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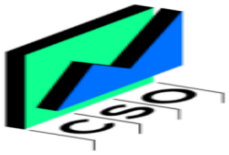

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An Alternative Methodology for Measuring Financial Services Sector Output In Ireland [1]

Jenny Osborne-Kinch, Dermot Coates, Aoife Moloney and Christopher Sibley

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'When someone confidently quotes the contribution of financial services to national income, you can be sure they have no understanding of the esoteric concept of "financial services indirectly measured" (don't ask)'

John Kay, 2014 (Financial Times, 15th April)

Abstract

This paper is an attempt to explain how banking sector output is currently measured in annual National Accounts. The significant contribution of the financial sector, and in particular the banking sector, to GDP during the crisis years seems puzzling, as banks in Ireland recorded large losses in their published financial statements, and required significant government support .This conundrum motivates the analysis that follows, and highlights the challenges that exist in deriving bank output. The authors examine current and alternative methods of calculating the FISIM component of value added of the banking sector, taking into account new statistical requirements under ESA 2010.

[1]. The views expressed are solely the views of the authors and are not necessarily those held by the Central Bank of Ireland, the Central Statistics Office or the European System of Central Banks. The authors would like to thank Joe McNeill and Rory McElligott for their useful comments, and to acknowledge research assistance from Siobhán O'Connell and Anne McHugh. Corresponding authors are Jenny Osborne-Kinch (jenny.osbornekinch@centralbank.ie), Dermot Coates (Dermot.coates@centralbank.ie), Aoife Moloney (Central Bank of Ireland) and Christopher Sibley (Central Statistics Office).

Section 1: Introduction

The measurement of the contribution made by the financial sector to economic output is challenging, in particular, as bank output is derived from both implicit and explicit service charges. Banks charge explicitly for certain services such as account services fees and asset management costs. Such direct charges are easily measurable, however, they account for only part of total output as measured within the national accounts framework. Implicit charges represent a key component for measuring banks' financial services output. These implicit charges are based on interest rate margins for loans and deposits. To measure these implicit charges, the concept of FISIM (Financial Intermediation Services Indirectly Measured) has been developed internationally since 1995. This FISIM process seeks to decompose total interest payments into a service element and a financing element. This service is measured using the difference between the lending (or borrowing) rate applicable to customers and a risk-free reference rate. The risk-free rate chosen should represent the interest rate financial intermediaries would charge or offer where their services were charged directly (i.e. an interest rate that does not include any service component).

A considerable amount of research has, in recent years, been dedicated by academics and statistical compilers to the topic of measuring FISIM – from Mink (2008) to research undertaken as part of European and International task forces set up in 2010 and 2011[2] – to further develop the FISIM methodology. These task forces were set up to examine the treatment of FISIM within the new statistical manuals[3], but the importance of their work was reinforced by the crisis. FISIM has continued to contribute an increasing amount to GDP across various economies[4], which increases the importance of accurately measuring FISIM. For example, in Ireland, in 2010, banks recorded large losses in their published financial statements (of approx. €32 billion), required capital transfers to the sum of €31.5 billion in that year, yet they continued to generate consistently positive value added in the national accounts. Close to its peak, in 2010, the value added of the financial sector to the Irish economy was €15 billion (or 10 per cent of Gross Domestic Product). This compared with a euro area average of around 5 per cent and reflects the large financial service sector in Ireland. Of financial sector output, banks accounted for the largest contribution, with a value added of nearly 7 per cent of GDP, or nearly 70 per cent of the value added of the total financial sector. Under the income approach to GDP, the term 'value added' [5] is decomposed into Gross Operating Surplus and Compensation of Employees. In this paper, we focus on the Gross Operating Surplus as FISIM is the major component of this. For the purposes of this paper, the authors have focussed on FISIM for bank loans and deposits, FISIM of non-bank financial institutions or from securities are not addressed.

In the context of estimation difficulties and considering the increasing volatility of FISIM's contribution to GDP during the financial crisis, it is important that the measure of value added is reflective of economic reality. This paper examines alternative approaches to the current method

[2] At European level, the Committee on Monetary, Financial and Balance of Payments Statistics established the European Task Force on Financial Intermediation Services Indirectly Measured (FISIM) under the responsibility of Eurostat. At worldwide level, the Intersecretariat Working Group on National Accounts established a Task Force on FISIM under the lead of the UN and the OECD. The task forces concentrated their work on four aspects, respectively related to the treatment of foreign currency denominated balances, how to reflect term and credit default risk premiums, and volume measures of FISIM.

[3] System of National Accounts (SNA 2008) and European System of National Accounts (ESA 2010).

[4] Refer to Chart 1 in Annex 2 for examples of a number euro area countries such as Germany, Spain and Belgium.

[5] The term 'value added' is a standard statistical method of measuring the economic contribution of a sector to GDP.

of estimating FISIM in Ireland, including those methods suggested by the aforementioned task forces and also the new ESA 2010 regulations[6], which come into effect in September 2014.

Our approach for the rest of the paper is to compare estimates of FISIM, and the contribution of the banking sector to Irish economic growth, under both ESA 95 (i) and ESA 2010 (ii) frameworks. In other words, we compare estimates of FISIM using (i) ex-ante, short-term published interest rates[7] versus (ii) estimated interest rates calculated from observed stocks of loans and deposits alongside flows of interest payable (or receivable) to Irish-resident banks. We discuss the meaningfulness of estimates of FISIM under the current CSO methodology (ESA 95) when compared to estimates calculated using Central Bank of Ireland quarterly survey data[8] under the proposed ESA 2010 framework. We also examine the implications of these alternative approaches for both Irish GDP and the allocation of output across sectors of the Irish economy.

Thereafter, the authors proceed to explore a number of alternative methodological approaches to the measurement of risk-based returns in the interest margin and consider the implications of the treatment of Central Bank output in the context of the funding of the Irish banking system during the financial crisis. The paper also identifies future potential workstreams for addressing conceptual challenges in the estimation of FISIM.

The paper is organised as follows. Section 2 sets the background, discussing the motivation for this paper. Section 3 examines the current methodology to calculate banking sector output and the approach under ESA 2010, while Section 4 suggests alternative measurements of FISIM, taking into account a number of conceptual issues. Section 5 discusses the results, Section 6 considers a future workplan and Section 7 concludes.

Section 2: Background

While Irish banks balance sheets began to contract from 2008 onwards, and government support of around €63bn was injected into banks between 2009 and 2012 (of which €42.96bn were capital transfers[9]), the financial sector itself continued to add value within national statistical accounts, amounting to €15 billion in 2010, which seems counter-intuitive. Specifically, banking value added remained strong at 7 per cent of GDP in 2010, relatively unchanged from the boom periods 2004-2006 when it added an average 6 per cent of GDP (see chart 1 below). Understanding the estimation of value added of the banking sector is a key motive for the analysis that follows, particularly as the contribution of domestic banks to GDP remained strong during the crisis in spite of the large losses recorded in their published financial statements.

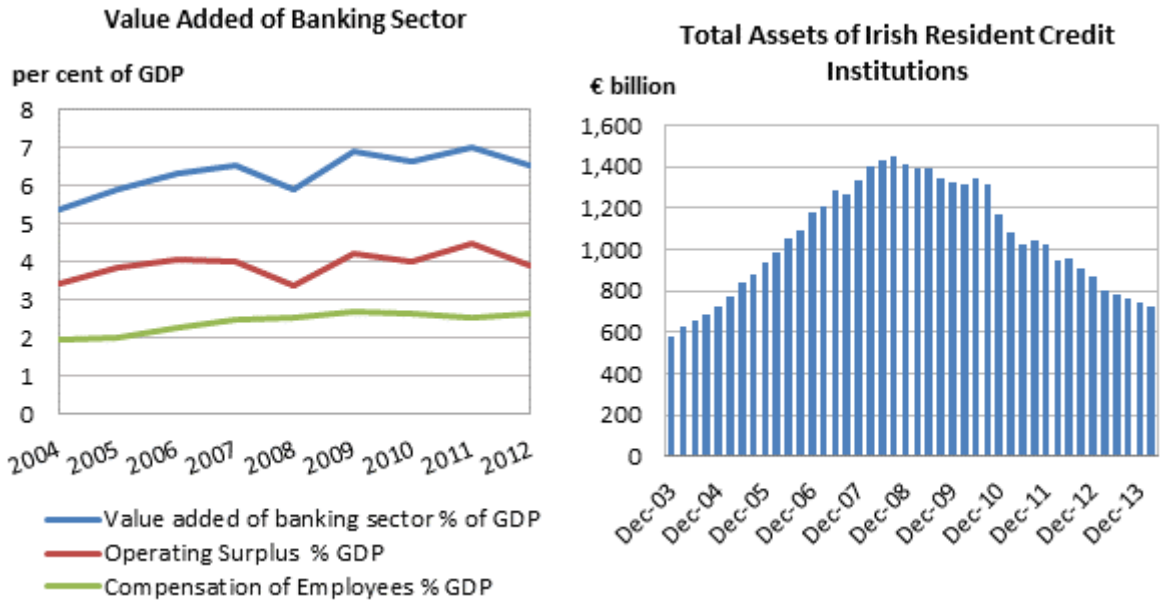
[6] European System of Accounts (ESA) 2010 outlines the statistical framework for EU national statistical compilers and replaces ESA 95 from September 2014. Here the term ESA 2010 refers to the changes since ESA95, including European Commission Regulations 448//1998 and 1889/2002.

