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The Outlook for Credit in the Irish Economy

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Abstract

This note presents estimates of the likely credit requirements of different sectors of the economy over a short-term horizon to 2013. The measure of credit "demand" used in the analysis is the stock of outstanding loans to the Irish private sector from the resident banking sector. The results indicate a substantial fall in the amount of loans outstanding by 2013, the bulk of which is contained within Property (construction and real estate) and Personal Mortgage lending. Despite the projected fall in the amount of outstanding credit allocated to Mortgage lending, as a sector it is expected to continue to account for the majority of outstanding loans to the Irish private sector.

Introduction

The future demand for credit in the Irish economy is a key policy concern going forward. Part of the fiscal support programme agreed between the Irish Government, the EU Commission, the European Central Bank and the IMF in November 2010 involves specific loan to deposit targets being set for the guaranteed Irish financial institutions.[2] Given the existing high rates of loan-to-deposits, it is inevitable that a significant degree of deleveraging will take place within these institutions. Indeed, average annual growth rates for private sector lending of -3.8 per cent since the beginning of 2010 would indicate that such deleveraging is already under way.[3] A key policy question, therefore, is, in the context of this deleveraging process, what are the credit requirements of the Irish economy likely to be?

At present, the Irish banking system struggles to service the considerable levels of credit extended over the past seven to eight years. The disproportionate amount of total credit allocated to the property sector has led to further problems as the banks attempt to deleverage and reallocate credit away from property to the real economy sectors.[4] This will have a direct impact in determining the size and structure of the Irish banking system in the

[1] The views expressed in this paper are those of the authors and do not necessarily reflect those of the Central Bank of Ireland or the ESCB.

[2] These institutions being Anglo Irish, Allied Irish Bank, Bank of Ireland, Irish Life and Permanent, Educational Building Society and Irish Nationwide Building Society.

[3] *Private Sector Credit Advanced to Irish Residents* - see Table A.5, www.centralbank.ie

[4] The shift in credit allocation towards the property sector over the last decade is documented in a number of Central Bank publications. See, for example, *Measuring the Sectoral Distribution of Lending to Irish Non-Financial Corporates*, McElligott, R. and Stuart, R., in *Financial Stability Report 2007*.

future. The size and lending practices of the banking system will, additionally, be shaped by demand-side and macro-economic factors in the individual sectors of the economy.

In this note, we address the latter aspect and attempt to ascertain the likely level of credit demand at a sectoral level and, therefore, establish the credit requirements of the Irish economy in the future. In particular, we focus on the likely requirements of the different sectors of the economy by estimating both long and short run models of credit demand for each sector. Forecasts of credit requirements for the different sectors are then generated with these models. Ideally, what we would like to measure is the real value of new loans advanced to each sector at a given point in time. However, the only data available to us at a sectoral level is the stock of credit, hence this is the data used. We use the terms *credit demand* and *stock of credit* interchangeably, although the credit stock data analysed here is really the intersection of supply and demand. As explained below, we include a number of factors to control for both slope effects and shifts in the curves.

Using a dataset on sector-level credit allocation within the Irish economy covering 1970:Q1 - 2010:Q3, we estimate the relationship between credit, sectoral output values and the cost of credit over the period. Data on the volume of sectoral output are kindly obtained from the Economic and Social Research Institute (ESRI) HERMES database, and using forecasts contained in Bergin, Conefrey, Fitzgerald and Kearney (2010), the models are used to generate the credit requirements for the different sectors out to 2013. Post 2003 the sectoral credit data is adjusted to reflect ongoing enhancements to the credit data being conducted by the Statistics Division of the Central Bank.[5]

We also use newly available information on the mortgage loan book of the guarenteed Irish financial institutions to get a greater understanding of the underlying dynamics of credit for private households total stock of credit for private households.[6] We use this data to model the pay down rates of the outstanding mortgage books. As a result, we can explicitly model this sizeable component of total credit using a perpetual inventory method.

