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# Money and Debt

Empirical Studies in Northern Europe 1840-2015

Seán Kenny

LUND STUDIES IN ECONOMIC HISTORY 77



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## Money and Debt



# Money and Debt

Empirical Studies in Northern  
Europe 1840-2015

Seán Kenny



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DOCTORAL DISSERTATION


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# Money and Debt

Empirical Studies in Northern  
Europe 1840-2015

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*“Hold to the now, the here, through which all future  
plunges to the past” (James Joyce)*



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*"Think where man's glory most begins and ends  
And say my glory was I had such friends."*

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# Introduction

## Aim and Motivation

Money and debt are never far from the centre of the economic debate. With the exception of the interwar years, this dissertation concerns itself with money and debt in Northern Europe at selected locations over the period 1840-2015. In the first place, by producing new financial data series on money which are consistent with current definitions, it opens the way to macroeconomic analysis over a longer time horizon in the context of Ireland and the United Kingdom. Secondly, it explores the evolution of public debt in Ireland 1950-2015 by constructing a consistently defined fiscal series and reviews the use of private sector debt in current financial regulation in a regional analysis (Finland, Ireland, Sweden and the UK) for the period 1986-2013.

In current times, central banks analyse the behaviour of money with the recognition that it tracks activity in the economy in times of distress and under ‘normal’ conditions (Andrews and Janssen, 2005; ECB, 2012, Hancock, 2005). For instance as monetary data is of higher frequency, it can be used to obtain information in real time about the economy, which national accounts cannot yield on a quarterly basis. Monetary aggregates will not tend to suffer from alternative methods of estimation and accounting assumptions that national accounting is subject to, particularly in a historical context. Monetary aggregates remain essential as they provide central banks with a relevant guide in accounting for variation in nominal income (Bordo and Filardo, 2007).

Prior to the financial crisis of 2008, the most recent comparable episodes in Britain occurred in 1847, 1857-8, 1866 and 1878 (Turner, 2014, pp. 72-88). Considering the information which the behavior of monetary aggregates in crises and depressions can reveal (see for instance Anderson et al, 2016; Bordo, 1985; Bordo and Filardo, 2007; ECB, 2012; Friedman and Schwartz, 1963; Jonung, 1975), it is striking that no money series which

are consistent with the Bank of England's definition exist prior to 1870 (Capie and Webber, 1985), despite the fact that the period 1844-70 witnesses the most concentrated sequence of crises in 200 years of UK economic history.

Long run macroeconomic series on the Irish economy remain comparatively scarce with some recent exceptions (Gerlach and Stuart, 2014; Grossman et al, 2014; Hickson and Turner, 2008, 2005a; O'Rourke, 1998). The effects of the Great Famine of the 1840s, mass emigration and the pronounced rise in living standards in the late nineteenth century remain largely unknown in quantitative terms. As we yet only possess national account estimates for Ireland in isolated years (Bielenberg and O'Mahony, 1998; Cullen, 1995; Geary and Stark 2015), such series are all the more valuable in shedding light on economic activity and turning points in the cycle as used by contemporaries (ECB, 2012). This concept is similar in spirit to related studies on equity prices and property transactions by Hickson and Turner (2005a) and O'Rourke and Polak (1994) respectively.

The first aim of this dissertation is to fill these gaps by constructing new series consistent in definition for narrow and broad money for the years 1844 to 1870 for the UK and for the years 1840-1921 for Ireland with an analysis of the trends and events. It also contributes an asset series for the UK 1844-1880 which can be employed as a proxy for lending (Reinhart et al, 2012; Schularick and Taylor, 2012). In doing so, it will be possible for researchers to track the development of the modern financial system in the region since the 1840s to the present.

On the other side of the banking system's balance sheet appears the assets, of which lending to the private and public sector comprises the key component. While lending to the private sector (debt) has attracted considerable attention amongst academics (see for example Andersson and Jonung, 2015; Reinhart and Rogoff, 2009, pp 157-62; Schularick and Taylor, 2012) and regulators such as the Basel Committee (BCBS 2010a, 2010b) in the wake of the global financial crisis, public sector debt has similarly re-emerged at the forefront of the policy debate in the wake of the sovereign debt crisis which subsequently followed it. Both varieties of debt are explored in Northern Europe as the second objective of this dissertation.

The historically high levels of public debt in the post crisis environment have led to a number of studies on the mechanisms of historical debt reduction. While Abbas et al (2014a, 2014b, 2011) and Crafts (2016) show that higher debt reductions in the post war environment have been achieved

through economic growth and low real interest rates across a broad range of countries, Eichengreen and Panizza (2014) identify exceptional episodes of debt reductions through budget surpluses as unique cases peculiar to small open economies which invites further research on Ireland and Sweden. Despite the historically high level of sovereign debt currently prevailing in Ireland, comparative analysis is generally lacking on historical debt with some exceptions (Bergin et al, 2011; ESRI, 1998; McCarthy, 2009). This dissertation contributes to the fiscal policy debate through constructing a consistent sovereign debt/deficit series from 1950 which is in turn employed to compare public debt dynamics and fiscal stance during three crisis episodes (1950-2015) in a similar vein to Crafts (2016) who analysed debt reduction over a 200 year period for Britain. In particular it contributes to the debate on how debt reduction was achieved from similar levels in economic history.

Finally, private sector debt is analysed in the context of four northern European countries (Finland, Ireland, Sweden and the UK). The dissertation finishes with a critical analysis of the macro prudential instrument of Basel III (the Countercyclical Capital Buffer), which takes the deviance of private sector debt from its long term trend as the trigger variable of the buffer. The study contributes to the debate with a regional perspective on the question of the counter cyclicity of the buffer and its counterfactual performance during both normal periods and distress periods (Drehman and Tsatsaronis, 2014; Edge and Meizenzahl, 2011; Orphanides and Van Norden, 2002; Repullo and Saurina, 2011 ).

## Previous Research and Context

### **A Selection of Perspectives on Money in Macroeconomic History**

The analytical power of money as a macroeconomic variable is not new to contemporary central banks and academics. The recognition of money as a measure of economic activity was recognised even before the great debates between the banking, free banking and currency schools that took place in the nineteenth century internationally and within the UK. Confusion often arises from the fact that the former is both the unit of account in which the latter is expressed and itself represents a debt or liability of the relevant



issuing bank. In current times money is typically the liability of the national central bank, whereas historically commercial banks issued bank note money as a liability through which they funded assets or lending.

The Bank Charter Act of 1844 was a watershed in the banking history of the United Kingdom, which effectively began the procedure of controlling bank note issuance, placing the Bank of England at the centre of the process. The Bank's note issuance was limited to the value of bullion it held and government securities (which could not exceed £14 million). The joint stock and private banks which had been issuing prior to the act were limited to a ceiling of average circulation over the twelve weeks prior to the 6<sup>th</sup> of May in England and Wales. The Bank Acts (1845) which applied to Ireland and Scotland not only calculated their certified calculation over twelve months, but allowed issuance above the certified issue backed with bullion. No new banks were allowed to issue and the principles behind the Acts were to keep circulation roughly unchanged (Barrow, 1975, p. 175). Therefore, the Bank Acts of 1844 and 1845 concerned themselves with controlling banking sector debt/liabilities or bank "money." A similar approach was adopted by Sweden throughout much of the nineteenth century, where notes became the focus of criticism and regulatory attention until the Riksbank was granted a legal monopoly of issuance from 1903, though private bank notes had been phased out since 1897 (see Ögren, 2006; Jonung, 2000).