[7] Monetary Financial Institutions (MFI) interest rate statistics and risk-free rate components.

[8] Refers to the quarterly survey of Irish-resident banks collected by the Central Bank of Ireland where this survey captures data on stocks of loans and deposits between Irish-resident entities in addition to flows of interest payable (or receivable) to Irish-resident banks.

[9] As GDP is derived from real transactions in goods and services between economic entities, non-transaction effects arising from distributions of income or debt write-downs are not measured as part of GDP for any economic sector. Hence, recordings of capital transfers to a total of €42.96bn do not directly reduce GDP but is recorded as a transfer of income between the government and the financial sector (Everett, McNeill and Phelan, 2013). Overall, it is recorded as a balance sheet effect. The remaining subvention is treated as an equity injection by government into the banking sector.

Chart 1: Value added of Banking sector and total Assets of Irish Resident Credit Institutions.



Source: CSO National Accounts Statistics and Central Bank of Ireland Statistics

Table 1: Government subventions

€ Billion	Government Capital Transfers	Government Capital transfers % GDP
2009	4,000	2.50
2010	31,575	19.97
2011	7,121	4.40
2012	280	0.20

Sources: CSO Government Financial Statistics

FISIM has a symmetric effect on the income (value added) and expenditure (final demand) methods of measuring GDP. FISIM for households is identified explicitly in the expenditure approach in the annual National Accounts publication NIE2012 (Table 13)[10]. Under the income approach to GDP measurement, one must decompose value added into compensation of employees (wages) and operating surplus (National Accounts definition of corporate profits). FISIM is a major component of operating surplus for banks[11].

Prior to examining the current methodology used to calculate FISIM in Section 3, the basic concept and how it feeds into GDP is explained here. Under the statistical framework outlined in the European system of national and regional accounts (ESA 1995), all EU countries implement a similar methodology to compile implicit bank output (i.e. FISIM). Implicit bank output *Y* is dependent on the spread between the retail interest rates on loans r^L and deposits r^D and a reference rate r^R (risk free rate), and the outstanding stock of loans (L) and deposits (D).

[10] Central Statistics Office, National Income and Expenditure publication 2012.
[11] The other components of Financial Sector Gross Operating Surplus are Insurance and Pension Funding and Services Auxiliary to Financial Intermediation.

That is, implicit bank output (Y_t) is: $Y_t = Y_t^L + Y_t^D$

Where $Y_t^L = (r_t^L - r_t^R)L_t$ and $Y_t^D = (r_t^R - r_t^D)D_t$

Changes in FISIM can therefore be explained by volume changes, relative interest rates movements or a combination of both.

Box 1: FISIM and the National Accounts Framework

Under the National Accounts framework, total FISIM output is decomposed into intermediate consumption and final demand.

The **intermediate consumption** element is the implicit service charge on loans to, and deposits from, business. In this case, business includes households in their role as providers of housing services. FISIM on housing loans is therefore, intermediate consumption of households as producers of housing services.

Final demand is principally the FISIM of households from deposits and non-property related loans.

Final demand contributes directly to GDP under the expenditure measure. Under the income measure, total FISIM increases the output and gross value-added of the financial sector. However, the value-added of other sectors is reduced by the intermediate consumption of FISIM. This ensures consistency between the income and expenditure measures.

FISIM essentially has a redistributive effect of reducing consuming sectors value added which is allocated to the financial sector. See Annex 1 for an illustrative example of this redistribution effect under the income and expenditure measures.

Section 3: Methodology

3.1: ESA 95 Methodology (Current CSO Approach)

The ESA 95 methodology is currently applied by the CSO for the purposes of estimating FISIM in Ireland's National Accounts. The imputed interest rate margin is calculated as the spread between retail interest rates, for loans and deposits respectively, and the risk-free rate. The current approach for the estimation of both a risk-free rate and the retail rates for loans and deposits is summarised below. Further technical information is presented in Annex 3.

Risk-free Reference Rate:

The ESA 95 framework suggested the calculation of two reference rates (or risk-free rates): (i) an internal reference rate for the allocation of FISIM on domestic loans and deposits; and (ii) an

external reference rate for imports and exports[12]. ESA 95 provided that the internal risk-free rate for use in the estimation of FISIM could be calculated on the basis of loans and deposits granted by financial intermediaries[13].

In each case, ESA 95 did not make any distinction with regard to the type of maturity of the instrument. The reference rate aims to represent an average interbank interest rate and '*implies that the reference rates reflect a short-term maturity and typically have low risk attached*' (Colangelo, 2012). This approach treats compensation for term premium and default risk as part of the financial services output.

ESA 95 provided for multiple methodological approaches to the calculation of this rate. In determining the appropriate interbank rate, the CSO does not currently calculate a risk-free rate from interest flows (and the associated stocks of loans and deposits) reported directly by Irish-resident financial intermediaries. Rather, the approach used has evolved over time, with the increasing availability of data. This is based upon the use of published Eurosystem interbank rates, as reported by a panel of euro area banks. These rates are used as a proxy measure of the interbank rate for Irish-resident banks. The latter is estimated using an average of the following ex-ante, short-term published rates: Eonia Overnight; 1-month Euribor; 3-month Euribor; and 12-month Euribor.

Retail Interest Rates:

The ESA 95 framework suggested that FISIM should be calculated as the implicit charge on the loans and deposits of non-banks held with all resident financial intermediaries. Under the current CSO approach, FISIM is compiled on all bank loans and deposits vis-à-vis non-financial corporations (NFCs), households (HHs), government and insurance corporations. FISIM is produced by all financial intermediaries with other non-bank sectors of the economy; however, NFCs and HHs are the greatest consumers of FISIM and so for the purposes of calculating the retail rates, the CSO have primarily focussed on the FISIM output of resident banks on loans and deposits vis-á-vis HHs and NFCs.

These retail interest rates are calculated using the MFI interest rate (hereafter: MIR) statistics published by the Central Bank of Ireland for Irish-resident households and NFCs and the associated stock of loans and deposits, by maturity, for Irish-resident households, government, insurance corporations and NFCs[14] with Irish-resident banks.

3.2: ESA 2010 Methodology

For the purposes of this research, the authors have sought to generate updated estimates of FISIM by calculating both risk-free rates and retail interest rates from quarterly survey data. The ESA

[12] Imports and Exports of FISIM are an important part of the methodology, but are small in the Irish context and not dealt with in this paper. The reasoning for this is that most international transactions are between credit institutions and for FISIM purposes are deemed not to attract FISIM or a service element, just a financing element.

[13] Under ESA 95, these are categorised as S.122 (other monetary financial institutions, except the central bank) and S.125 (other financial intermediaries, except insurance corporations and pension funds).

[14] The retail rate is a blend of MFI interest rates combined using a weighting of loan/deposit data by maturity. MIR statistics relate to euro-denominated loans/deposits to HHs and NFCs. The average retail rate for these sectors is applied to the stock of loans and deposits, respectively, for all institutional sectors (NFCs, HHs, government and insurance corporations).

2010 approach for the calculation of both a risk-free rate and the retail rates for loans and deposits is summarised below. Further technical information is presented in Annex 3.

Risk Free Reference Rate:

Under the ESA 2010 methodology, the internal risk-free rate is calculated on the basis of loans and deposits between resident financial intermediaries[15]. This approach is similar to Method 1 under the ESA 95 approach. For the purposes of this research, the authors have calculated preliminary estimates of the internal risk-free rate. These rates are calculated using quarterly survey data for both loans and deposits with Irish-resident banks. This covers the period Q1 2011 to Q4 2013. In each period examined here, the calculated risk-free rate was significantly higher than the suite of short-term, low-risk rates used as a proxy under the current CSO approach (see Annex 2, Chart 2).

This implies that the actual interbank rate prevailing between the Irish-resident banks was greater than the risk-free rate used heretofore. This calculated rate eased downwards in 2013[16] and in so doing, followed a broadly similar trend to the risk-free rate used under the current approach (and in particular, the 3-month Euribor and 12-month Euribor rates).

Retail Interest Rates:

At the outset, the authors sought to use the quarterly survey data to replicate the current ESA 95 methodology for calculating retail interest rates for NFCs and HHs. The new data source yielded comparable results to the MIR statistics. On the basis of this finding, the authors proceeded to use this new data source within the ESA 2010 methodology**.**

Similar to the risk-free reference rate above, ESA 2010 recommends that the retail interest rate is calculated as the interest receivable, or payable, on loans and deposits between financial intermediaries and each non-bank sector. Consequently, an alternative methodology is also used here to calculate the retail interest rates on loans and deposits with Irish-resident banks. Rather than using the contractually agreed rates from the Central Bank of Ireland's MIR statistics as our principal data source, the retail interest rates are now calculated based on the actual interest receivable and payable to banks. We have used quarterly survey data to calculate the total stock of loans and deposits by counterparty sector, and the associated interest rates[17].