Modelling credit allocation in the Irish economy

In econometrically modelling credit in the Irish economy, we focus on the following sectors of the economy (see Table 1): *Agriculture, Property (construction/building and real estate activities), Transport and Communications, Wholesale and Retail Services, Manufacturing, Consumer Credit (excluding mortgages) and Mortgage related credit*. The latter includes the stock of outstanding securitised mortgage credit. In 2010, these sectors accounted for approximately 90 per cent of the total stock of outstanding credit. The remaining 10 per cent is accounted for by the Financial Intermediation sector, excluding securitisations, which we have added back into the stock of mortgage and property credit. Our measure of credit, particularly from 2003 onwards, more accurately reflects what is actually owed to the resident banking system by the various economic sectors, thereby allowing for a more demand-side interpretation of the results.

In Figure 1 we plot the implicit leverage ratios for each of the sectors for the historical period. Where data is available, the leverage ratio for each sector is defined as credit allocated divided by the value of output. For consumer (non-mortgage) credit and mortgage credit, we have used GDP and housing stock respectively. With the exception of manufacturing and transport, it is evident that most sectors witnessed a sizeable increase in the relative amount of credit from the mid 1990s onwards - the property sector in particular saw a significant increase.

In modelling the demand for credit, the following relationship is specified for each individual sector where $C_{i,t}$ refers to credit allocation in sector i and $Y_{i,t}$ refers to output in that sector, $R_{i,t}$ is the cost of capital in the sector and GDP_t refers to overall GDP in the economy. The cost of capital for each sector is taken to be the interest rate most appropriate for the sector - that is, one of either a consumer, mortgage or SME rate. GDP is

[5] The adjustments to the credit data mainly correct for the potential distortion in calculating the underlying flow of credit due to the recognition of impairment provisions, exchange rate movements and securitisations. For further details see *Irish Money and Banking Statistics - A New Approach*, McElligott R, and O'Brien, M. Quarterly Bulletin No.1, 2011. Comprehensive data on this basis will be published later in 2011.

[6] This includes data for Allied Irish Bank, Bank of Ireland, permanent tsb and the EBS.

included to capture the impact of overall growth in the economy - this may have confidence implications for credit use in particular sectors above and beyond what is captured in the sectoral output value. The specification is as follows:

$$c_{i,t} = f(+y_{i,t}, +gdp_t, -R_{i,t}). \quad (1)$$

where lower case denotes logs.

We estimate a long-run version of (1) and the following short-run error correction model version

$$\triangle c_{i,t} = \lambda\left(\epsilon_{i,t-1}\right) + \sum_{i=1}^{2} \gamma_i \triangle c_{i,t-i} + \sum_{j=1}^{2} \gamma_{3+j} \triangle y_{i,t-j} + \sum_{j=1}^{2} \gamma_{6+j} \triangle gdp_{t-j} + \sum_{j=1}^{2} \gamma_{9+j} \triangle R_{t-j} + u_t. \quad (2)$$

where,

$$\epsilon_{i,t-1} = c_{i,t-1} - \beta_0 - \beta_1 y_{i,t-1} - \beta_2 gdp_{t-1} + \beta_3 R_{i,t-1}$$

to capture the dynamics of credit allocation. We then, based on the forecasts for GDP and sectoral output values in Bergin et al. (2010) and assumptions for interest rates, forecast out the credit allocation amounts based on the error correction models. Individual long and short run results for the sectors are presented in Table 2. In Figure 2 we summarise the long-run model results.

Taking the fitted value from the long-run model as the "fundamental" level of credit within the economy, it can be evaluated whether the level of credit extended within the sector is above or below what the activity in that sector would appear to justify. Different periods can be identified from the charts where the two lines diverge for a period, thereby suggesting disequilibrium in the sector i.e. the over/under extension of credit. However, clearly the most notable episode is the latter years of the sample for the property sector (construction/building and real estate). Even allowing for the heightened level of activity in that sector, the level of credit provided appears to have been significantly in excess of that warranted by output levels and interest rates.[7] It is important to point out that, for the *Property* sector in particular, the stock of credit in the more recent period also reflects the absence of repayments that would have otherwise been repaid. This will have implications for the interpretation of the model results, possibly introducing a downward bias in the coefficients, i.e. in recent years in particular, credit "demand" is actually lower in these sectors than we would infer from simply observing the stock figures.