Thomas Tooke (1844, p. 124, p.70) writing at the time of the Act asserted that the "amount of the circulating medium" is the consequence of prices and output and that "the quantity, therefore, is an effect, and not a cause of demand." A number of bankers who were his contemporaries interviewed on the Banking Committees tended to have similar views. In 1841, a Director of the Bank of Ireland attributed the fluctuations in the quantity of money to the balance of payments through seasonality of exports and imports (P.P. 1841, pp. 231-2). Answering questions on the dramatic fall of the circulation in Ireland in 1848, a Director of the Provincial Bank of Ireland (P.P. 1848, pp. 45-6) stated that because of the devastating failure of the potato crop "that which produced circulation before had disappeared." These statisticians and practitioners held the view that the quantity of money was a direct response to underlying economic activity. The currency school by contrast, insisted that unregulated money played a causal (and distortionary) role regarding the trade cycle and prices, encouraging further speculation and one of their foremost defenders Samuel Jones Loyd, recommended that "paper currency should be made to conform

to what a metallic currency would be, and especially that it should be kept at all times the same amount” (PP, 1840, p. 211). The Banking Act of 1844 was passed in this spirit. While it is clear that opposing viewpoints existed even within the same schools of thought among contemporaries (see White, 1990, c. 4), all agreed on the central importance of money to the economic cycle.

The MacMillan Report of 1931 coincided with a renewal of interest in money as a central theme in macroeconomics. It stressed the “utmost importance” of “exact quantitative knowledge concerning the chief elements of the monetary and financial system” and regretted that “the statistical coverage of financial assets and liabilities had not received the same attention” as national output calculations (Capie and Webber, 1985, p.7). In the same period, economists revisited the money debates of the nineteenth century with the improved statistics of contemporary times and wrote voluminous texts on the behaviour of money, its functions and its ideal forms (Fisher, 1918; Hayek, 1932; Keynes, 1930; Mises, 1934). Despite the variety of opinions expressed, the key function of money as a *medium of exchange* in economic transactions is common to all bodies of work with some differences in the ranking of the function’s importance. For instance, though Mises (1934, p. 42) emphasised the primary “function of money is to facilitate the business of the market by acting as a common medium of exchange,” Keynes (1930, p. 3) stated that if a convenient medium of exchange is “all” that money represents, then “we have scarcely emerged from the stage of barter.” Though each volume offered varied definitions, descriptions and histories of money, it was apparent to contemporaries that the nature of money had changed in the era of globalisation and economic development that occurred at the end of the nineteenth century.

## **Money, Finance and Growth**

In terms of economic and financial development, the traditional debate on the causality between finance and growth typically employs monetary aggregates and bank assets in analysis. In a variety of contexts, financial development has been shown empirically to play a significant role in economic development. King and Levine (1993) and Levine (1997) studied the effects of various financial indicators on real per capita GDP growth, real per capita capital stock growth, investment to GDP and productivity growth and found statistically significant results in every instance. Ögren

(2009) confirmed that indicators of financial development, such as broad money growth and total bank assets, Granger-caused GDP growth in Sweden. Rousseau and Sylla (2001) employed broad money over output as a measure of financial sophistication to show (among other tests) that finance played a leading role in economic growth across seventeen countries in the period 1850-1997. In a historical context, Hansson and Jonung (1997) found that the “role of the financial system in promoting growth was significant during the early stages of economic development” in Sweden prior to World War II.

Similarly over shorter time horizons, money is significant in economic growth. For instance without taking its effects into consideration, monetary stimulus is employed by central banks in an attempt to ultimately raise inflation which would ideally encourage investment and consumption. Indeed, money growth is an indicator of overall inflation (Andersson, 2011). In this respect, the post crisis reaction of many of the major central banks is therefore an effort to create conditions conducive to increases in GDP via investment and consumption. In the pre-crisis era, increases in money in the financial sector explained approximately one third of equity price increases and one fifth of the increase in UK GDP for the period 2004-2007, (McLeay and Thomas, 2016).

## **Monetarism**

Beginning in the 1960s, the monetarist approach placed money at the centre of the international debate which had the Quantity Theory of Money, earlier formalised in the equation of exchange by Irving Fisher (1918, p.26), as the choice method of calculating nominal expenditures (GDP). The total money supply (M) multiplied by the velocity of circulation (V) equals the number of goods and services sold (Q) by their average price (P). The latter term below represents nominal GDP (spending).

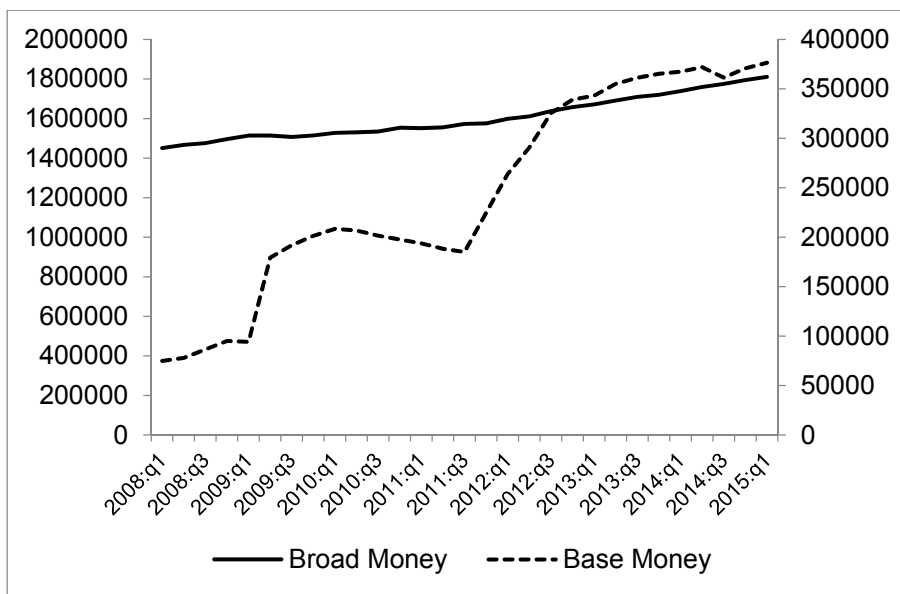
$$M.V. = P.Q.$$

Cagan (1965, p 5) found that from 1875 until the 1960s, there had generally been a one for one correspondence between monetary and business cycles in the United States. Monetarism produced a new wave of interest in money as a macroeconomic variable in the context of stagflation which emerged during the 1970s and prevailed until the early 1980s. The attention that money received in policy and academic circles led to the publication of a number of long run monetary aggregate series for a variety of countries

including the United Kingdom (Capie and Webber, 1985), the US (Friedman and Schwartz, 1963) and Sweden (Jonung, 1975). According to the monetarists, central banks should concern themselves with targeting money growth equivalent to the increase in real output growth. Monetary policy was only capable of controlling “nominal quantities” such as money (i.e. central bank liabilities) and could “not use its control over nominal quantities to peg a real quantity” such as real national income (Friedman, 2006, p. 105).

Recent research has blamed the monetarist framework prominent in the 1980s for overlooking the Optimal Currency Area Theory with reference to the design of the Euro. Monetarists did not view the sacrifice of national monetary policies as a “loss” as they had only produced “macroeconomic instability in a large number of EU countries” (de Grauwe, 2013a, 2013b). As a result, the ECB concerned itself with price stability, avoided “fine tuning” and “financial stability was disregarded” as a mandate (de Grauwe, 2013a).

