the saving behaviour of households. The objective of this article is to specifically gauge to what extent uncertainty concerning the general economic outlook or income prospects has contributed to these developments. We will first provide a brief overview of the relevant theoretical background before turning to the empirical part with an analysis of the driving factors of the saving rate.

1. Consumption and saving: theoretical background

Different theories aim to provide an explanation for the level and the development of household saving. Predominant among those are the neoclassical theories, which assume some form of rational forward-looking behaviour for households, in particular the permanent income theory and the life cycle hypothesis, respectively.
associated with the names of Friedman (1957) and both Ando and Modigliani (1957, 1963). According to this view, consumers will not necessarily base their consumption decisions on their current disposable income, but rather on some permanent income or wealth concept, which may be defined as the present value of lifetime housing and financial wealth, current labour income and the present discounted value of the labour income that households expect to earn during their entire lifetime. Consumption will therefore not be influenced by short-run fluctuations in income, but will instead respond to permanent income shocks. This can explain changes in the saving ratio: if consumers believe that (positive or negative) income shocks are not permanent, they may not fully adjust their consumption but instead modify their saving ratio. This also implies that a policy change (regarding taxes or interest rates) will have a different impact on consumption, depending on whether consumers perceive the policy change to be of a transitory or a more permanent nature. Under stronger assumptions, in particular regarding the concern for the welfare of future generations, the so-called Ricardian equivalence would hold and households would fully take into account the government budget constraint, implying that changes in government saving through modifications of taxes would be offset by equivalent changes in private saving (Barro, 1974).

In these neoclassical models, household saving (or borrowing) to some extent serves as a shock absorber and is typically adjusted to smooth consumption. However, in reality, households are often found to respond more strongly to current income shocks than what theory predicts (Beznoska and Ochmann, 2012). Different elements can account for deviations from neoclassical consumption theories. First of all, behavioural economists have pointed out that households may be less forward-looking and rational in real life. According to Trevisan (2013), consumers tend to rely on information that is easily available and will not bother to gather and interpret all information that is necessary to make a decision. Rather than by “rational” decision-making, private consumption may be governed to a greater extent by simple rules of thumb, pre-commitment, habit formation and imitation (Mcfadden, 2013).

Second, the aforementioned neoclassical theories assume that financial markets are working perfectly. Households should in particular always be able to borrow against their outstanding debt and try to quantify the level of uncertainty on the basis of different indicators.

2. Measuring uncertainty

It is generally argued that the great recession has brought about a remarkable increase in uncertainty. As mentioned briefly in the previous section, uncertainty may increase the incentives for households to save, as they may come to fear income losses. Uncertainty is not directly observable but several approaches exist to quantify it. In order to capture financial market uncertainty, for example, it is common to look at the VIX, which is the implied volatility of S&P 500 index options(1). To measure economic uncertainty in a broader way, the ECB (2013) distinguishes two different approaches:

- “Forecast variance” operationalised using either standard deviations of a set of projections made by different professional forecasters, or the variance of the aggregate distribution of such forecasts that also takes into account the forecasters’ own assessment about the variance around their projections;

(1) The VIX is calculated and published by the Chicago Board Options Exchange.
“Uncertainty of households and enterprises” based upon the heterogeneity in the responses to certain individual questions in business and consumer surveys.

At the euro area level, the uncertainty indicators considered rose sharply following the outbreak of the financial crisis in 2008 and, after having fallen back in the course of 2009 and 2010, increased again in the second half of 2011 due to the euro area debt crisis (ECB, 2013). In the remainder of this section, we will present different indicators for Belgium and analyse whether they follow the same pattern as the euro area uncertainty indicators.

2.1 Consumer confidence and uncertainty

In the 1970s, the National Bank of Belgium introduced a specific consumer sentiment survey. In the current format, a different sample consisting of 1850 households is interviewed on a monthly basis. Apart from respondent identification questions (sex, age, employment situation, income and education level), there are 17 questions about the economic conditions and unemployment level, the respondent’s own financial situation and capacity to save, price developments and major expenditure (such as purchases of cars, furniture and other durables as well as construction or renovation of dwellings). Questions relate to past developments, the (assessment of) the current situation and the outlook for the next twelve months. Replies are qualitative with the exception of the two questions about the own financial position and capacity to save, for which respondents have to provide an inflation rate. Only four questions are used in the construction of the National Bank’s consumer sentiment indicator:

1. How do you expect the financial position of your household to change over the next twelve months?
2. What do you think will happen to unemployment in Belgium over the next twelve months?
3. How do you expect the general economic situation in Belgium to develop over the next twelve months?
4. Do you think that you will be able to put any money by, i.e. save, over the next twelve months?