Forecast results

The forecasts of the respective models are presented graphically in Figure 3, while Table 3 summarises the relative changes over the forecast period 2010 - 2013. For the sectors modelled, the Property sector[8] experiences the largest change with a significant fall (79 per cent) in credit required. This reflects both the large credit bubble which had accumulated in this market since about 2004 and the expected reduced level of construction activity in the economy going forward.

For the other sectors, most experience an initial decline in the forecast period, however, the expected macroeconomic recovery embedded in the Bergin et al. (2010) forecasts results in credit levels beginning to increase towards 2013. In the case of manfacturing, the increase in credit demand is quite significant reflecting the highly cyclical nature of credit demand in this sector.

Overall, however when the results for these six sectors are combined, the level of credit provided by the banking sector is expected to contract substantially within the Irish economy. The considerable reduction owing to the collapse in activity in the residential and commercial property markets far outweighs the increases in the other sectors.

Credit demand amongst Private households

One of the largest allocations of credit within the economy is that for private households. This mainly consists of the total value of the residential mortgage stock in the domestic banking system. As can be seen from Table 1, in 2010 this amounted to 41.9 per cent of the total stock of private sector credit (excluding Financial Intermediation). The availability of detailed loan-level information by the guarenteed financial institutions enables certain forecasts to be generated.

As a result we now generate forecast levels of this credit aggregate using a form of perpetual inventory approach. The value of the stock of domestic mortgage credit (M_t) is assumed to evolve in the following manner

[7] Additionally, it is worth noting that the level of output in the construction sector could itself be determined by credit provision. McQuinn and Fitzpatrick (2007) find clear evidence, for example, of a mutually reinforcing relationship between house prices and mortgage credit. As a result the estimates presented here could *understate* the excess levels of credit in this sector.

[8] The property sector is inclusive of NAMA transfers. In other words, while NAMA tranches have been removed from bank balance sheets, they have been included in the stock of credit analysed for the purposes of this exercise.

$$M_t = A_t + (1 - \sigma)M_{t-1}. \quad (3)$$

where A_t is the value of the additions to the stock of mortgage credit and σ is the pay-down rate in the mortgage book. This latter rate is dependent on a number of factors: the maturity profile of the stock of mortgages on the books of the Irish banks, the composition of loan-types on the books both now and in the future (in terms of the interest rates), and how interest rates might evolve in the future.

Information on the maturity profile of the stock of mortgages on the books of the Irish Banks is taken from from a snap-shot of the ROI mortgage books of certain Irish banks at December 2010 (approximately 70 per cent of the stock of total mortgage credit). The data set contains information which allows us to construct the maturity profile of the stock of mortgage credit in each bank. Subject to certain assumptions, such as that the contract observed at end 2010 remains the contract for the lifetime of the mortgage, we can also model how the composition of loan-types (tracker, fixed and standard variable rate) will change over time. For future interest rates, we use the Euro Forward curve out to 30 years as at 23 March 2011. Putting all of this data together, we obtain a pay-down rate of 4 to 5 per cent per annum from 2011-2013. This rate remains quite constant up to 2020, after which the maturing of the mortgages from early on in the boom period begins to kick-in and the rate increases. Figure 4 shows the cumulative proportion of the 2010 stock of mortgage credit paid down over time.

For A_t (additions), there is limited historical data allowing us to infer how new mortgage loans might evolve in the short term. Using the bank loan-level data described above, we observe that the amount of new mortgage loans issued in 2010 was equal to approximately 3 to 4 per cent of the outstanding loan book. For the purposes of the current exercise we have assumed that the total value of new mortgage loans in each of 2011 to 2013 is equal to the total value of new loans in 2010 (from the bank loan-level data described above) adjusted for the projected evolution of house prices. For house price changes we use the baseline projections in the March 2011 Prudential Capital Assessment Review (PCAR) that is: -13.4 per cent, -14.4 per cent and +0.5 per cent in each year. For new loans that are not first-time buyers - approximately 55 per cent of the new loans observed in 2010 - the new loan will include a consolidation of existing loans where a mortgage-holder sells one property before moving onto a new property. Unfortunately we have no information as to the scale of any such consolidation, and, therefore, make no adjustment in our current calculations. These assumptions are, of course, open to question. However, the greater availability of detailed mortgage book data will allow all of these assumptions to be probed in greater detail. Applying the above methodology suggests that the stock of household mortgage debt will decrease between 2010 and 2013 by 7.9 per cent or from €143,279 million to €131,901 million.