The monetarist approach eventually declined in importance because among other things, velocity was generally problematic due to the fact that monetarists viewed it as typically stable or “conforming to the cycle” (Friedman, 2006, p. 206). However velocity is subject to psychological forces during depressions and is also notably affected by risk premia, financial innovation and major banking regulations (Anderson et al, 2016). Additionally, central banks are not as capable of controlling velocity during depression periods through base money injections as the relationship between the base and broad money tends to alter considerably as exhibited in the case of the UK by Figure 1. To illustrate, between January 2008 and March 2015 the monetary base in the UK increased by 402% in comparison to broad money which grew by only 24% over the same period (Hills et al, 2015).



**Figure 1: Broad Money and the Monetary Base in the UK (2008:Q1- 2015:Q1)**

Source: Hills et al. (2015). Notes: Quarterly Data. Millions of Pounds £. Broad Money (LHS), Base Money (RHS).

In addition to questions surrounding velocity, Bordo and Filardo (2007) point out that money temporarily assumed a more diminutive role as a natural by-product of the low and stable inflation that was achieved since the 1980s.

Despite the academic decline of monetarism, the modern central banking and academic communities continue to accept the explanatory potential of money as an indicator of economic activity. In contemporary as well as historical times, money is likely to “contain corroborative information about the *current* level of nominal spending in the economy” (McLeay et al, 2014). For instance, the main component of the monetary base, the public’s holding of currency (*PC*), largely reflects consumption as notes and coin bear no interest to the holder with the implication that they are typically held for transaction purposes (Andrews and Janssen ,2005; Hancock, 2005). Central banks also continue to analyse relationships between alternative monetary aggregates to study depression dynamics (ECB, 2012; McLeay and Thomas, 2016) in a similar vein to the approach used by Friedman and Schwartz (1963). In summary, central banks analyse

money to assess the underlying state of the economy (Smaghi and Gros, 2000, p 160). Given the current macroeconomic context, it is not surprising that attention to monetary aggregates amongst central banks has returned given that they are useful measures of the policy stance especially under various episodes characterised by deep deflation and situations in which the policy rate is near the lower bound (Bordo and Filardo, 2007).

More recently, divisia money has gained prominence among central banks as an indicator for analytical purposes. It is regularly published for both the U.S. and the U.K. by the Centre of Financial Stability (and the Federal Reserve Bank of St. Louis) and the Bank of England for both countries respectively. The essence of divisia money is that it weighs the components of money according to their usefulness for transaction purposes and the indicator might be expected to have “stronger short term links to aggregate spending” (Hancock, 2005). Though the methodologies vary across region, the underlying assumption is that the differences in interest earned on the components of broad money are due to differences in their usefulness for money’s purpose as a medium of exchange, or usefulness for transaction purposes (Hancock, 2005). Recent work has begun the process of formalising and publishing this indicator for the Eurozone (Darvas, 2014).

These new indexes have been developed with the objective of achieving a more representative measure of spending with the recognition that “the continued development of the financial sector has meant that the nature of money and its determination has changed over time as has its relationship with monetary and financial policy” (Thomas, 2014).

## Money and Credit Creation

### **From the Nineteenth Century to the Post War Era**

As previously discussed, on the opposite side of the banking system’s balance sheet to *money* lie the assets (*lending/credit*). Credit is extended by banks to both the public and private sector. In Northern Europe, many of the first modern day central banks were established as the first government chartered institutions. The Bank of England was created to raise funds for

the government in 1694 (Grossman, 2010, p. 42), or with the express intention of lending to the public sector.

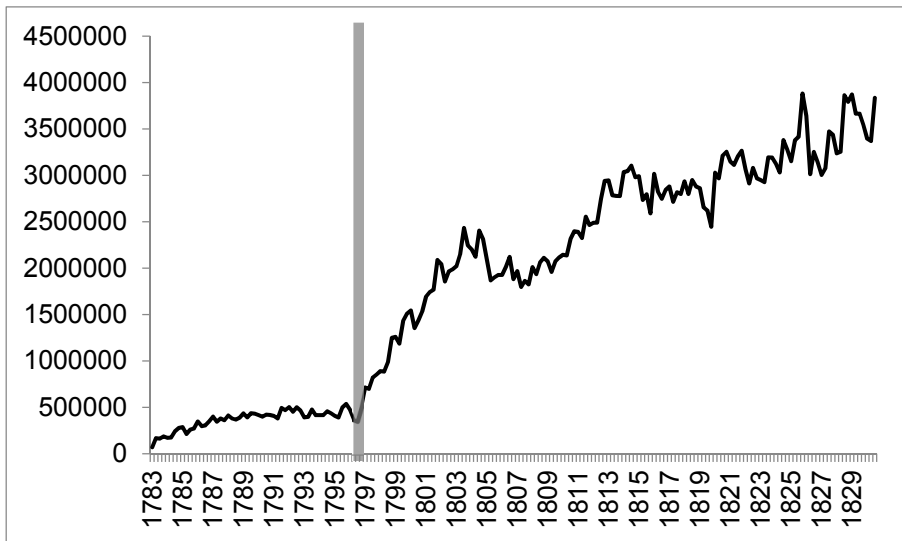
The Bank of Ireland which was modelled upon it was established in 1783 as a “national bank” with the intention that “Irish trade and commerce should be allowed to develop freely” (Hall, 1949, pp. 30-2). The oldest bank to become a modern day central bank was the Swedish Riksbank established in 1668 which was owned by the Parliament to “preserve the convertibility of its deposits, later its notes, into specie” following the bankruptcy of its predecessor Stockholm Banco (Edvinsson et al, 2014, pp. 299-302; Fregert and Jonung, 1996). Finland and Norway established government banks in 1811 and 1816 respectively (Grossman, 2010, p. 42).

Writing during the suspension of gold payments which occurred during the Napoleonic threat, Henry Thornton (1802, p. 176) wrote that “if a less stock of gold will, through the aid of paper, equally well perform the work of a larger stock, it may be fairly said that the use of paper furnishes even *additional* stock to the country” (*italics added*). In “An Enquiry” (1802) he had identified the link between paper money and credit expansion. Grossman (2010, p. 5) develops the point to state that without reserves, notes actively *created* credit. Schularick and Taylor (2012) point to the fact that “our ancestors lived in an Age of Money, where credit was closely tied to money and formal analysis could use the latter as a proxy for the former.”

To illustrate with an extreme example from the same period, in Ireland paper money replaced gold coin on a permanent basis following the suspension of gold payments in 1797 in line with the Bank of England’s reaction to the Napoleonic threat (Hall, 1949, pp. 79-81). The Bank of Ireland began issuing new paper (Figure 2) as a reaction to the new situation where “the public required substitute ‘money.’ The result was a proliferation of suppliers of paper money” (Ó Gráda, 1994, p. 51). Similar to the Swedish experience (Fregert and Jonung, 1996), in Ireland paper money had thus emerged from a time of panic.

This translated as a lending frenzy on the corresponding asset side of banks’ balance sheets (Figure 2) as bank liabilities were no longer redeemable in gold. The Bank of Ireland had not realised, as the Riksbank in Sweden would also fail to grasp a century later when they received the monopoly of note issuance (Ögren, 2013), that private banks had been using its notes as reserves which were “as good as gold” and the increased issuance of these notes constituted a massive injection of high powered money as a base to lend from (Ó Gráda, 1994, pp. 53-4; Bodenhorn, 1992). In this “free banking” period, “banks,” which were under no reserve

obligations and were not required by law to register and were constantly blamed by contemporaries as with the private banks in England, for causing panics, inflation and failures (Ó Gráda, 1994, p. 53). Later, characteristics such as joint and several unlimited liability in both Sweden and Ireland (Hickson and Turner, 2004) and joint stock bank regulation contributed to the stability of the system in the period between 1826 and the Bank Acts (Hickson and Turner, 2005b, 2004).