In general, there are six possible responses: strong improvement (PP), slight improvement (P), no change, slight deterioration (M), strong deterioration (MM) or don’t know. For each question, the balance of responses is then calculated using the following formula:

\[ Q_i = (PP_i + \frac{1}{2} P_i) - (\frac{1}{2} M_i + MM_i) \]

where \( r \) ranges from 1 to 4 as it stands for the question concerned.

The general balance of consumer confidence is then defined as the weighted average of the seasonally adjusted balances of questions 1 to 4. However, this aggregated balance obscures the underlying heterogeneity of the responses. This heterogeneity is captured by specific uncertainty indicators that measure the variability of the replies, such as the one suggested by the European Commission (2013):

\[ Q_u = -\frac{1}{6} \sum_{i=1}^{6} a_i \cdot \log (a_i) \]

where \( a_i \) is equal to the proportion of individuals giving one of the six possible responses and \( r \) ranges from 1 to 4, representing one of the four questions.

The indicator is equal to zero if all of the respondents choose the same response, reflecting the absence of uncertainty. Conversely, the indicator reaches its maximum if the responses are divided proportionately among the various options; in that case, the uncertainty is greatest. In chart 2, the uncertainty indicator, represented by the blue line, is standardised, i.e. it was reduced by its average long-term value and divided by its standard deviation. Its value therefore fluctuates around zero. When the indicator is above (below) zero, the uncertainty is relatively higher (lower) than on average over the observation period.

Chart 2 reproduces the uncertainty indicator, as well as the headline balance, for the four questions that are used to construct the overall consumer sentiment indicator. It is clear that the picture varies slightly according to the question concerned. The chart also shows that the relationship between the balance and the uncertainty indicator varies depending on the question. For example, in the case of expectations related to the own financial position, uncertainty is relatively higher in periods when the balance is low, i.e. when prospects are rather bleak. The same holds for the question about the general economic prospects. However, the opposite is true for the unemployment expectations: a better outlook (i.e. lower unemployment) tends to coincide with higher uncertainty, as evidenced by a larger heterogeneity in survey replies.

2.2 Economic policy indicator

Another approach to capture uncertainty is based on media coverage. The general idea is that media will report more on uncertainty if uncertainty is actually high or increasing. In addition, more media coverage may in itself raise economic uncertainty.
In this connection, the seminal paper by Baker, Bloom and Davis (2013) proposes a synthetic Economic policy Uncertainty indicator that aims at capturing a broader form of uncertainty regarding economic policies. Tobback et al. (2014) have extended this approach and applied it to Belgium. They construct an improved version of the existing ‘Economic Policy Uncertainty index’ (EPU), using text mining of Dutch-language Belgian newspapers. This resulted in two additional indicators besides the existing EPU index (also referred to as the ‘naïve EPU index’). The ‘modality EPU index’ expands the so-called ‘uncertainty list’ with words or verbs that also indicate uncertainty without mentioning it explicitly. The ‘EPU SVM index’ relies on a Support Vector Machines classification method that looks for patterns in texts and automatically selects the words with the largest discriminative power. Chart 3 shows that it is mostly the naïve indicator that peaks during the typical “crisis moments”, that is at the end of 2008 (financial crisis) and during the course of 2012. The modality index had already reached a remarkable peak in 2007, and hasn’t climbed higher since. The SVM index is especially volatile during the European debt crisis.

Note: all variables were standardised over the period beginning in 1990. A balance higher than zero means that the assessment of the future is positive; an uncertainty reading higher than zero means that uncertainty has increased.
Source: NBB, own calculations.
2.3 Forecast variance

A third uncertainty indicator that will be considered in this article is the degree of divergence between individual forecasts. To this end, we use the detailed projections made by the different forecasters in the context of the quarterly Belgian Prime News publication (NBB). For each issue, participating financial institutions inter alia provide forecasts of annual GDP growth for the current and the following year. The degree of uncertainty is defined here as the average standard deviation with regard to the different point estimates, for year t and year t+1, of the individual institutions. The result is displayed in chart 4.

As could be expected, forecast uncertainty increased at the end of 2008 and in 2009. However, after an initial improvement in the course of 2010, there was another remarkable hike in the coefficient of variation of the different institutions’ projections at the end of 2011.