The above projections are reflective of *what is owed*, in other words, they make no adjustment for potential losses due to mortgage defaults/repossessions over the period. Given the stressed position of many Irish mortgaged households, this is a rather optimistic assumption - see Kelly, McCarthy and McQuinn (2011) for example. Therefore, as a stressed scenario we also examine what the future stock of mortgage credit would be if some of the total stock was lost each year to default. The losses are based on estimates of joint probability of distress and negative equity as set out in Kelly, McCarthy and McQuinn (2011). Kelly *et al.* (2011) estimate this joint probability at 6 per cent using 2009 data. We take this figure as our measure of defaulting mortgages and apply a loss given default of 60 per cent (the approximate peak-to-trough fall) as the basis for our 'stressed losses' in each of year from 2011 to 2013. Under these circumstances, the stock of mortgage credit would fall by 18.3 per cent between 2010 and 2013 from €143,279 million to €117,037 million.

An alternative method to determine the future demand of mortgage credit is to model mortgage credit using the same specification as was used to determine credit demand for the other sectors. Estimates of the losses in stock are also imposed on the resultant forecasts. In this case, total housing stock is assumed to approximate the output variable $Y_{i,t}$. GDP is also included in the specification - therefore, forecasts of the stock of mortgage credit are determined by assumed future levels of housing stock and GDP. Housing stock, itself, evolves in a perpetual inventory method, with housing supply assumed to be at 20,000 units per annum over the forecast period.[9]

Estimating the long run version of (1) and the short run error correction model (2), for mortgage credit, results in a 3.6 per cent decline in mortgage credit stock between 2010 and 2013, from €143,279 to €138,097. However, when we apply the losses assumed above, the stock of mortgage credit declines by 13.8 per cent between 2010 and 2013 to €123,473 million. Both approaches are shown in Figure 5. The difference between both mortgage stock levels by 2013 is reflective of the differing underlying main drivers for both approaches, in addition, the model forecasts a sharper decline than the inventory method in the beginning of the forecast period, mainly as a result of the underlying macroeconomic forecasts.

[9] As per the Department of the Environment estimates of housing stock, an annual fixed obsolescence factor of 0.73 per cent is applied.

Overall figures for private sector credit

The purpose of this note is to ascertain the likely credit requirements of different sectors of the economy over a short-term horizon to 2013. The primary driver of credit demand as modelled in this note is the output in each sector. The model forecasts are shown in Table 3. Overall, we project a 39.3 per cent fall in the overall stock of credit (lending to non-financial sectors). The bulk of the fall is concentrated in the *Property (building/construction and real estate*) and *Personal Mortgage* sectors. Despite the considerable drop in the *amount* of credit allocated to personal mortgages, driven to an extent by conservative loss assumptions, by 2013 it continues to account for a sizable proporation (60 per cent) of the overall stock of credit in the economy.

References

[1] Bergin A., Conefrey T., Fitzgerald J. and I. Kearney (2010), "Recovery scenarios for Ireland: An update", *Economic and Social Research Institute*, Quarterly Economic Commentary, Summer 2010, Special Article.

[2] Fitzpatrick T. and K. McQuinn (2007), "House prices and mortgage credit: Empirical evidence for Ireland", The Manchester School, Vol. 75, Number 1, pp.82-103, 2007.

[3] Kelly R., McCarthy Y., and K. McQuinn (2011), How correlated is negative equity and mortgage repayment distress across households?, Paper given at University College Dublin, February 18th, 2011.

Table 1: Sectors Used in Analysis and 2010 Quarter 3 Share of Credit, excluding Financial Intermediation

Sector	% Share of Total (2010)	Indicator Used
Agriculture, Forestry and Fishing	2.2	Agriculture (E)
Construction and Real Estate Activities	31.7	Property (E)
Transport, Communications	1.1	Transport (E)
Wholesale, Retail Trade	9.0	Market Services (E)
Manufacturing	2.6	Manufacturing (E)
Personal (Private Households)	47.3	
Mortgage	41.9	
ex Mortgage	5.3	

Note 1: (E) denotes that the output indicator used is the sectoral output value from the ESRI HERMES database.
Note 2: A residual called "'Other' accounts for some 6 per cent of the credit stock. We have not attempted to model this category in this paper.