**Figure 2: Bank of Ireland Notes Outstanding 1783-1830**

Notes: Old Irish Guineas reconverted to British pounds £ at 1826 rate (13:12). Line marks suspension of gold payments. Quarterly data. Source: (Hall, 1949)

As we have seen, the later Bank Acts of 1844/45 principally affected bank notes which had been used both to grow credit and as a means of payment against money physically deposited. The Act occurred in the midst of the Industrial Revolution and had the potential to act as a brake on normal lending. As Thornton (1802, p. 76) surmised: “if there may be a convenience in giving credit in the infancy of society, when the interchange of commodities is small, there may be, at least, the same convenience when goods begin to be multiplied, when wealth is more variously distributed, and society is advanced.” Writing about the Acts some decades later, Keynes (1930, pp.17-18) recognised “the limitation of the quantity of representative money as a means of ensuring the standard” as a “sound



principle.” However, he describes as a “serious confusion” the “futile attempt” in the Acts to “ignore the interrelationships of money and bank credit” which would “probably have led to an actual breakdown” if it had not been for, in his opinion, the emergence of the “sound principle” of “the efficacy of Bank rate for the management of managed money.” Keynes (1930, p. 17) claimed that this “great discovery” was “a most novel one” which had “swam into the consciousness of the best practical financiers at about the same date.”

Following the Bank Act of 1844, bank lending was increasingly channeled via deposits as an alternative (Barrow, 1975, p. 187-88; Grossman, 2010, p. 11; McLeay et al, 2014) which largely accounts for the “prodigious growth of bank money which characterised British monetary developments for the next seventy years” (Keynes, 1930, p.17). Three reasons were provided by a Director of the Bank of Ireland as to why the Irish note issue did not exceed the limit in Ireland up until 1875: 1) the extensive issue and “enormous circulation” of cheques, 2) deposit banking absorbed notes as “no man would keep a note in his pocket if he could get interest for it” and 3) extensive branching divided or even decreased circulation (P.P, 1875, pp. 159-160).

Keynes (1930, p. 24) classified bank deposits according to their origins. He identified those deposits “against value received in the shape of cash.” He then described deposits “against promises...in favour of a borrower” in which the bank can “create a claim against itself.” In summary, a bank can increase its lending (assets) by creating deposits or receiving them (liabilities). Deposits served as a convenient substitute liability item which avoided regulation until much later, with similar trends observed in Scandinavia (Ögren, 2006). These Northern European trends occurred despite the fact that as a form of money, deposits were recognised as equivalent to bank notes in economic terms by economists with viewpoints as diverse as Fisher (1918, pp. 38-40), Keynes (1930, pp. 23-26) and Mises (1934, p. 66). Smith (1936, p. 189) makes a case (by quoting Courcelle-Seneuil in the French banking debate) that deposits were a riskier form of money as loss incurred on them would be concentrated on individual families and companies, whereas losses incurred by holding notes would be distributed among a larger amount of people. Ögren (2006) showed that during the economic crisis of 1877-79 which occurred in Sweden, the run which affected the largest bank, *Stockholm Enskildas Bank*, was concentrated upon deposits and notes remained largely unaffected.

## **The Weakening Link between Money and Credit 1945-**

“Today, we live in a different world, an Age of Credit, where financial innovation and regulatory ease broke that link, setting in motion an unprecedented expansion of the role of credit in the macroeconomy.” Here, Schularick and Taylor (2012) observe that over the longer term the strength of the link between the volume of money in the economy and total lending began to weaken. In addition, other considerations emerged such as measurement problems associated with official monetary aggregates that did not include the deposit liabilities of insurance and investment companies which became more problematic in the post war era due to the growth of such institutions (Rousseau and Sylla, 2001). Minsky (1986, p. 236) had noted that “bankers respond to optimistic views about the viability of debt structures by financing positions with an increase in their own liabilities-money.” As we have seen, since 1844 banks increasingly issued “money” via deposits instead of notes to fund their lending and the majority of modern day bank deposits comprise loans or “fountain pen money” (McLeay et al, 2014).

However, this implies that the inclusion of customer deposits (“against value received”) in the broad money aggregate has blurred the stronger link with lending deposits (“against promises”) which money traditionally held. Indeed, the idea that customer deposits comprise “available funds” from which to lend is no longer a relevant one as “when households choose to save more money in bank accounts, those deposits come simply at the expense of deposits that would have otherwise gone to companies in payment for goods and services” (McLeay et al, 2014).

However, even if one is to ignore these issues within the umbrella of total deposits, Schularick and Taylor (2012) find strong growth of credit relative to broad money in the second half of the twentieth century. McLeay and Thomas (2016) show that especially from the 1990s, the link between the expansion of broad money and credit which was generally stable in flow terms until the 1980s, did not hold for “the long expansion” in the UK during the period 1992-2007. Credit grew faster than money (deposit liabilities) which opened a “funding gap” that was filled by the use of wholesale funding markets (McLeay and Thomas, 2016) and increases in non-core liabilities (Shin, 2010).

# Money and Credit- A Long Run Perspective

## Monetary Data Series

The changing nature of money and credit invites the production of new data series that span longer time frames. These provide a means of testing the relationship in a variety of ways. Indeed, proponents and critics of theories which have not yet emerged on the nature of money can return to such series in the future to explore longer term developments in the behavior of this macroeconomic aggregate.

A number of long run money series have been produced in recent years in the context of Northern Europe. In Sweden, the monetary data of Jonung (1975) and Ögren (2003) has been incorporated into the Riksbank's volume of 'Historical Monetary Statistics of Sweden' (eds. Edvinsson et al, 2014). Within the collection, Edvinsson and Ögren contribute a new money supply series for the period 1620-2012. The wider project compiles data spanning the period 1277 to the present. Exchange rates, prices, house prices, stock returns and the balance sheets of the Riksbank are a sample of some the long run series included in the project.

In the United Kingdom, the work on monetary series of Capie and Webber spanning 1870-1982 (1985) has been incorporated with updates into the Bank of England's project "Three Centuries of Macroeconomic Data" by Hills et al (2015). This initiative, as its name suggests, combines a wide range of data pertaining to the real economy. In addition to new monetary and financial series, the combined established data will form the basis for Dimsdale et al (forthcoming). "*UK Macroeconomic and Financial Cycles 1700-2014: Data, Analysis, Synthesis*." Until the present, no monetary series which are consistent with the Bank of England's definitions of the monetary base (M0) and broad money (M3) exist from the Bank Act until 1870, decades which experienced three (of the last four) significant financial crises to affect Britain until 2008 (see Turner, 2014, c. 4, though all are referred to as "minor" events, p. 66).

Though at the Central bank of Ireland no such umbrella project presently exists, internal research by Gerlach and Stuart (2014) produced consistent monetary series, interest rate series, a consumer price index and nominal and real GDP indexes for the period 1933-2012. Using some of that data (among other series), Gerlach et al (2015) confirmed that a Phillips Curve relationship did exist in Ireland over the period 1926-2012.