Using this quarterly survey data, the loan retail interest rate calculated was generally lower than the rate currently estimated whilst the deposit rate was also slightly lower than current rates by

[15] Under ESA 2010, these are categorised as S.122 (deposit-taking corporations except the central bank) and S.125 (other financial intermediaries, except insurance corporations and pension funds). For the purposes of this research, the authors have calculated the internal reference rate with respect to S.122 only. This is done for comparative purposes as (i) the risk-free rate under the current approach (ESA 95) relates solely to banks and (ii) the retail rates under both ESA 95 and ESA 2010 reference the stock of loans and deposits with Irish-resident banks only. This work is ongoing and the results presented here are preliminary estimates only.

[16] There was, however, some volatility around this rate. It did temporarily increase in Q1 2013 on foot of a steep reduction in the stock of interbank loan liabilities between Q4 2012 and Q1 2013, at least in part due to the liquidation of IBRC during this quarter. This subsequent fall in the flow of interest payable to banks became evident in Q2.

[17] In order to attach the necessary maturity profiles, these calculated rates are further weighted in line with the MIR statistics for HHs and NFCs where the latter sectors account for a substantial majority of the total reported stock of deposits and loans. The refined retail interest rates are then applied to the stock of loans and deposits for each sector (with some minor exceptions).

end-2013, albeit that these relativities did change over time. Depending on the risk-free reference rate chosen for a particular period, slight changes in these retail interest rates may have a significant impact on the margin, especially in the case of the deposit rate which can be quite similar to the reference rate. For example, with a risk-free rate of 1.29 per cent and a deposit rate of 1.25 per cent, bank output would yield a positive FISIM on deposits while a change in the deposit rate to 1.31 would result in a negative FISIM on deposits.

$$Y_t^D = (r_t^R - r_t^D)D_t$$

Section 4: Alternative Methodologies

4.1: The Choice of Risk-free Rate(s) and Term-spread Adjustments

This section examines a suite of alternative methodological approaches for the calculation of FISIM and the effects on the measurement of Irish GDP. We apply a number of scenarios proposed by Colangelo and Mink (2009) and others for the testing of various risk-free rates. Specifically, we examine a number of alternative methods for the treatment of the term premium in the risk-free rate.

The current approach, as per the ESA 95 framework, is based on the selection of a unique risk-free rate, without distinction by type and maturity of instrument. This implies that the risk-free rate reflects only a short-term maturity, and typically has low-risk attached. This framework, however, treats compensation for risk-taking (i.e. term premium and credit default risk) as part of financial services output. The rationale for endeavouring to exclude such risk-based returns from calculated output have been well established in the relevant literature (see Mink 2008; Colangelo and Inklaar 2010; and Colangelo 2012), to ensure that financial sector productivity is not exaggerated merely due to its accumulation of more risk. For example, consider Irish banks responding to increased expectations of loan defaults by raising retail interest rates on loans. The related increase in compensation for rising risk levels implies greater banking sector financial services output as measured under the current international statistical framework. However, the increase in value added does not correspond with any increased economic activity (Everett, McNeill and Phelan, 2013).

Colangelo and Mink have proposed modified approaches based upon adjusting the risk-free rate (or rates) to reflect the credit default risk and term premium characteristics of loans and deposits. In the case of the latter, these can be identified *'on the basis of a risk-free yield curve (a government bond yield curve or an interest rate swap curve for maturities above one year) and secured interbank rates (for maturities below one year)'*.

There is, therefore, scope to re-visit the choice of the risk-free rate with a view to deriving an estimate of financial sector output which, at least in part, excludes risk-based returns in the interest rate margin. Pursuant to the work of Colangelo and Mink, subsequent European and International Task Forces suggested the testing of a series of different methods for calculating the risk-free rate in the context of term premium adjustment. These approaches range from the use of unique versus multiple risk-free rates to the inclusion of interest rate swaps and sovereign bond securities to reflect longer-term maturities. The options tested, and compared, in this paper, are summarised below[18]:

[18] The authors have not calculated multiple Risk-free Rates for short and long-term loans and deposits for the purposes of this paper. There is scope to re-visit this in future research.

I. *Unique Risk-free Rate*: This is a simple average of the Eonia overnight, 1, 3 and 12-month Euribor (current approach).

II. *Risk-free Rate with term premium adjustment (option 1)*: Under this approach, the current approach is expanded to include an interest rate swap. In this paper the average of the 1, 3, 6, 12-month Euribor is used to represent short-term maturity and the Euribor 5-year interest rate swap rate is used to represent long-term maturity.

III. *Risk-free Rate with term premium adjustment (option 2):* Under this approach the risk-free rate also includes longer term instruments, and thus Irish credit risk, by combining the yield on Irish government securities, with the current approach. In this paper, we incorporate a number of long-term Irish sovereign bond yields (i.e. 3, 5, 7, 10-year securities) to represent long-term maturity.

IV. *Midpoint Reference rate (option 3)*: The unique Risk-free Rate under this approach represents the mid-point between the average interest rate that banks charge on loans to consumers and the published interest rate that banks pay on deposits to consumers, as calculated under the MIR statistics[19].

With regard to the retail rate, the ESA 95 method for calculating the retail interest rates is held constant in all the options above. Finally, there is further scope to adjust financial sector output to exclude both credit default risk and term premia through the use of a pool of debt securities with similar maturity and risk characteristics. The authors have not endeavoured to produce such a risk-adjusted estimate of FISIM for the purposes of this paper but it is envisaged that this will be addressed in planned follow-on research. This research will potentially more fully address the relationship between financial sector output and risk through the use of Risk-free Rate(s) adjusted for both credit default risk and term premia where the former will be modelled using euro area NFC and Asset-backed securities (ABS)/Mortgage-backed securities (MBS) indices, sovereign bond yields and survey data on interbank issuance of debt securities.

4.2: A Modified ESA 2010 Approach: Modelling the inclusion of Eurosystem Funding in the Risk-free Rate

ESA 2010 stipulates that FISIM is produced by the central bank, however the output of a central bank is measured as the sum of costs (intermediate consumption, compensation of employees, consumption of fixed capital and other taxes less subsidies on production), and FISIM therefore does not have to be calculated for the central bank (ESA 2010). Commission and fees for directly measured services invoiced by central banks are allocated to the appropriate counterparty sector whilst that part of total central bank output which is not sold must be allocated to the intermediate consumption of other financial intermediaries (S.122 and S.125).

During the course of the present financial crisis, however, the Irish banking system struggled to issue new market debt or to retain interbank funds. As a consequence, the system came to be funded substantially through Eurosystem financing. Since the reference rate should represent an average interbank interest rate reflecting domestic lending activity among financial intermediaries, and by 2010, Irish banks were not lending to one another, there is a strong case to

[19] The testing of the mid-point Reference rate has been suggested by the International Task Force on FISIM and a version of this approach is currently used by a number countries.

incorporate some measure of Eurosystem funding (EF) into the risk-free reference rate. In this case, the relevant interest rate margin needs to take cognisance of the true cost of funds.

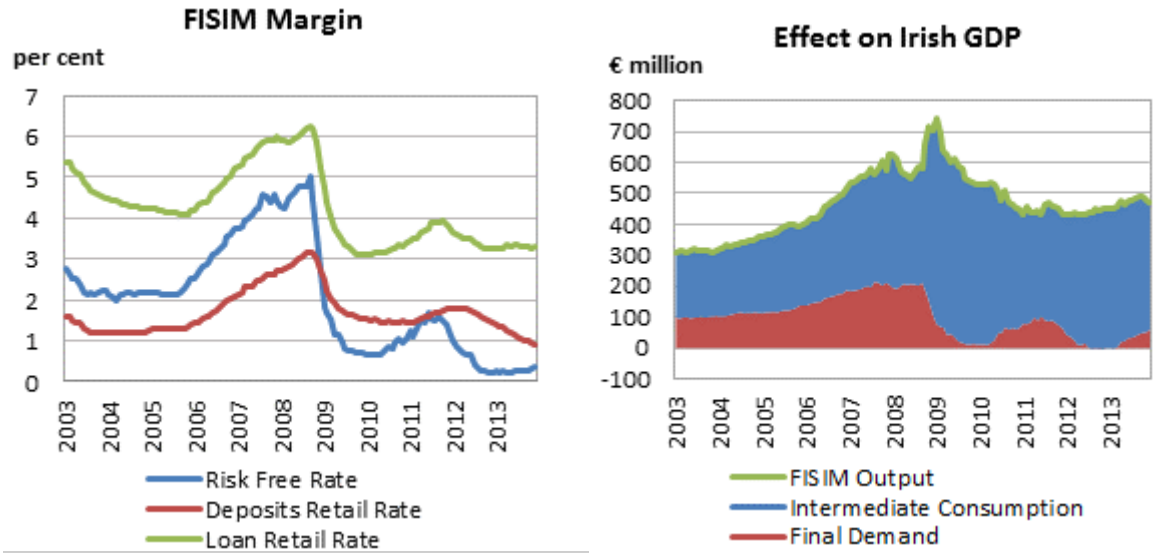
In order to test this modified approach, the calculations for ESA 2010 are replicated, albeit that Eurosystem funding is treated as resident bank funding. In other words, funding from the Eurosystem is treated as a liability to another Irish-resident bank. The stock figure that is used for this Central Bank funding in each quarter (i.e. liabilities to resident banks) is based upon a quarterly stock figure for Eurosystem funding[20]. An associated interest payable amount is derived using the MRO (Main Refinancing Operations) rate in each quarter.