3. Saving and uncertainty

3.1 Long-run variables

In order to assess the impact of uncertainty on household saving, we first estimate a standard Error Correction Model (ECM) on the basis of a number of potential long-run determinants. In line with the approach proposed by the European Commission (2013), we then try to expand the model by including uncertainty indicators in the short-run dynamics. In what follows, estimates will be performed using quarterly data in order to capture the precise impact of uncertainty that may mostly feed through short-term dynamics (1). However, in view of the volatility of these quarterly time series, it should be noted that this may not be the most appropriate estimation strategy to identify long-term determinants of household saving.

As indicated in section 1, private consumption and, hence, household saving may be determined by disposable income or some form of permanent income. As the latter is not directly measurable, we consider financial and housing wealth as proxies instead (Sierminska and Taktamano, 2007). As there is some evidence that saving behaviour differs depending on the type or source of income, with financial income typically saved to a larger extent, the regression equation is also augmented with the share of labour income in disposable income, for which a negative coefficient is to be expected. Variables are expressed in natural logs.

Long-term results can be found in table 1 (2). Column 1 shows that disposable income has little impact on the savings ratio. In the second column, this variable was excluded. The coefficients of the other variables changed very little, but the real net financial wealth gained some significance. As a crude test for the Ricardian equivalence theory, consolidated gross government debt (Maastricht definition) as a percentage of GDP was added to the regression in column 3. While the coefficient has the expected sign – a higher debt ratio seems to coincide with

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(1) Note that these are still the quarterly data according to the ESA 1995 methodology.

(2) Note that house prices could not be included for technical reasons (their order of integration differs from the other variables).
more household saving – the impact is not significantly different from zero. Overall, it is the share of labour income in total disposable income that appears to be the most robust significant variable. A rising share of labour income in disposable income will indeed, as expected, affect the savings rate downward. Quite remarkably, the same goes for a rise in real net financial wealth, although this effect is not always significant, suggesting that this variable might not be a really good proxy for permanent income.

All in all, our results seem to suggest that, in the longer run, labour income is mostly consumed and changes in the household saving ratio are driven by variations in non-labour income (from property), as this income is mostly saved. This could partly explain the broad movements, in particular, the trend fall in the household saving ratio in the 2000-2013 period: due to lower returns on capital, the share of property income in household disposable income has been on a declining trend, from around 17-18% at the start of the century to just 13% or less in recent years.

Short-run dynamics are given by the short-run equation of the ECM shown in table 2. The main component of this equation is the lag of the residuals from the regression in column 2 of table 1. Its coefficient indicates the speed at which prior deviations from equilibrium will be corrected, implying that about 30% of the gap will be closed every quarter. Again, also for the shorter term, changes in the share of labour income in total income appear to be more important drivers of changes in saving behaviour than those in total net financial wealth. Furthermore, it is clear that the savings ratio is quite persistent, as the lag of the dependent variable also turns out to be significant.

3.2 Possible additional short-run determinants

We now try to improve the fit by sequentially adding other potential determinants for changes in saving behaviour in the short run. In a first test case, the real long-term interest rate is added to the model. It is not a priori clear what effect the interest rate will have on savings. On the one hand, higher interest rates make it relatively more interesting to increase savings, in order to be able to buy more in the future. On the other hand, rising interest rates imply better income prospects for households. This will rather induce them to increase present consumption (Dirschmid and Glatzer, 2004).

Regression analysis reveals that the impact of a hike in the real interest rate essentially only lasts one quarter: the contemporaneous and the lagged effect roughly offset each other in the short-run equation. This suggests that, apart from the effect on the share of non-labour income, by themselves movements in interest rates cannot account for structural changes in saving behaviour.

Turning to our main question of how and to what extent economic uncertainty adds to the overall picture, the uncertainty measures, discussed in section 2, will now be added to the error correction model, as additional possible short-term determinants. In paragraph 2.2, four possible uncertainty measures were constructed based on respondents’ replies to the consumer survey. Besides the uncertainty measures, the general balances of each of the four questions will also be included. The logic behind this is that the two survey measures may complement one another. For example, low uncertainty might also exist when most of the respondents expect that the economy will be performing poorly in the next twelve months.

For every question separately, both a lag of the balance and a second lag of the uncertainty measure are added to the short-term variables. For the uncertainty variables,

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>ERROR CORRECTION MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable: Δ saving ratio</td>
<td>Coefficient</td>
</tr>
<tr>
<td>Constant</td>
<td>0.0005</td>
</tr>
<tr>
<td>Δ saving ratio (–1)</td>
<td>0.2884</td>
</tr>
<tr>
<td>Δ share of labour income</td>
<td>–4.3273</td>
</tr>
<tr>
<td>Δ share of labour income (–1)</td>
<td>1.7200</td>
</tr>
<tr>
<td>Δ real net financial wealth</td>
<td>–0.1650</td>
</tr>
<tr>
<td>Residuals (–1)</td>
<td>–0.3171</td>
</tr>
</tbody>
</table>

Note: regression includes quarterly data from 1999 Q1 up to 2014 Q1. The numbers between brackets refer to the number of lags.