Table 2: Short and long-run sectoral credit model results

Long-Run Model

	Agri-culture	Wholesale Retail	Property	Manu-facturing	Personal (ex mort.)	Personal (mort)	Transport Communications
Constant	-1.80	-1.62	-2.03	-0.91	-4.70	-20.27	-1.30
y_t	0.47	1.04	1.41			2.383	1.03
gdp_t	0.54			0.83	1.212	1.17	
R_t	-0.000	-0.02	-0.12				-0.01

Short-Run Model

	Agri-culture	Wholesale Retail	Property	Manu-facturing	Personal (ex mort.)	Personal (mort)	Transport Communications
ecm_{t-1}	-0.08 (-1.09)	-0.12 (-1.13)	-0.14 (-2.80)	-0.16 (-2.05)	-0.184 (-2.36)	-0.463 (-4.06)	-0.09 (-1.40)
$\triangle c_{i,t-1}$	0.60 (5.90)		0.58 (8.43)	0.24 (2.01)		0.45 (4.31)	
$\triangle y_{i,t}$		1.00 (8.73)	0.17 (1.17)				1.29 (5.32)
$\triangle y_{i,t-1}$	0.33 (2.57)						
$\triangle gdp_t$						0.83 (4.60)	
$\triangle gdp_{t-1}$				0.64 (3.43)	0.999 (5.75)		
$\triangle R_t$	-0.001 (-1.75)						
$\overline{R^2}$	0.46	0.08	0.55	0.35	0.27	0.68	0.33

Note: T-stats are in parentheses for the short-run models.

Table 3: Summary of Forecasts for Sectoral Credit Levels (€billions)

Sector	2010 (*% share*)	2013 (*% share*)	% Difference
Agriculture	7.4 (*2%*)	8.3 (*4%*)	12.2
Wholesale Retail	30.7 (*10%*)	27.0 (*14%*)	-12.0
Property	108.1 (*34%*)	22.9 (*12%*)	-78.8
Manufacturing	8.7 (*3%*)	8.4 (*4%*)	-3.9
Transport Communications	3.8 (*1%*)	3.8 (*2%*)	1.4
Personal - Non-mortgage credit	18.2 (*6%*)	7.1 (*4%*)	-61.3
Personal - mortgage credit	143.3 (*45%*)	117.0 (*60%*)	-18.3
Total	320.3	194.6	-39.3