Section 5: Analytical Results

5.1: Results of Current CSO Approach and ESA 2010 Methodology

Current CSO Methodology:

As per the ESA 95 framework, the risk-free rate is currently based on a simple average of a number of ex-ante, short-term published rates whilst the retail rates are derived from the MIR statistics.



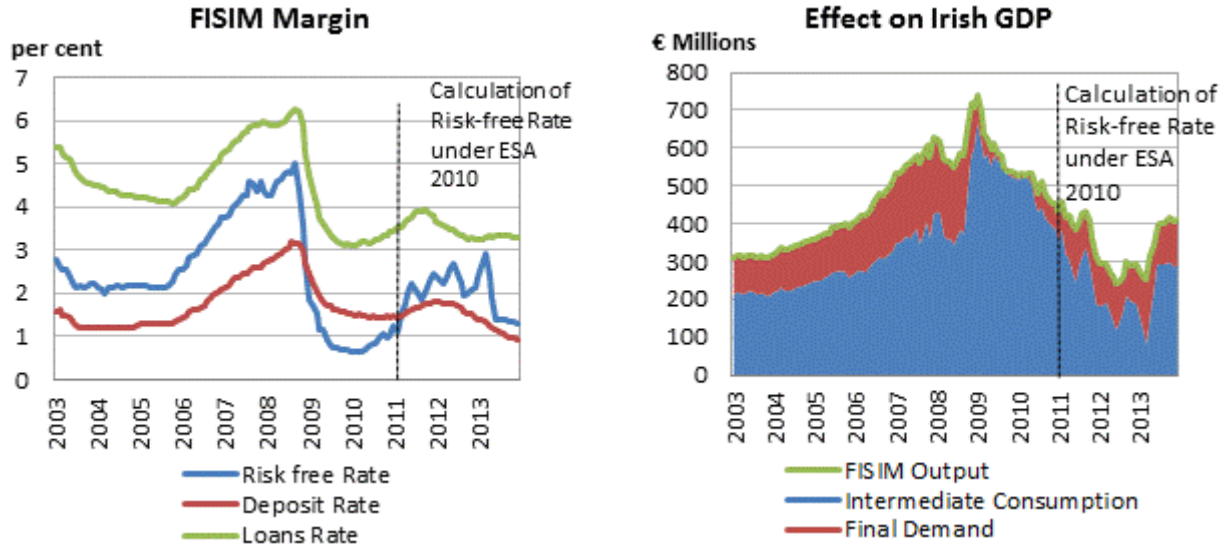
From the chart on the left-hand side the premium on loans is the retail rate (green line) less the risk free rate (blue line) while the premium on deposits is the risk free rate less the retail rate on deposits (red line). Total FISIM equals the shaded blue and red area in the chart on the right-hand side.

It is evident that up until 2008 the interest premium on loans and deposits was positive. From 2009, however, the premium on deposits became negative while on loans it increased. One could interpret this possibly as ECB rate reductions not being fully passed on to households and businesses as borrowers. Irish banks also made losses on deposits as they were required to pay higher rates in order to attract depositors. It is also evident that the composition of FISIM has changed between deposits and loans, which has an important effect on the flow of the data through the National Accounts, as its influences whether the data is classified to intermediate consumption or flows through to final demand.

[20] This data is obtained as part of the CBI Money and Banking statistics.

ESA 2010 Methodology:

For the purposes of implementing the ESA 2010 framework, the authors adopted a two-stage approach. Firstly, we calculated a risk-free rate using quarterly survey data whereby the risk-free rate represents the ratio of the interest payable/receivable for loans and deposits to the relevant stocks of loans and deposits between Irish-resident banks. The revised risk-free rate is introduced into this time series from Q1 2011. The bank retail rates for loans and deposits are derived from the MIR statistics, as per the current CSO approach, and relate primarily to the HH and NFC sectors.



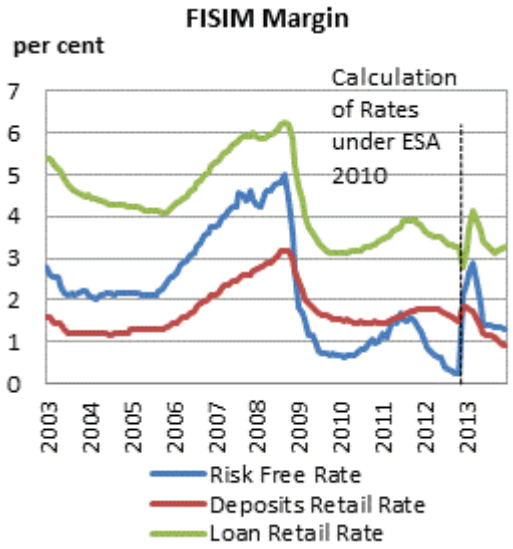
Note: The calculated risk-free reference rate is introduced into this time series from Q1 2011. This rate only relates to Irish-resident banks (S.122) in this paper.

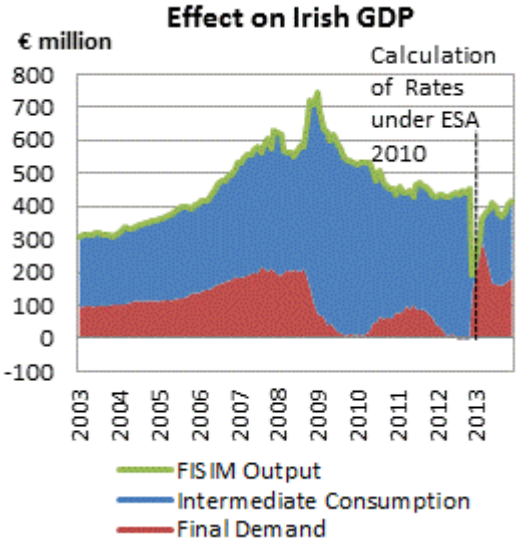
Under this model, the risk-free rate is higher than that applying under the current approach. From Q1 2011 onwards, this risk-free rate is greater than the deposit rate such that the premium on deposits is actually positive under the ESA 2010 framework. By contrast, FISIM on loans is lower as the gap between the risk-free rate and the loan rate narrows. Total FISIM is also lower whilst the higher proportion of FISIM allocated to deposits means that final demand is substantially higher for the period 2011 to 2013. By 2013, total final demand stood at €1.51bn (compared to €347m under the current approach).

Secondly, we calculated both the risk-free rate and the bank retail rates using quarterly survey data for the period Q4 2012 to Q4 2013[21]. The calculated retail rates are quite close to those used under the current approach but, generally speaking, there was a degree of variance over time. The risk-free rate is, again, higher over the relevant period examined here.

The use of new stock data and a higher risk-free rate means that total FISIM Output during 2013 is slightly lower under this model (when compared with the current approach). The composition of FISIM has also changed with a greater incidence of positive FISIM on deposits and a higher cumulative final demand of €2.38bn for the year.

[21] Survey data on interest flows and the stock of loans and deposits by all counterparty sectors and maturity is only available from Q4 2012



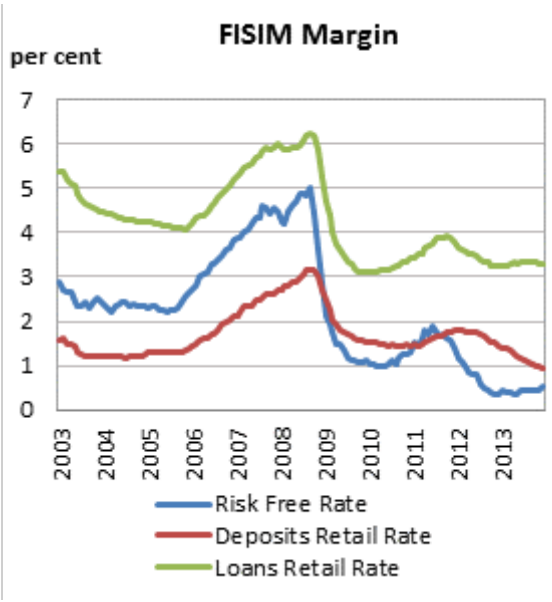


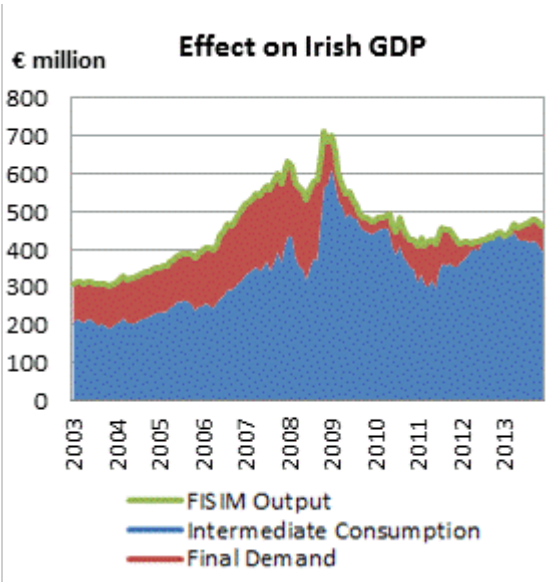
Note: The calculated risk-free reference rate and retail rates are introduced into this time series from Q4 2012. The former only relates to Irish-resident banks (S.122) in this paper.