<table>
<thead>
<tr>
<th>TABLE 3</th>
<th>ERROR CORRECTION MODEL, INCLUDING INTEREST RATE(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>p-value</td>
</tr>
<tr>
<td>Long-term interest rate</td>
<td>0.0156</td>
</tr>
<tr>
<td>Long-term interest rate (–1)</td>
<td>–0.0187</td>
</tr>
</tbody>
</table>

Note: regression includes quarterly data from 1999 Q1 up to 2014 Q1.

(1) In this and the following tables we do not repeat the basic specification, already reported in table 2, in order to save space.
the second lag was included because this was often more significant than the first lag. Results are reported jointly in table 4, without mentioning the coefficients for the other variables again, as these are largely unchanged from the numbers in table 2-3.

Clearly, the way in which uncertainty is measured, matters. The variables with regard to the financial situation (question 1) have the expected signs: an increase in the uncertainty leads to a (significant) rise of the savings rate. A higher overall balance (better prospects) leads to a decline of the savings rate, but the coefficient estimate is not significantly different from zero. All other estimates turn out to be non-significant even though some of them have the expected signs (positive for the uncertainty indicator, negative for the balance indicator).

In table 5, the error correction model is expanded by means of the policy uncertainty indicators that were constructed by Tobback et al. (2014). Again, these variables appear to have no significant relationship with the savings rate, when they are added separately to the ECM. This might be due to the fact that these indicators were constructed using only Dutch-language newspapers, whereas the saving ratio is of course calculated for Belgium as a whole. To the extent that media coverage on uncertainty differs between regions, this could have an impact on the estimation results.

In table 6, the professional forecasters’ uncertainty is added to the error correction model. The regression would suggest that higher uncertainty, measured as the coefficient of variation in professional forecasters’ projections, gives rise to higher savings, but the variable is in fact not significant.

As a final test, uncertainty variables from table 5 and table 6 were also combined with the variables from table 4. Table 7 only reports the combination which turned out to be significant: the EPU naïve (again without lags) does have a significant impact on the savings ratio, when it is combined with the Q1 indicators. Moreover, including this variable improves the value of the adjusted R-squared from 0.74 (only including Q1-indicators) to 0.76. Baker et al. (2013) suggest that the EPU indicator partly reflects changes in confidence, rather than just changes in uncertainty, which may explain why, in combination with

| TABLE 4 | ERROR CORRECTION MODEL, INCLUDING ADDITIONAL SURVEY UNCERTAINTY VARIABLES |
| Coefficient | p-value |
| Financial situation |  |
| Q1u (–2) | 0.0317 | 0.0011 |
| Q1b (–1) | −0.0059 | 0.3530 |
| Unemployment |  |
| Q2u (–2) | 0.0039 | 0.5666 |
| Q2b (–1) | 0.0011 | 0.8726 |
| General economic situation |  |
| Q3u (–2) | −0.0123 | 0.0825 |
| Q3b (–1) | −0.0049 | 0.2482 |
| Ability to save |  |
| Q4u (–2) | 0.0074 | 0.7157 |
| Q4b (–1) | −0.0018 | 0.7805 |

Note: regression includes quarterly data from 1999 Q1 up to 2014 Q1. The numbers between brackets refer to the number of lags.

| TABLE 5 | ERROR CORRECTION MODEL, INCLUDING POLICY UNCERTAINTY INDICATORS (added separately) |
| Coefficient | p-value |
| EPU naïve | 0.0063 | 0.2206 |
| EPU modality | −0.0040 | 0.4862 |
| EPU SVM | 0.0003 | 0.9603 |

Note: data for the policy uncertainty indicators are available from 2000 Q1 to 2012 Q3, so the regressions in this table were executed over a somewhat smaller sample.

| TABLE 6 | ERROR CORRECTION MODEL, INCLUDING FORECAST DISAGREEMENT |
| Coefficient | p-value |
| Professional forecasters’ uncertainty (–1) | 0.0218 | 0.6142 |

Note: the forecasters’ uncertainty is available from 2002 Q4 to 2014 Q1, so the regression in this table was executed over a somewhat smaller sample.

| TABLE 7 | ERROR CORRECTION MODEL, COMBINING DIFFERENT UNCERTAINTY MEASURES |
| Coefficient | p-value |
| EPU naïve | 0.0145 | 0.0233 |
| Q1u (–2) | 0.0312 | 0.0010 |
| Q1b (–1) | 0.0090 | 0.2919 |
the survey-based uncertainty measure, this EPU indicator can still have additional predictive power for consumption dynamics.