It is surprising then that apart from O'Rourke's (1998) series of deposits and notes, no monetary aggregates which are consistent with official definitions exist for Ireland for the pre independence period. Such a monetary series could reveal a great deal on economic activity in the pre independence Irish economy considering the absence of national accounts. Looking at Ireland specifically, Ó Gráda (1994, p. 178) recognised banknote circulation as a "good barometer of the level of economic activity" and Cullen (1972, p 137) considered bank deposits to serve as "a sensitive barometer of agricultural incomes." While these observations are not unreasonable, without observing the components of the base and broad money or their behavior together, the dynamics of economic activity and cycles are difficult to interpret. Furthermore, without higher frequency data, seasonal behaviour is impossible to observe. This dissertation fills the gap by producing a monthly monetary base and an annual broad money series for Ireland for the period 1840-1921.

## **Credit Series**

The majority of the increase in debt which occurred in Ireland and the UK prior to the financial crisis of 2008 was held by the private sector (Whelan, 2014; Turner 2014 pp. 93-101) as had been the case with the Nordic episodes 1991-1993 (Jonung et al, 2009, pp.34-5) with both events occurring following a sustained period of low real interest rates and asset price bubbles.

Attention to private sector credit has therefore been reinvigorated by both academics and central banks. The publication in 2009 of 'This Time is Different' (Reinhart and Rogoff) coincided with the immediate aftermath of the financial crisis of 2008 and the database which it drew from (encompassing 800 years) was published online. In the *American Economic Review*, Reinhart and Rogoff (2011a) constructed a database of 70 countries encompassing domestic and external debt of the private and public sectors and address long run debt cycles and crises over the past two centuries revealing a direct effect of banking crises increasing the likelihood of public debt crises. Schularick and Taylor (2012) combined data on money and credit from 14 countries over the years 1870-2008 and found that credit growth is a powerful indicator of financial crises. Rey (2013, 2014) has studied the concept of a "global credit cycle" which is theoretically driven by the monetary policies of "centre" countries. Relevant to the Northern European region, Andersson and Jonung (2015) find that Ireland and

Sweden's credit cycles are the most strongly correlated with the international credit cycle in a sample of 20 advanced economies after the deregulation of the financial sector in both countries. They also conduct a long run review of the Swedish private sector credit cycle from 1963. Ahnland (2015) has constructed a private debt series for Sweden for the period 1900-2013 and found that there is a significant relationship between the buildup of private debt and the outbreak of financial crises within two years.

Mason and Jayadev (2014) have reviewed household debt in the US for the period 1929-2011 and using "Fisher Dynamics" normally associated with public debt, they show that inflation, interest rates and growth explained a large fraction of the changes in household debt. Jordà et al (2015) assembled credit data on 17 countries (with the earliest from 1870) and found that loose monetary conditions led to property bubbles which heightened financial crisis risk, the tendency become more prominent in the post war era.

In Ireland, as a result of the crisis of 2008 and its association with high levels of private sector credit, the Credit Reporting Act was passed in 2013, which allowed the Central Bank of Ireland to develop the Central Credit Register (CCR). "The development of the CCR is an important financial sector reform contributing to financial stability and consumer protection, which will have implications for lenders and borrowers" (Central Bank of Ireland, 2016). With this renewed interest in mind, Kenny et al (forthcoming) have constructed a series of Irish private sector credit for the period 1879-2015. Nonetheless, investments which form a component of credit have received attention by academics over the longer term. Research by Hickson and Turner (2005a, 2008) and Grossman et al (2014) has resulted in a monthly stock market index from Ireland spanning the period 1825-1930. Lyons (2015) has produced a house price index for Dublin for the period 1900-2015.

For the UK, Hills et al (2015) have constructed a credit aggregate series which employs bank assets as a proxy (Sheppard, 1971) spanning the period 1880-2014. As already mentioned, the period with the highest concentration of crises prior to 2008 is the 40 year period preceding 1880. This dissertation fills that gap by producing a consistent bank asset series similar to Sheppard's (1971) which links assets in the economy from the Bank Act of 1844 with the existing series which begin at 1880. Longer run studies such as Turner (2014) on British Banking stability have drawn heavily upon stock market volatility as a means of measuring financial instability while

simultaneously reviewing the incentive structures around monitoring risk produced by the evolving forms of corporate ownership versus prudential regulation. Campbell et al (2015) reviewed a number of variables in their study of banking instability over the long run (1830-2010) including money supply, share and house prices, interest rates and bank lending. Due to the dearth of consistently defined data prior to 1870, the study used the average deposit growth of two banks as a proxy for money supply growth for the period 1834-1869 and it used the average lending growth of the twenty largest banks for which balance sheet information was available to proxy bank lending growth for the period 1860-1881.

Campbell et al (2015) additionally find an increase in financial instability during the final quarter of the twentieth. This finding for Britain can be compared with the aforementioned studies of McLeay and Thomas (2016) who find a weakening link between money and credit during the same period, Schularick and Taylor (2012) who see this trend beginning in the post war era and Turner (2014, pp. 56-57) who shows an increase in the volatility of bank stock returns from the 1950s. Taking these overlapping findings into consideration, I now review a selection of post war trends in debt that are relevant to the region.

## Selected Trends in Northern European Debt 1946-2015

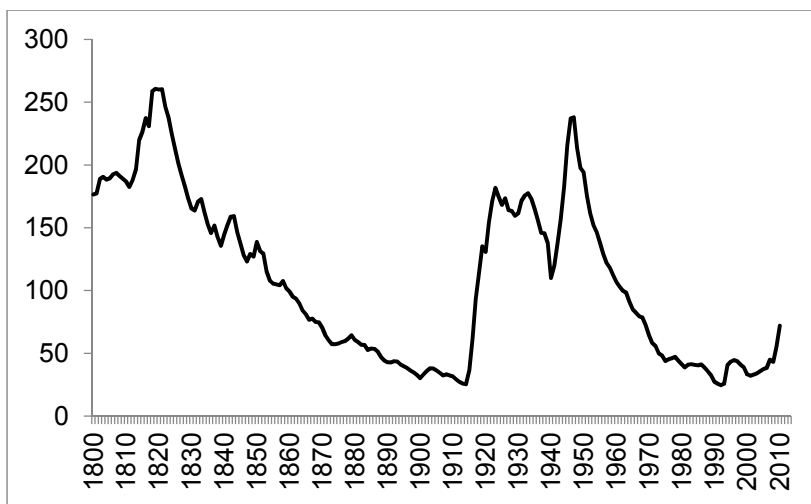
### **From Public Debt 1946-1987...**

In the aftermath of the Second World War, it was the debt of the public sector which the focus shifted towards amongst many of the world's developed countries, particularly amongst the belligerent nations. While Ireland had been active in the First World War, the Irish Free State had maintained neutrality like Sweden during the second. Largely as a consequence of the war, British public debt was comparatively enormous at almost 200% of GDP in 1950 (Crafts, 2016).

Reinhart et al (2011) describe how nominal interest rates remained very low with inflationary spurts during the Bretton Woods era of tightly controlled domestic and international capital markets. They find that real interest rates until 1970 were consistently lower than eras of free capital mobility both before and afterwards. This was the era of "financial

repression” where binding interest rate ceilings on deposits kept real ex post deposit rates even lower than the equivalent rates on government debt “inducing” domestic savers to hold government bonds (Reinhart et al, 2011). Reinhart (2012) summarizes financial repression as directed lending to government by captive domestic audiences, explicit or implicit caps on interest rates, regulation of cross border capital movements, tight connections between government and banks and is sometimes associated with higher reserve requirements usually including some form of non-marketable or other government debt.