5.2: Alternative Measures Results

The Choice of Risk-free Rate(s) and Term-spread Adjustments

The authors also tested a series of alternative measurement scenarios. The first scenario (or Option 1) relates to a *Risk-free Rate with term premium adjustment* where the latter adjustment is made through the inclusion of a Euribor 5-year interest rate swap rate in the calculation of the risk-free rate.



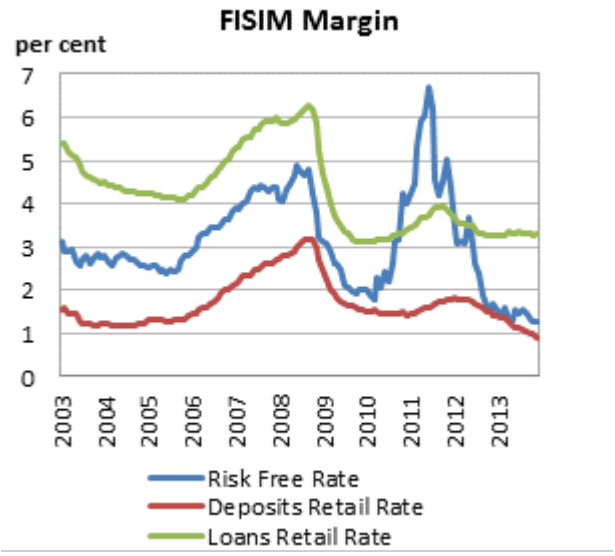


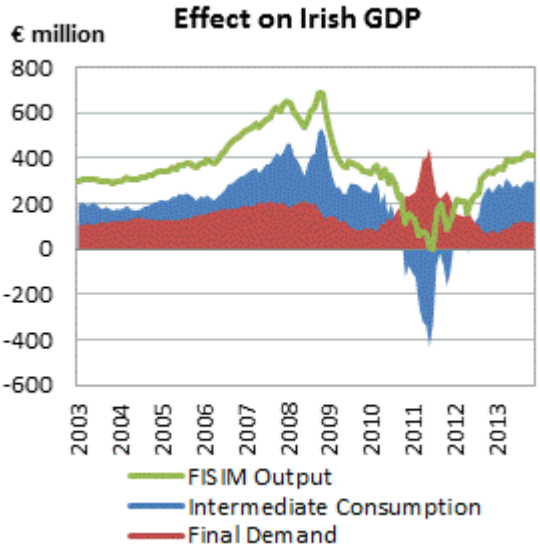
The results under Option 1 are quite similar to the current methodology, although this is likely to be skewed by the absence of weighting in the derivation of a simple average of the component rates[22]. The total volume of FISIM is broadly comparable to that found under the current approach although intermediate consumption falls somewhat. By contrast, total final demand is higher. For

[22] A full series of market rate charts are attached in the annex. Future research work intends to examine a weighting method for this option.

instance, cumulative final demand in 2013 stood at approximately €460m (compared to €347m under the current approach).

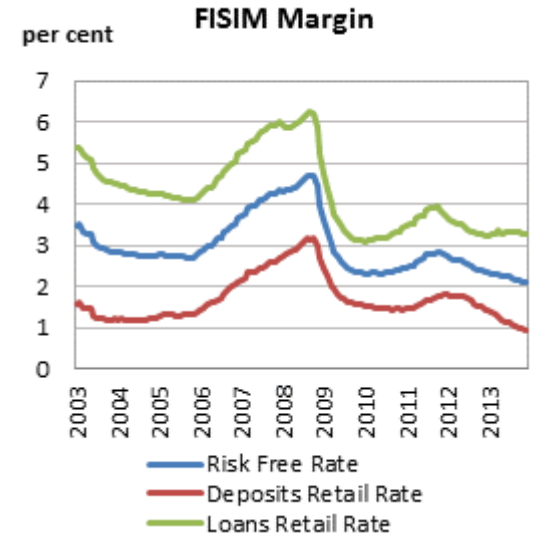
The second scenario (or Option 2) relates to a *Risk-free Rate with term premium adjustment* where the latter adjustment is made through the inclusion of a number of Irish long-term government securities in the calculation of the risk-free rate.

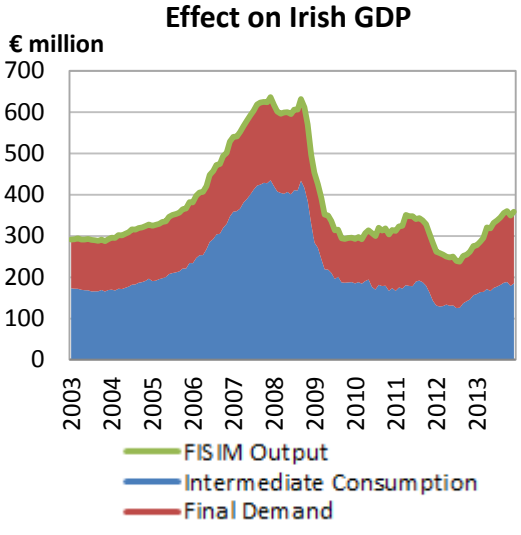




The results are significantly different to the previous methods as the reference rate is much more volatile. It reaches a peak of nearly 7 per cent in 2011 which generates negative FISIM on loans for a period of time in 2011, while large positive FISIM was generated on deposits[23]. This, in turn, leads to lower intermediate consumption – including a period of negative results – whilst final demand is significantly larger under this scenario, having a greater impact on GDP.

The third scenario (or Option 3) relates to a *Risk-free Rate with term premium adjustment* where the risk-free rate under this approach represents the mid-point between the average published interest rate.



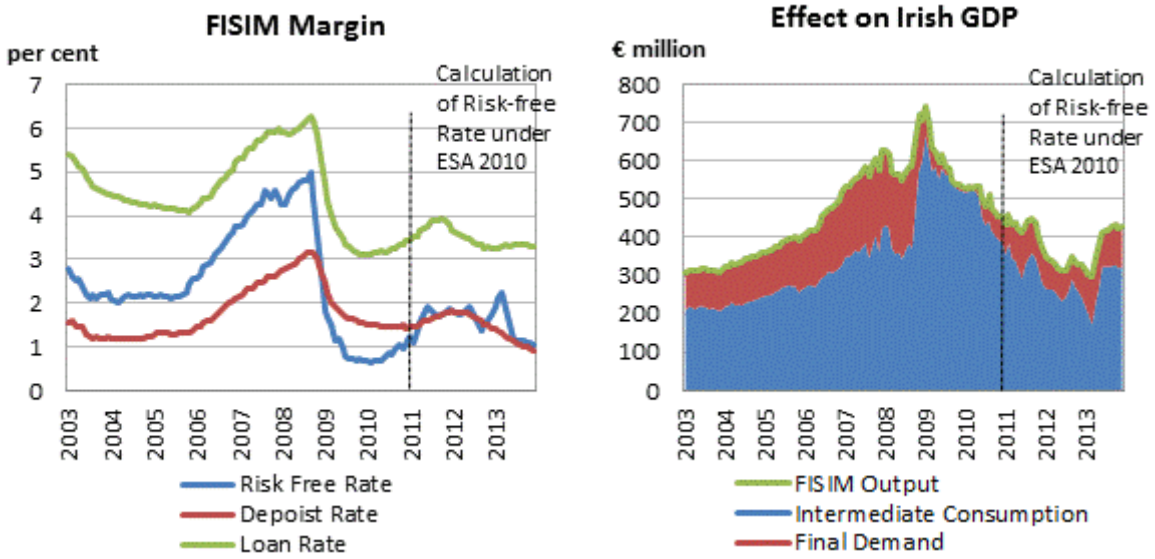


[23] Germany and Spain also experienced periods of negative FISIM under the testing of alternative reference rates as part of the European Task Force.

Under this scenario, as the risk-free rate is quite a bit higher, FISIM on loans falls, while contrary to the current approach, FISIM deposits turn positive. Overall total FISIM falls significantly under the midpoint approach. However, as final demand increases it will have a greater impact on GDP.