Putting our empirical results together, the recent movements and current level of the saving ratio of Belgian households can now be interpreted. Both at the beginning of the great recession, in 2008 and 2009, and in the 2012-2013 period, Belgian households saved more than the equilibrium level anticipated by the long-run equation of the ECM. These two episodes with relatively high saving rates (compared to the estimated benchmark) can to some extent be traced back to periods of rising uncertainty, as our empirical findings suggest.

In the first phase of the great recession, extensive media coverage regarding economic uncertainty, as witnessed by a surge in the (naïve) EPU indicator, is likely to have boosted precautionary saving and motivated households, in particular, to spend income increases (e.g. coming from an indexation based on higher inflation in the previous year) only to a very minor extent. This accounts for the peak in saving in the first quarter of 2009. In the following quarters, uncertainty gradually declined and the saving ratio fell back to lower levels: in 2010 and 2011, it was more than 1 percentage point below the structural levels anticipated by our model. However, the lingering euro area crisis and falling activity growth brought about a new increase in uncertainty in the last two years, as shown by the increasingly diverging replies to the survey question related to the financial situation. This prevented the saving ratio from dropping further and kept it above the model estimates throughout the 2012-2013 period. The saving ratio only dropped again in the first quarter of 2014, despite improving economic conditions and declining uncertainty from the spring of 2013 onwards. This may be related to the lag that we find in the pass-through from uncertainty to saving.

Higher (precautionary) saving mechanically translates into lower consumption. In this connection, consumption of durable goods is likely to be hit hardest; such expenses are particularly costly to reverse as the value of the good drops immediately after it is first used (Gudmundsson and Natvik, 2012). One example of such a durable good is the purchase of a new car. As chart 6 shows, those purchases have indeed been consistently below their long-term average level since 2012.

As a final note, we will shortly compare our results to those found by other authors who have recently also constructed uncertainty indicators, but mostly assessed their impact on consumption rather than on the savings ratio. In the article by the EC (2013), estimations were performed for a panel of eight countries, which also included Belgium. They concluded that, in the long run, disposable income, net foreign assets, house prices and the ratio of credit to house prices are important drivers of consumption. In the short run, they found a significant negative impact stemming from the long-term interest rate, two of the consumer uncertainty indicators and, to a lesser extent, the policy uncertainty indicator.
Lebrun and Pérez Ruiz (2014) also relied on an Error Correction Model to look into the impact of uncertainty on components of domestic demand for Belgium, Germany and France separately. In the case of Belgium, the authors found that consumer confidence and uncertainty indicators had a non-significant impact on consumption. Their long-term equation did point to a marginal impact from financial wealth and a significant role for real disposable income (excluding property income): the income elasticity of consumption was estimated at 0.85. Furthermore, they were also unable to find a robust significant impact from real interest rates or house prices.

Concluding remarks

This article focused on the impact of economic uncertainty on household saving. While, in the longer run, the downward drift in the saving ratio of Belgian households should be seen in the context of the declining share of property income (that is saved to a relatively larger extent) in total household income, other factors may account for the short-run dynamics.

Our empirical results suggest that the level of uncertainty can help to explain movements in the household saving ratio. However, the precise definition of the uncertainty indicator matters. We find that self-reported uncertainty (in the consumer survey) regarding the financial situation has a significant impact on household saving behaviour. This may also be the case, albeit to a lesser extent, for media coverage of economic uncertainty. On the other hand, we find no evidence that divergence between professional economic forecasts has any explanatory power for the Belgian household saving ratio.

Relatively high levels of uncertainty are likely to have increased saving in the 2012-2013 period, thereby preventing the saving ratio from falling even further to historically low levels that could be expected on the basis of the currently very low share of non-labour income in household disposable income. The increase in confidence against the background of improving economic conditions in the course of 2013 coincided with declining economic uncertainty. To the extent that this trend can be sustained and is not fundamentally derailed by the economic slowdown and decline in sentiment seen recently, this may herald a further drop in the saving ratio in 2014 – as already suggested by the first quarterly statistics – and, hence, support consumption growth.

In interpreting our results on the positive impact of economic uncertainty on the household saving ratio in recent years, it should be kept in mind that the latter is currently at a very low level due to the changes in the composition of household income. A rising share of property income is likely to result in an increase of the saving ratio even if uncertainty declines.
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