In Britain, Turner (2014, pp. 182-186) summarized how liquidity and cash ratios were designed simply to ensure a guaranteed market for short term government debt, the high levels of which meant that both an abnormally low level of deposits were lent to borrowers, giving banks no room to shift risk which fostered stability and at the same time justified a lack of concern from the Bank of England on the prevailing persistence of low capital to deposit ratios. Reinhart et al (2011) show that the “wipeout” of high levels of public debt via financial repression-what they call the “liquidation effect”- reduced the United Kingdom’s public debt on an annual basis by 26% of total tax revenues or by 3% to 4% of GDP for the period 1945-1980. Crafts (2016) calculates for the United Kingdom that in every year for the period 1950-1970, the required primary budget balance was negative in order for debt to remain stable. He finds that of the dramatic reduction of 135 percentage points of debt to GDP achieved in the interval 1950-70, 73 percentage points of this was driven by a favourable configuration of low or negative real interest rates and positive real output growth. This shows up as the most remarkable debt reduction which occurred in Britain since the end of the Napoleonic wars (see Figure 3). However, the post-World War II debt ratio was fell from peak to trough in a 45 year interval (the bulk of which occurred in 25 years), compared with the gradual reduction over a period of 95 years following the Napoleonic conflict.



**Figure 3: UK Government Debt as a Percentage of GDP**

Source: Reinhart and Rogoff (2011a)

While the era 1950-1970 is often referred to as the “golden age” (Eichengreen, 2007; Rhode and Toniolo, 2006), Ó Gráda and O’Rourke (1993) show that Ireland’s record of economic growth remained dismal by all available national income databases over the period until 1988. The authors claim that it “failed” to reach its economic potential as Solow’s growth model suggests that countries with initially low per capita income should converge. Despite the fact that Ireland’s per capita income was 48% lower than Britain’s and 15% lower than Western Europe, it “should” have grown faster than Western Europe as a whole (Ó Gráda and O’Rourke, 1993). The fact that it did not places it as a unique outlier. Eichengreen (2007, p. 88) places Ireland, Sweden and the United Kingdom as the poorest performers in output per worker in the 1950s. He attributes the poor growth in British worker output to slow educational attainment.

However, Eichengreen has not accounted for the policy of “financial repression” in Britain which had the effect of restricting lending via “quantitative directives” to the private sector (Turner, 2014, pp. 183-184) as banks were “induced” to hold government debt. The “qualitative” directives the banks received concerned specific industries favoured by government (Turner, 2014, p.184). “Control of credit was paramount to economic planning” (Turner, 2014, p.186) which is why the nationalisation of the Bank of England took legislative precedence. Favoured government



industries received credit based upon government policy which undoubtedly deprived more productive sectors of the economy of the investment which they required. In Sweden, Jonung (2013a) observed a similar draconian and paternal approach which he calls “open mouth operations” pursued by the Riksbank during the same period. The Riksbank effectively directed and interrogated the heads of the commercial banking system regularly scrutinising their asset growth and the nature of their lending which they monitored using various government policies as their guiding principles.

### **Fiscal Developments in Ireland and the UK 1950-1987**

Eichengreen (2007, p. 88) similarly reflects upon the slow increase in both physical and human capital stocks in Ireland during the period 1950-1960. This missed economic ‘catch up’ opportunity for Ireland has been blamed on import substitution policies from the 1930s which had not worked, and poor macroeconomic management showing an undue “obsession” for the balance of trade (Ó Gráda and O’Rourke, 1993). They continue to cite the lack of attractive foreign outlets (other than the U.K.) for agricultural products which harmed exports. Ireland consoled itself with the fact that it kept pace with growth in the United Kingdom, though the latter was described as ‘the sick man of Europe.’ Thus even with newly achieved independence, Ireland’s long economic history within the United Kingdom still cast a long shadow over the Irish economy in the mid twentieth century. Crafts (2009) and Fitzgerald (2003) linked Ireland’s pre-crisis success to a loosening dependence on trade with Britain.

Nonetheless despite the pound parity maintained by Ireland, it did not import the full extent of British inflation which had generated the favourable public debt dynamics for the UK discussed by Crafts (2016). Ireland may not have benefitted in the early 1950s from this, but in the depression which occurred in the latter part of the decade, British levels of inflation may have alleviated the ‘required’ fiscal contraction or the effects thereof which was pursued by the authorities in Ireland in response to a balance of payments crisis (see Honohan and Ó Gráda, 1998). This is illustrated in Figure 4 showing the required primary budget balance in order for the public debt ratio to remain stable for the two countries. Through much of the 1950s, Ireland required surpluses to maintain stable debt ratios. In the British case in stark contrast, the government could have run primary deficits as large as 15% of GDP at one point, without changing the debt to GDP ratio.



**Figure 4: The Required Primary Budget Balance for Public Debt to Remain in a Stable State for the U.K. and Ireland 1950-60**

Notes: Calculated by  $b^* = d(i - \pi - g)$  expressed as percentage of GDP, where  $b^*$ =primary balance,  $d$  = the public debt to GDP ratio,  $i$  = the nominal rate of interest,  $\pi$  =inflation and  $g$  = real GDP growth. Sources: Crafts (2016), Finance Accounts, Central Statistics Office of Ireland. Author's Calculations.

The Central Bank of Ireland (established in 1943) was concerned solely with maintaining currency convertibility as Ireland remained linked to the British pound following independence (Honohan, 1994). As Ireland was not saddled with large wartime debt like its neighbour, it was able to take advantage of the low interest rates of the early 1950s. However, Kavanagh (2015) and Moynihan (1975) have documented the rigid adherence to convertibility adopted by the central bank through reviewing its reports and its overriding concern of increasing public debt potentially jeopardising the convertibility of the currency. The relatively unstudied balance of payments crisis of the 1950s has been reviewed by Honohan and Ó Gráda (1998) which resulted in a “fiscal crisis” (Honohan, 1994).

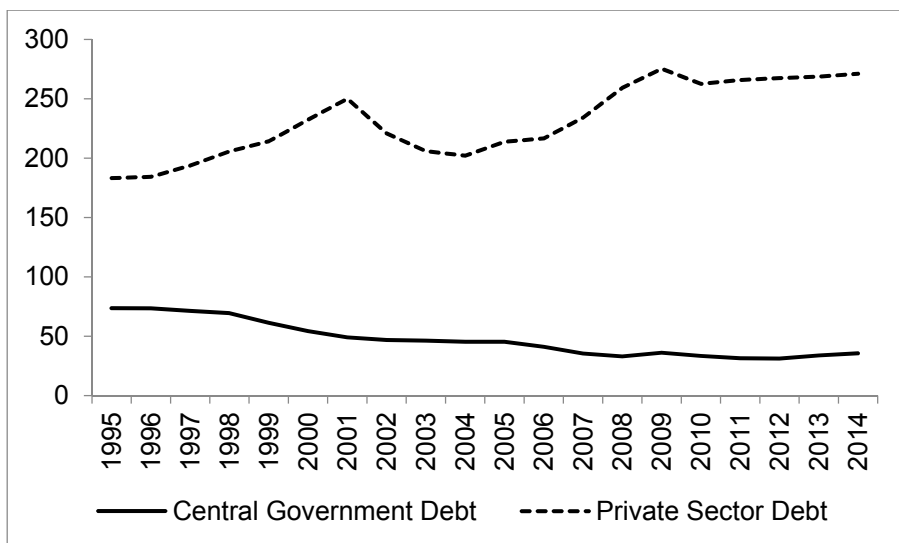
In contrast to the 1950s experience, the link with the pound meant that Ireland “wholly imported” the inflation of the United Kingdom during the 1970s (Honohan, 1994). Honohan and Walsh (2002) outlined the “ill-judged demand driven policies” in this next subsequent environment of low interest rates. The public borrowing undertaken to fund capital investment projects was vulnerable to the oil shock of 1979 and the interest rate rises of the

1980s (McCarthy 2009; Ó Gráda, 2011). In effect these misguided policies contributed to the fiscal crisis which the political parties of the 1980s consistently attempted to rectify (see Ó Gráda, 2011; Honohan and Walsh, 2002). Honohan and Conroy (1994) review the strains on the Irish pound which was tied to a weakening sterling in the Irish decision to join the EMS in 1979. This put an end to parity with the British Pound which had existed since 1826. The weakened British pound was among other things, associated with the inflation which had helped erode British government debt, which did not exceed 50% of GDP since 1973 and was to remain below it until 2009. Therefore, the rapidly growing Irish debt for the period 1977-1987 should be contrasted against the relatively low and stable British government debt for the same period.