A Modified ESA 2010 Approach: Modelling the inclusion of Eurosystem Funding in the Risk-free Rate

Finally, the authors also considered the implications of re-estimating the risk-free rate where funding from the Eurosystem is treated as a liability to another Irish-resident credit institution. For the purposes of implementing this modified approach, the bank retail rates continue to be derived from the MIR statistics and relate primarily to the Household and NFC sectors (as per the current approach).



Note: The calculated risk-free reference rate is introduced into this time series from Q1 2011. This rate only relates to Irish-resident banks (S.122) in this paper.

In this case, the risk-free rate falls because the MRO rate is lower than the rate at which interbank loans and deposits are made between other resident credit institutions. For instance, by Q4 2013 the risk-free rate is 1.05 rather than 1.31. This revised risk-free rate was generally lower than the deposit rate throughout 2011 and 2012 leading to a negative premium on deposits for much of this period.

Although total FISIM is higher than under the standard ESA 2010 framework, the higher proportion of FISIM earned on loans under this modified approach means that Final Demand is lower when compared to an approach which does not take cognisance of Eurosystem funding in this way (albeit that it is still higher than under the ESA 95 framework).

Results Summary table

Table 2: Annual effect of Final Demand on GDP (2008-2013): € millions

Total	Current	ESA 2010*	ESA 2010 (incl EF)	Term Premia(1)	Term Premia(2)	Midpoint
2008	2255			2274	2236	2305
2009	414			641	1314	1521
2010	481			670	1696	1510
2011	1003	1306	1140	1151	3538	1839
2012	127	1254	884	222	1449	1424
2013	347	1510	1244	461	1224	1839
Difference to current approach as per cent GDP (in value terms)						
2010				0.1	0.7	0.65
2011		0.19	0.08	0.09	1.56	0.51
2012		0.69	0.46	0.06	0.81	0.79
2013		0.71	0.55	0.07	0.53	0.91

*Refers to the use of MIR-based retail rates in the first example (see above)

[Refer to Annex 4 for a more complete table of results on all options]

Section 6: Conceptual Issues and future workplan

This paper has endeavoured to explore the implications of implementing the ESA 2010 methodology through the use of new quarterly survey data from Irish-resident banks. In doing so, we have also sought to address a number of conceptual issues. However, the results presented here are neither final nor exhaustive and there are various outstanding matters that need further discussion. The Central Bank of Ireland and the Central Statistics Office aim to progress work on these conceptual issues as part of a future workplan. The range of further issues and questions to be addressed include the following:

- Future research work will look at the possibility of deriving the risk-free rate and interest margins taking into account multiple reference rates using ex-ante published rates (MIR rates) and calculated rates[24]. Each reference rate would then reflect the maturity structure of the loan/deposits.

- How should bearing risk be measured? Further research work is necessary to calculate the reference rate taking into account both term spread and risk of default[25]. Credit default risk could be modelled using euro area CDS and bond indices for NFCs, and mortgage backed securities indices (MBS), for households (refer to Colangelo and Manzano, 2011).

[24] The CBI's quarterly survey of resident credit institutions does not capture detailed data on the underlying maturity profile associated with the flows of interest payable and receivable.

[25] The Advisory Expert Group on National Accounts (2006) noted that '*the reference rate used in the compilation of FISIM should be a rate that has no service element in it and which reflects the risk and maturity structure of the financial assets and liabilities to which FISIM applies'. ESA 2010 does not include risk.*

- Should securities be included in the measurement of FISIM and how might this be achieved? Currently bank profits in the national accounting framework only looks at loans (assets) and deposits (resident and non-resident)[26].

- Should other entities such as treasury companies be included in the calculations of FISIM?

- There is also scope to factor in the impact of non-performing bank loans during periods of financial distress. There is potential to re-estimate the underlying stock of performing loans for the purposes of calculating the bank retail rates and the interest margin.

- Finally, it would be interesting to examine non-FISIM banking output (i.e. explicit charges such as fees and commissions) using our quarterly survey data in order to examine what impact they have had on total output.

Section 7: Conclusions

The aim of this paper has been to obtain a greater understanding of the relationship between statistical data and economic concepts. In this context, the authors have attempted to explain how banking sector output is currently measured in annual National Accounts.

The Value Added of the banking sector accounts for around 7 per cent of GDP. Of this 7 per cent, approximately 3.5 per cent is represented by FISIM (or implicit charges). While FISIM is a major component of the Gross Operating Surplus (GOS) of the financial sector under the income measure of GDP, its contribution to overall domestic GDP is, in fact, smaller. This is because the consumption of FISIM is treated as a cost of non-bank sectors which, in turn, reduces the GOS of these sectors. FISIM's contribution to GDP only relates to Final Demand (i.e. largely households and Government in Irelands' case), which is just under 1 per cent of GDP. Commentary on the contribution of the banking sector to domestic GDP is, therefore, often misleading.

The authors have endeavoured to explain the concept of FISIM and have discussed the meaningfulness of estimates of FISIM under the current methodology. The paper also examined the implications of any variations to FISIM estimates (using ESA 2010 and new data sources) for both Irish GDP and the allocation of output across sectors of the economy. A number of alternative methodological approaches to eliminate term premia in the interest margin are also considered, while the implications of the treatment of Central Bank output in the context of the funding of the Irish banking system during the Financial Crisis is also addressed.

The research undertaken in this paper is by no means exhaustive, with a wealth of conceptual issues yet to be addressed in future research on this topic. These include attempting to eliminate credit default risk as well as term premia for the risk-free rate. Furthermore, the potential inclusion of securities in the measurement of FISIM will be explored in future work, as will the inclusion of other entities such as treasury companies. However, from the results presented here it is evident that each of the different scenarios result in a positive impact on GDP, to varying degrees, which is somewhat counter-intuitive, particularly during crisis periods.

[26] Currently, the view is that there are no intermediation services for debt securities, to the extent that a bank was involved in issuing or placing these securities, they will have received an upfront fee and to the extent that they bought these on the secondary market, they have not provided services. (Colangelo and Inklaar 2010).

There are a number of reasons that might explain this. Firstly, estimates of bank output do not necessarily use a plausible market base for determining the banking system's cost of funds as during crisis periods, markets may be dysfunctional. Secondly, it is important to understand that only the final demand component of FISIM effects GDP, and under various approaches, there are a number of cases whereby FISIM output has fallen, but intermediate consumption has fallen by a greater extent, leaving increased final demand, resulting in a greater impact on GDP. The basis for allocating FISIM between final demand and intermediate consumption is, therefore, crucial for determining the impact of alternative methodologies on GDP. Furthermore, it is important to bear in mind that even if bank output has been overstated it is unlikely that any overstatement will have a significant impact on the estimated growth of GDP. As highlighted by Oulton (2013), 'if banking output is overstated then the output of some other industry or industries must have been understated, leaving GDP relatively unaffected'.

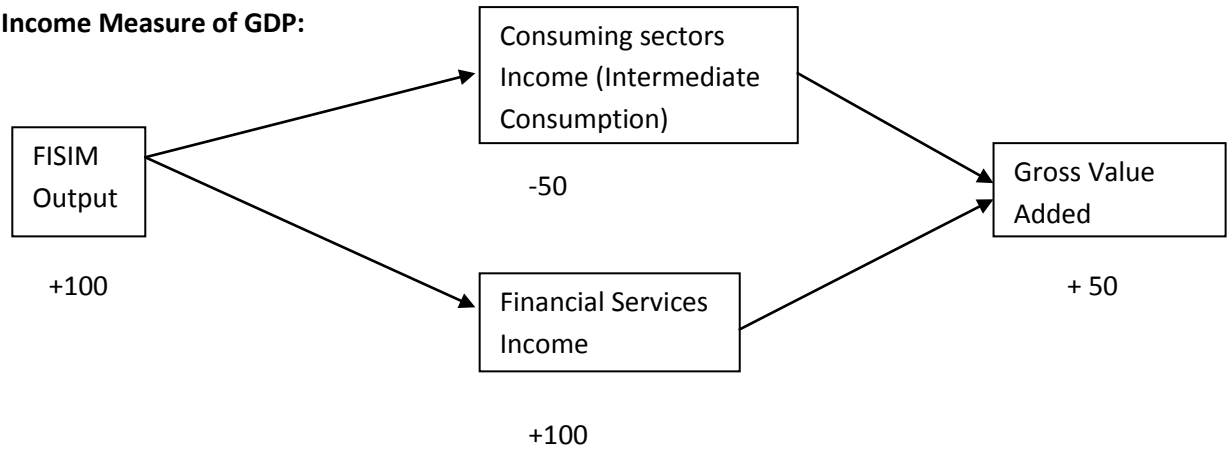
Overall, one should not look at the value added of the banking sector in isolation, as there are likely to be redistribution effects on other sectors. Furthermore, looking purely at the gross value added figure may be misleading, as it is only the Final Demand of FISIM component that affects GDP.