Figure 1

Irish Sectoral Leverage (Credit to Output) Ratios: 1971-2010

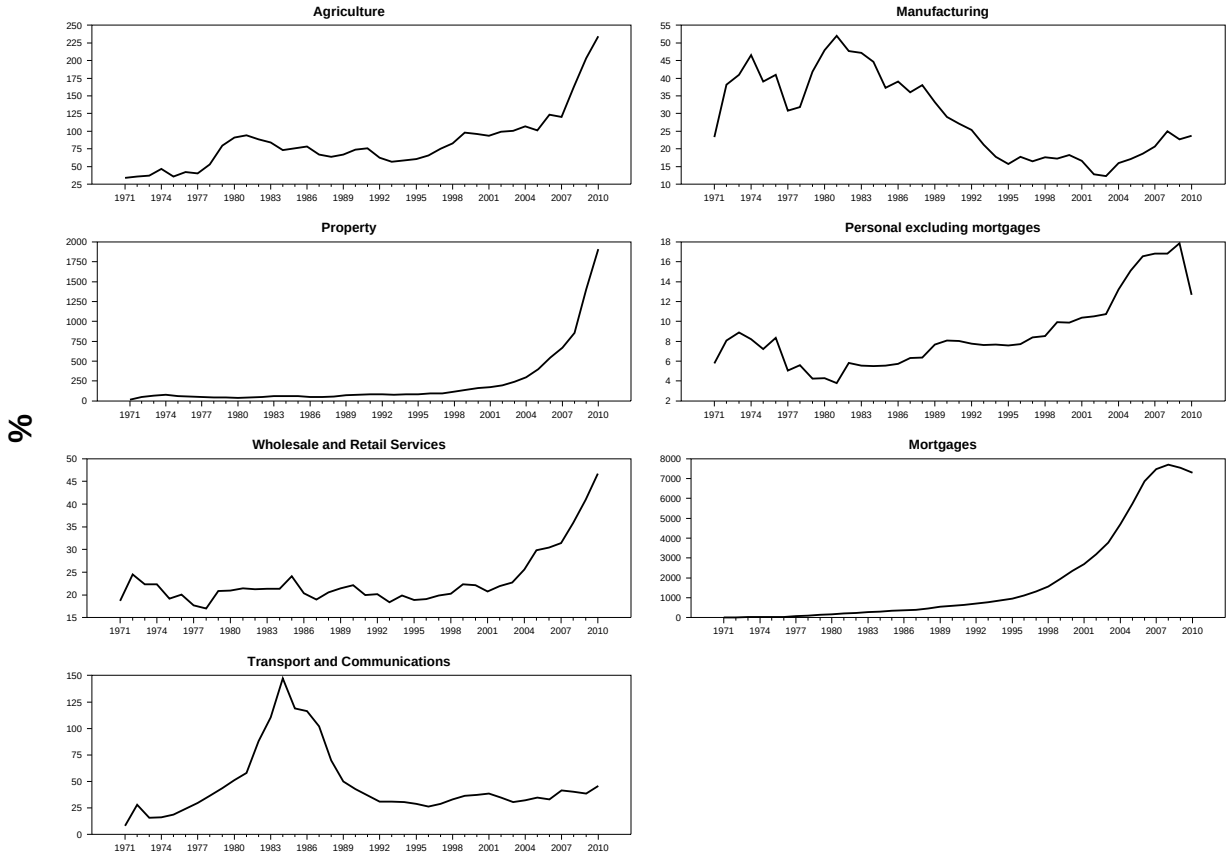

Figure 2

Actual and Fundamental Sectoral