Honohan (1987) and McCarthy (2009) reviewed the fiscal plans of the Irish government and how there was a consistent undershoot in both primary budget balances and economic growth. While no research until now has reviewed the decomposition in which the resulting debt ratios were reduced, “expansionary fiscal contraction” has been ruled out by Honohan and Walsh (2002), Barry and Devereux (1994) and Bradley and Whelan (1997) who find that international demand led an export boom. Similarly, the same “buoyant” conditions driving exports enabled Sweden as a small open economy to recover from its financial crisis 1991 (Jonung, 2009).

### **Irish Public Debt Reduction 1987-2007**

During the most intensive period of Irish public debt ratio reduction (1987-2001), Lane (1998, 1999) recommended the introduction of a rainy day fund subject to “significant penalties” for bank rescues and reorganisations as well as countercyclical fiscal policy. This is not dissimilar to current day recommendations forwarded by Andersson and Jonung (2016) in the Swedish debate. Though the two series are not directly comparable, the generally divergent trends between private and public debt in Sweden (Figure 5) exhibits some similarities to the case of pre-crisis Ireland (Figure 6), though the magnitude of the rate of change in Ireland’s case is markedly more pronounced. It is worth noting that in 2007, Ireland’s public debt approached 20% of GDP (Budgetary and Economic Statistics, Department of Finance).



**Figure 5: Swedish Private Sector Debt and Central Government Debt**

Notes: Expressed as percentage of GDP; Sources: OECD for Private Sector Debt, Swedish National Debt Office for Central Government Debt.

In the context of Ireland's open economy, Lane (2010a) highlighted the problem of the "temporary nature of the extra tax revenues that may be generated by unbalanced growth episodes in which asset prices are growing quickly and/or high-income sectors grow disproportionately quickly." As a long term structural (through the cycle) balance should be a primary objective, it is worthy to note that "the identification of the trend output path for a small and highly open economy is bound to carry a large standard error band" (Lane, 2010a), the trend being "chronically difficult to ascertain" (Benetrix and Lane, 2010b). He argued that when operating in such "fog," prudence is the only reasonable option for fiscal policy.

A useful case study in recent economic history is available to both open Northern European economies. The operation of the Chilean "rainy day fund" has been outlined by Lane (2010b). The Chilean government which adopted a new fiscal framework in 2001 was obliged to run a *structural* fiscal surplus. The state of business cycle is evaluated by an independent committee to reduce political pressures. For instance, during the period 2004-2008 the government ran a cumulative surplus of 28.5% of GDP. An aggressive countercyclical fiscal stance was adopted in 2009 with real

growth in public spending of 14.5%, despite a 28.5% fall in fiscal revenue (Lane, 2010b).

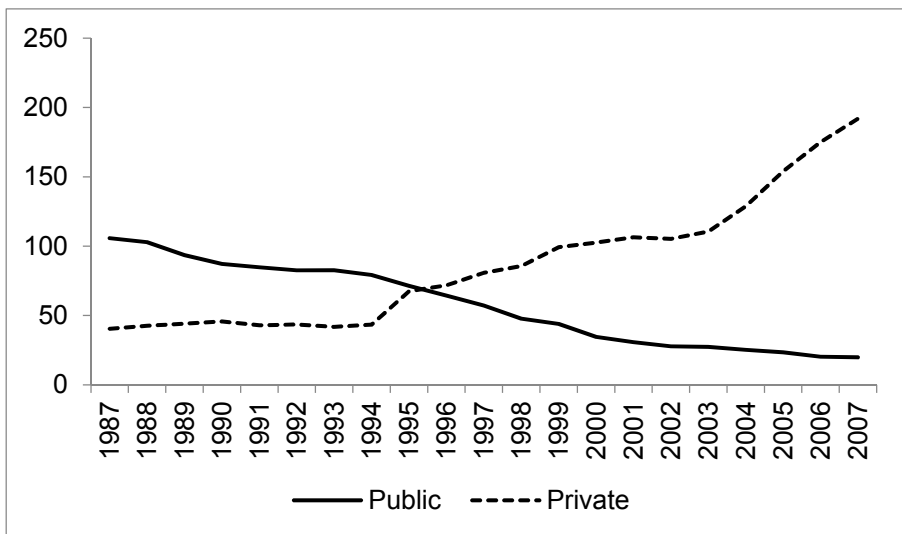
In the Irish case, erring on the side of caution in fiscal policy was paramount as evidenced by the insufficient surpluses to allow a countercyclical discretionary fiscal response in a crisis event. Bénétrix and Lane (2013) find this to have been a phenomenon of most countries within the Eurozone following the adoption of the single currency. Though Ireland met the fiscal deficit requirement of a maximum of 3% in the Stability and Growth Pact by recording consistent fiscal surpluses until 2007, de Grauwe (2013b) has shown that meeting the fiscal balance criteria of the Stability and Growth Pact was a poor predictor of subsequently experiencing financial crisis. The Irish *structural* budget balance was worse than that reported under the standard methodology according to Lane (2010b). In line with this, Kearney (2012) has pointed out that Irish fiscal policy had in fact been pro-cyclical every year 1977-2012 with the exception of the years 1987-9, when the government was only in a position to consolidate its fiscal position due to the re-emergence of strong growth in external demand. To stress the argument, it should be observed that these tests cover a period when Ireland posted constant primary surpluses during the period 1987-2007. This supports Lane (1998, 1999, 2010b) and Bénétrix and Lane (2012, 2013) who emphasised that the structural (through the cycle) balance was a more appropriate measure and was relatively weak throughout the period.

### **...to Private Debt 1988-2007**

As already discussed (see Credit Data section), a renewed interest in private sector debt has emerged in the post crisis world. The variable has typically been shown among other things to be a powerful indicator of financial crises (Minsky, 1986, p. 222, 272; Schularick and Taylor, 2012) and it has been found that the larger the share of credit which goes to the private sector, the more likely it is that financial crisis occurs (Demirgüç-Kunt and Detragiache, 1997). As we have observed, pronounced increases in private sector debt also preceded the financial crisis of 2008 in Ireland and the UK (Whelan, 2014; Turner 2014 pp. 93-101) as had been the case with the Nordic episodes 1991-1993 (Jonung et al, 2009, pp.34-35).