Annex 1: Example of Redistribution Effect

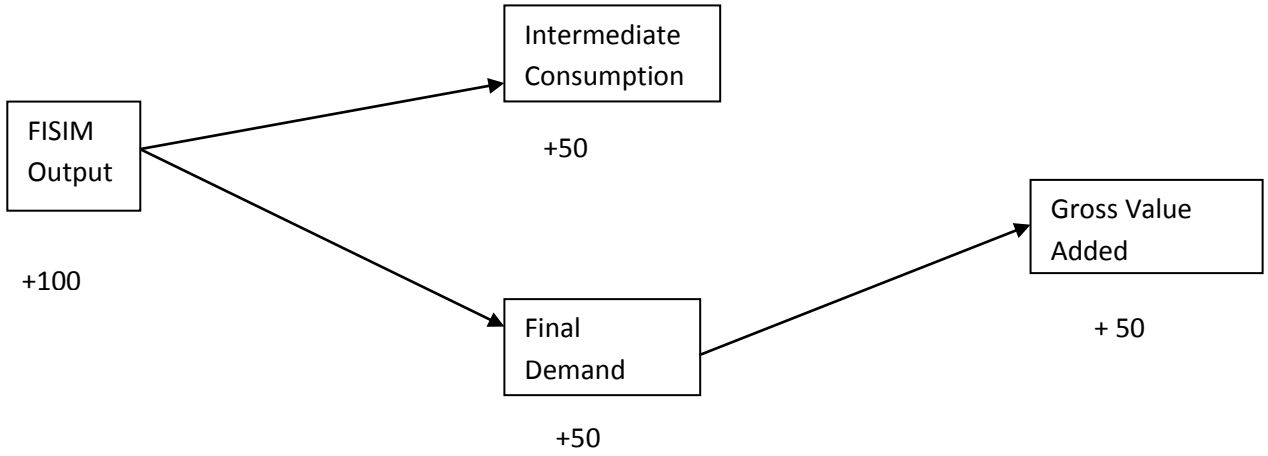
Scenario – Total FISIM Output increases by 100

50 of which is attributable to Intermediate Consumption and 50 is attributable to Final Demand.

Income Measure of GDP:



Expenditure Measure of GDP:

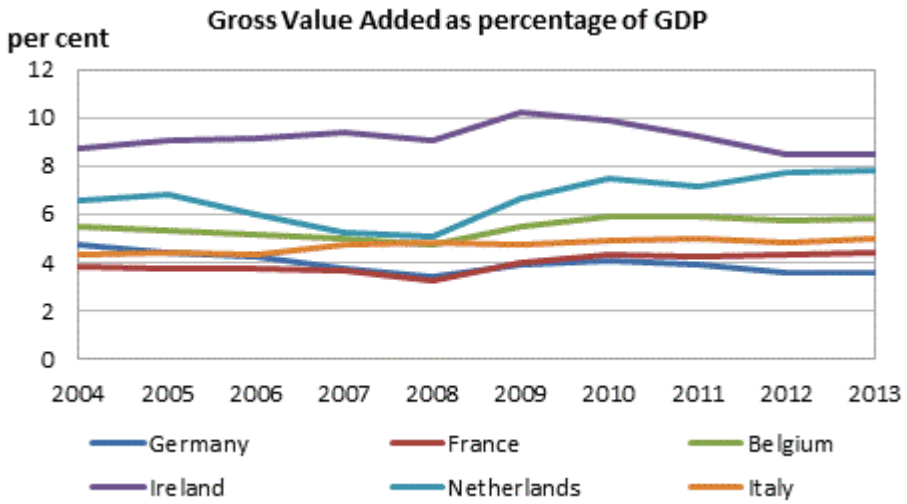


Notes:

1. Household expenditure increases by 50 thereby reducing household income by an equivalent amount.
2. Financial sector output is increased by output of FISIM. Output of other sectors is reduced by intermediate consumption of FISIM.

Annex 2:

Chart 1: Comparative GVA of the financial sector across the euro area



Source: Eurostat and IMF statistics

Chart 2: Comparative Risk-free Reference Rates under various methodologies, 2011-2013

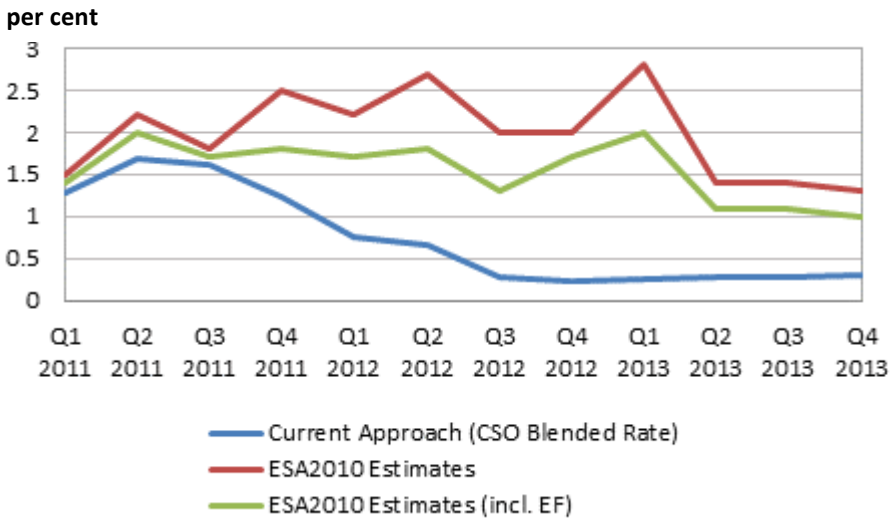
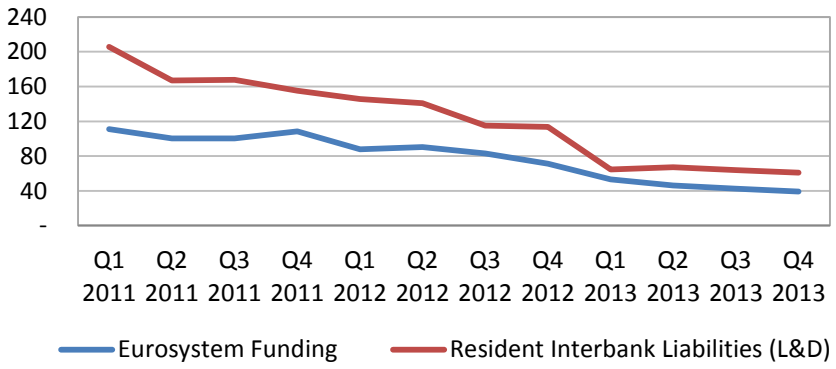
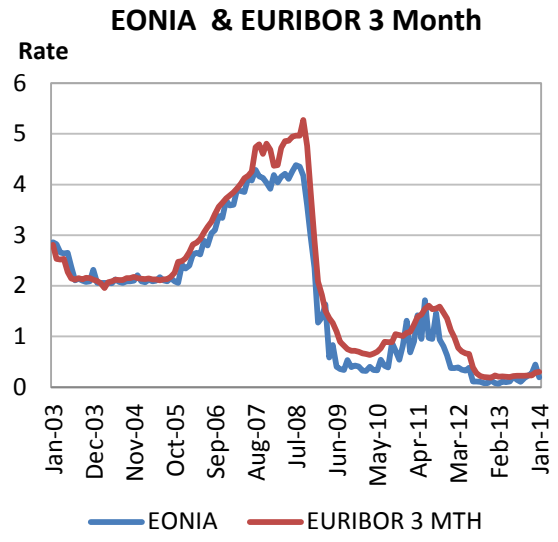
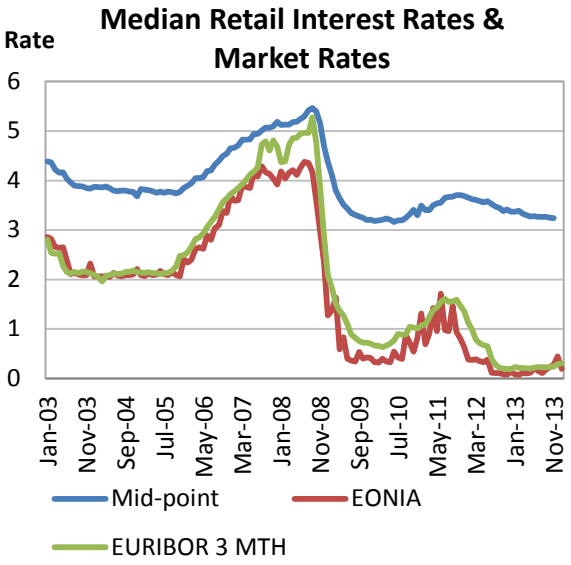