Credit Levels: 1971-2010

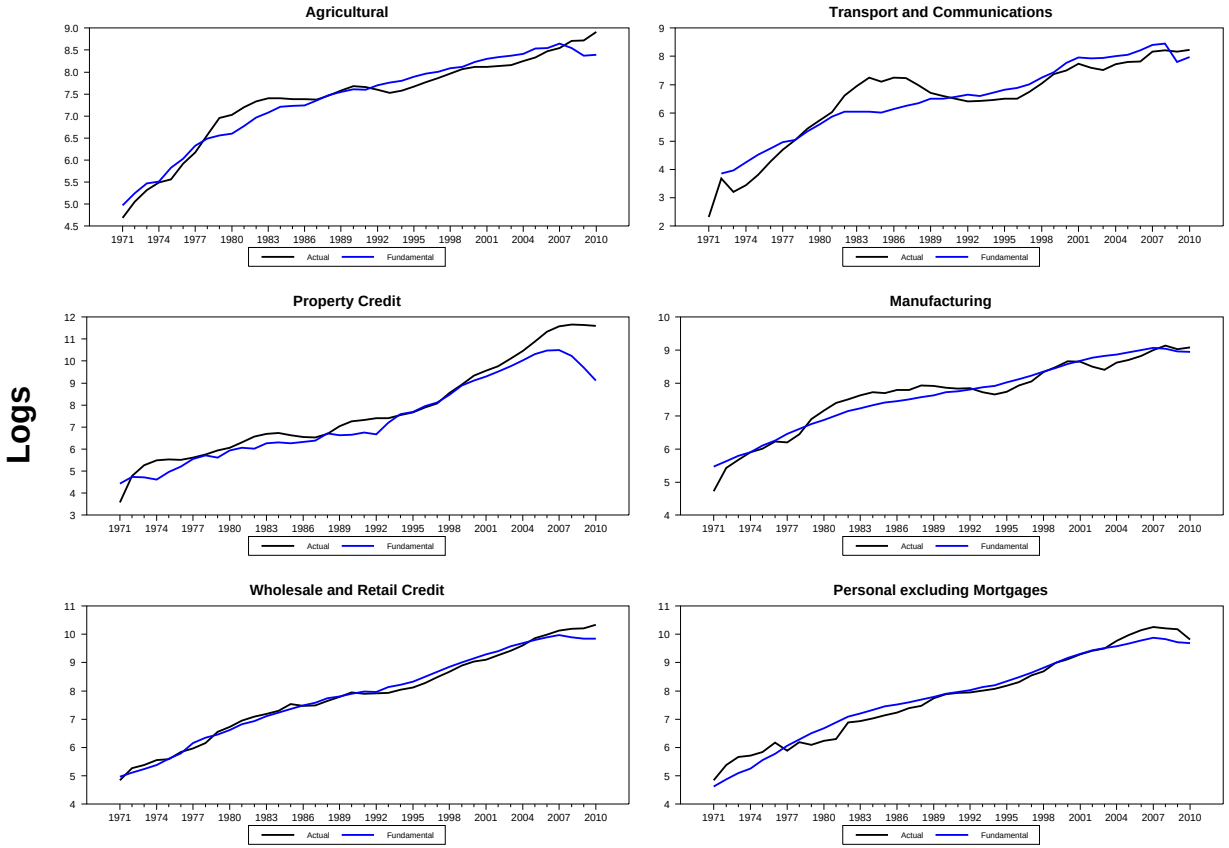

Figure 3

Actual and Forecast Sectoral Credit Levels: 1990-2013

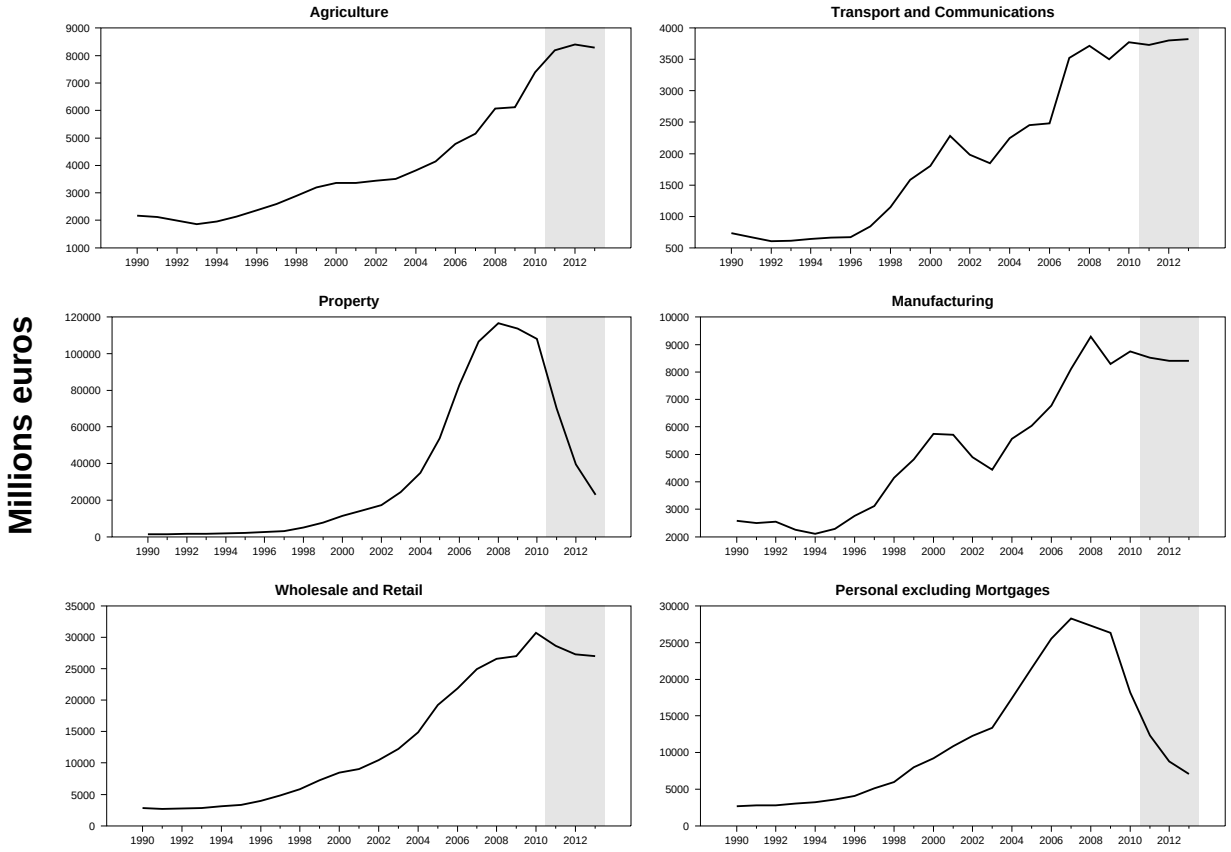