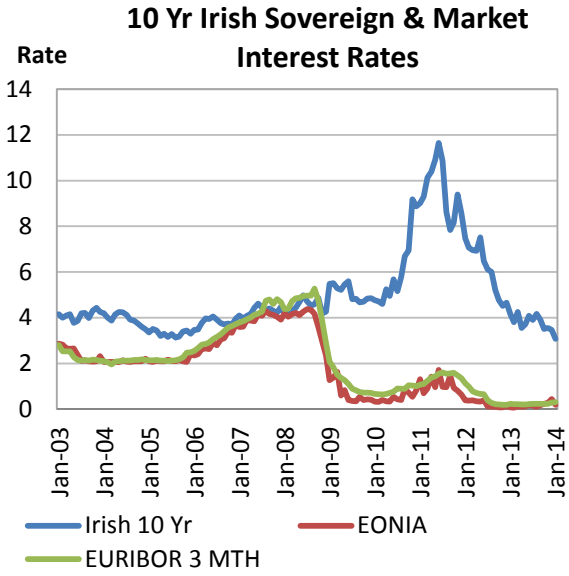
Chart 3: Eurosystem Funding and Resident Interbank Liabilities

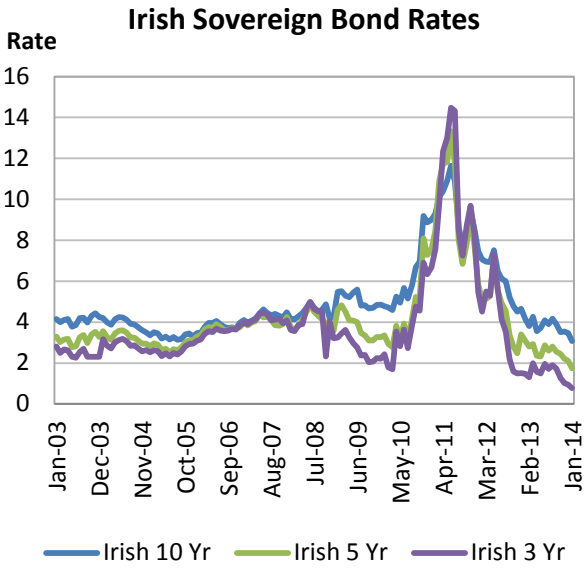


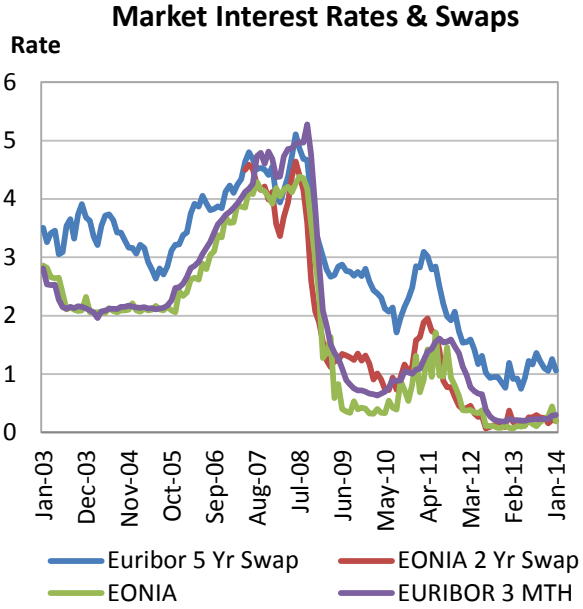
Market Rates











Annex 3:

Box 2: Options for the calculation of internal Risk-free Reference Rates under the ESA 95 Framework

Risk-free Reference Rate:

Under Council Regulation 448/98, it was decided to calculate and allocate FISIM on loans and deposits granted by financial intermediaries. The calculation of FISIM was to be made on the basis of actual interest rates payable and receivable where these rates could be calculated using the average stock of loans and deposits.

The ESA 95 framework stipulated that the internal reference rate (or risk-free rate) for use in the estimation of FISIM was to be calculated from the prevailing interbank interest rate on loans and deposits. This framework did, however, also provide FISIM compilers with a choice of six alternative compilation methodologies.

Method 1:

$$\frac{(interest\ receivable\ on\ loans\ between\ S.122\ and\ S.123)}{stock\ of\ loans\ between\ S.122\ and\ S.123}$$

Method 2:

$$\frac{\left(\begin{array}{c}interest\ receivable\ on\ loans\ between\ S.122\ and\ S.123\ plus\ interest\ on\\ securities\ other\ than\ shares\end{array}\right)}{\begin{array}{c}stock\ of\ loans\ between\ S.122\ and\ S.123\ plus\ securities\ other\ than\\ shares\ issued\ by\ S.122\ and\ S.123\end{array}}$$

Method 3:

To obtain the FISIM output of resident financial intermediaries (FIs) by institutional sector, two reference rates can be applied, one for short-term transactions (as per Method 1) and one for long-term transactions (using published rates for securities other than shares whose maturity reproduces that of the liabilities in the Balance Sheet with a long maturity.

Method 4a:

To obtain the FISIM output of resident FIs by institutional sector, the internal reference rate is calculated, as an average of lending and deposit rates which are undertaken with all resident user institutional sectors (except the central bank).

Method 4b:

To obtain the FISIM output of resident FIs by institutional sector, the internal reference rate is calculated, as an average of lending and deposit rates which are undertaken with all resident user institutional sectors (except the central bank), and the implicit interest rate calculated as in Method 1.

Method 4c:

To obtain the FISIM output of resident FIs by institutional sector, the internal reference rate is calculated, as an average of lending and deposit rates which are undertaken with all resident user institutional sectors (except the central bank), and the implicit interest rate calculated as in Method 2.

Box 3: Options for the calculation of internal Risk-free Reference Rates and Retail rates under the ESA 2010 Framework

Risk-free Reference Rate:

ESA 2010 recommends that this rate then be calculated as the ratio of interest receivable on loans between these financial intermediaries to the relevant stock of loans, as follows:

$$\frac{(interest\ receivable\ on\ loans\ within\ and\ between\ subsectors\ S.122\ and\ S.125)}{stock\ of\ loans\ within\ and\ between\ subsectors\ S.122\ and\ S.125}$$

Alternatively, this rate can be calculated on the ratio of interest payable on deposits between these financial intermediaries to the relevant stock of deposits where data on deposits is considered to be more reliable, as follows:

$$\frac{(interest\ payable\ on\ deposits\ within\ and\ between\ subsectors\ S.122\ and\ S.125)}{stock\ of\ deposits\ within\ and\ between\ subsectors\ S.122\ and\ S.125}$$

ESA 2010 stipulates that if the loans and deposits data are equally reliable then the internal reference rate should be calculated on interbank loans and deposits.

Retail Interest Rates:

ESA 2010 recommends that FISIM are calculated in respect of each non-bank institutional sector. For each sector, total FISIM is the sum of loans granted by, and deposits with, resident financial intermediaries. For example, the loan rate for a given sector would be as follows:

$$\frac{(interest\ payable\ (per\ sector) to\ subsectors\ S.122\ and\ S.125)}{stock\ of\ loans\ (per\ sector) from\ subsectors\ S.122\ and\ S.125}$$

For the purposes of this paper, a modified version of this approach has been implemented. A separate rate is calculated for NFCs and HHs and the average rate is used as the loan rate, as follows:

NFC Loan Interest Rate:

$$\frac{(interest\ receivable\ on\ loans\ \ between\ S.122\ and\ S.11)}{(stock\ of\ loans\ between\ S.122\ and\ S.11)} \times \quad Maturity\ Weighting$$

HH Loan Interest Rate:

$$\frac{(interest\ receivable\ on\ loans\ \ between\ S.122\ and\ S.14)}{(stock\ of\ loans\ between\ S.122\ and\ S.14)} \times \quad Maturity\ Weighting$$

Interest Rate on Loans:

$$\frac{(NFC\ Loan\ Interest\ Rate + HH\ Loan\ Interst\ Rate)}{(2)}$$

Annual effect on GDP (2008-2013), € millons

Income: Gross Operating Surplus; Expenditure: Final Demand

	Current	ESA 2010	ESA 2010 (incld EF)	Calculated Retail Rates and stocks	Calculated Retail Rates and stocks (incl EF)	Term Premia (1)	Term Premia (2)	Midpoint
2008	2,255	2,255	2,255	2,255	2,255	2,274	2,236	2,305
2009	414	414	414	414	414	641	1,314	1,521
2010	481	481	481	481	481	670	1,696	1,510
2011	1,003	1,306	1,140	1,003	1,003	1,151	3,538	1,839
2012	127	1,254	884	269	250	222	1,449	1,424
2013	347	1,510	1,244	2,379	2,168	461	1,224	1,839
Difference in € millions								
2008						19	-19	50
2009						227	899	1,106
2010						189	1,215	1,029
2011		303	137			148	2,535	836
2012		1,128	757	142	123	95	1,322	1,297
2013		1,163	897	2,032	1,821	114	876	1,492
Difference as % of GDP (in value terms)								
2008						0.01	-0.01	0.03
2009						0.14	0.55	0.68
2010						0.12	0.77	0.65
2011		0.19	0.08			0.09	1.56	0.51
2012		0.69	0.46	0.09	0.08	0.06	0.81	0.79
2013		0.71	0.55	1.24	1.11	0.07	0.53	0.91

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