Figure 4

Cumulative proportion of 2010 mortgage stock paid down

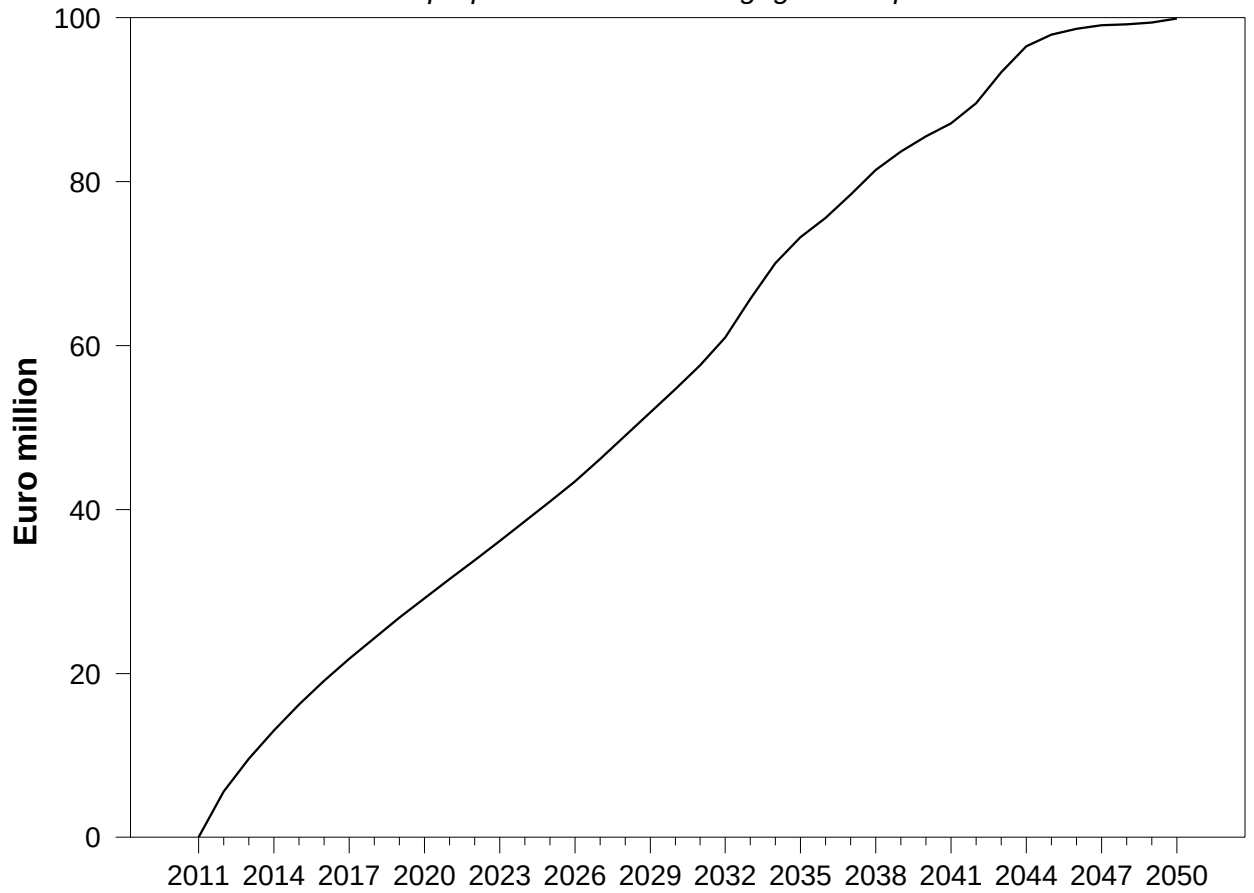

Figure 5

Personal - Mortgages