In Ireland, this was occurring against the backdrop of falling public debt ratios during the 1990s. Britain's dramatic post war debt reduction described by Crafts (2016) had already resulted in low public debt relative

to Ireland at the beginning of the 1980s. Combined with an intensive period of financial deregulation in Ireland (Bielenberg and Ryan, 2013, p. 40) in the early 1990s, the conditions were set for a surge in private sector credit and an asset price bubble. Indeed, Johansson and Ljungberg (2013) showed that Ireland required interest rates significantly higher than those which prevailed at ECB level according to the Taylor Rule, but as a member of the Eurozone, the chosen policy rate more closely resembled what was required by French and German economic conditions. The financial deregulation which occurred in Britain in the 1980s (see Dimsdale and Hotson, 2014, p. 167) and the growth of credit relative to money as already discussed (McLeay and Thomas, 2016) had created similar conditions there. Figure 6 displays the inverse relationship that Ireland experienced between private and public debt during the period 1987-2007.



**Figure 6: Ireland Public and Domestic (non-financial) Private Sector Debt as a percentage of GDP 1987-2007**

Sources: Budgetary and Economic Statistics, and World Bank database for Ireland

Turner (2014, pp. 93-100) describes the economic environment leading into the 2007-8 crisis in Britain. As with Ireland on that occasion and Sweden (in 1991-3), the well-known common pattern involved a rapid rise in property values fuelled by bank credit, much of which was demanded by the increasingly leveraged household sector supported by low interest rates. The

collapse of domestic property prices served as the proximate cause of the banking crisis in the UK and Ireland (see Whelan, 2014 for a descriptive account of the Irish Financial Crisis). In Ireland and the UK, the crisis of 2008 was the most acute since 1820/21 and 1825-6 respectively (Turner, 2010, c. 4).

### **...to Public Debt 2008-**

Reinhart and Rogoff (2011a) have shown that “while debt surges are an antecedent to banking crisis, banking crisis often precede sovereign debt crises, they help predict them.” This sequence of excessive private sector borrowing, banking crisis and government debt explosions is a familiar topic to contemporaries since 2008. Indeed, the Nordic crises of 1991-3 followed a similar order of events (Jonung et al, 2009). In a comparative context, “going back to 1800, the current level of central government debt in advanced economies is approaching a two-century high-water mark” (Reinhart and Rogoff, 2013).

It is little wonder then that so much attention has returned to public debt reduction and appropriate fiscal policy in the macroeconomic environment following 2008. For instance, Abbas et al (2011) have assembled a range of data in a comprehensive database for 174 countries. Abbas et al (2014 a, b) generalise that most high debt episodes of over 80% of GDP were escaped through favourable configurations of low real interest rates and relatively high growth in the post war history of the twentieth century. Eichengreen and Panizza (2014) accuse European policy makers of having a “surplus of ambition” requiring consistently large primary surpluses over decades which is not historically common and politically very difficult to implement. Looking at the fiscal adjustment strategy to achieve debt targets by 2030, they show that Ireland and the UK must run a cyclically adjusted primary balance over 2020-30 of 5.6% and 4.2% of GDP respectively. Using a sample of 54 emerging and advanced economies over the period 1974-2013, they find only 3 occasions where governments were able to maintain primary surpluses of more than 5% of GDP for a ten year period and state that it is in general “extremely rare.” Uniquely among the countries that did achieve debt reduction in this manner, their economies were extremely open in nature. Abbas et al (2013) examine the currently prevailing economic conditions in the context of the history of debt reductions and offer little optimism. Though they recognise that previous debt reductions started under adverse circumstances, strong external

demand typically supported output growth as fiscal consolidation occurred. They regret that monetary policy is already at the lower bound and the medium term growth outlook is “very weak.” Indeed fiscal consolidation in such an environment “takes away demand and further lowers growth in the short term because of fiscal multiplier effects.” By planning the adjustment path in structural terms, “procyclical tightening” is avoided but where fiscal accounts are weaker and sovereign rates are higher “the pace of consolidation has to be more ambitious.” Finally Abbas et al (2013) recommend “structural reforms” and prioritising safeguarding programmes with strong positive growth effects such as “high-return infrastructure projects or key active labour market policies.” According to Andersson (2016), major banking crises have caused favourable reforms to both political and economic institutions 5 to 10 years following the event, which in the current post crisis context, may facilitate recommendations similar to those suggested by Abbas et al (2013).

Other databases have been constructed such as those by Reinhart and Rogoff (2011a) who produce public debt series for 70 countries (the longest spanning 200 years) and Reinhart and Rogoff (2011b) which yields domestic debt series for 64 countries. While all of the above mentioned large databases are extremely valuable for a number of reasons, they are likely to suffer from oversight on accounting changes from any given public authority or country specific factors relating to either output or debt calculations.

In the context of this dissertation, long term series on public debt have been produced for individual countries in Northern Europe. Fregert and Gustavsson (2008) have published fiscal statistics for Sweden for the entire period 1719-2003. These have been recently updated and included in Edvinsson et al’s (2014) Riksbank volume of statistics. For the United Kingdom, the “Three Centuries of Data” project at the Bank of England (Hills et al, 2015) has combined fiscal variables from Mitchell (1988) and the Office of National Statistics to yield among other things the primary balance and the national debt for the period 1688-2015. Crafts (2016) long run study shows that most of the high debt reduction episodes (as defined by more than 80% of GDP) in the United Kingdom were achieved in a context of high growth, in line with Abbas et al (2011, 2013, 2014a, 2014b) who find the same internationally.

While some fiscal studies have been conducted over the longer term in an Irish context (Cronin and McQuinn, 2014), no effort to date has been made to date to treat the data in a consistent manner which reflects



accounting policy changes in order to create a robust long run fiscal series. In doing so comparative analysis across periods is made possible over the longer term as Crafts (2016) has conducted for the UK during the period 1831-1970.

However, recent research by Foley-Fisher and McLaughlin (2016a, 2016b) has opened the door into historical debt studies in an Irish context. Looking at the period 1920-1938 (2016a), the authors examine how sovereign default on Irish land bonds which the UK government had guaranteed affected the risk premium on UK guaranteed land bonds. They study daily yields on land bonds traded on the Dublin stock exchange as markets had treated the land bonds as sovereign debt. In the *Financial History Review*, the authors (2016b) publish annual land bond prices (weighted average prices and current yields) for the period 1892-1938. Cronin and McQuinn (2014) produce a long run study which addresses fiscal policy over the period 1964-2012. They focus on Irish government expenditure and its effects on unemployment and output and find that in negative output gap regimes alone, positive shocks to government consumption had significant impacts on unemployment and output.

Much comparative research has been conducted with the debt reduction of the 1980s in mind, though no quantitative method has been specifically applied in decomposing the debt reduction. Debt dynamics between 2011 and 2015 were forecasted by Bergin et al (2011). Kearney (2012) measured the fiscal stance throughout the 1980s to present. ESRI (2009) demonstrated that though the fiscal adjustment in the form of nominal cuts was more contractionary following the recent crisis in the deflationary environment in 2008 and 2009, the initial contraction of the 1980's was the more severe in terms of real reduction due to the higher levels of inflation which prevailed. More specifically, according to Bergin et al (2011) the austerity budgets of 1983, 1988 and 1989 taken together comprise a tightening by 10% of GDP against 7.5% adopted between 2008 and 2011. Keane (2015) comprehensively details the evolution of public finances throughout the crisis. While McCarthy (2009) provides a summary view of how public debt was reduced following the 1980s, at time of writing it was not yet clear which trajectory Irish debt would take and the Troika (EC, IMF and ECB) were not required until the sovereign debt crisis which emerged the following year. No quantitative study has been conducted which specifically addresses the government's fiscal policy of the 1950s.

In the present setting, Reinhart (2012) sees a "return of financial repression" which she claims has already begun in the UK and Ireland

(among others) as a mechanism of reducing debt ratios and specifically targets Basel III as the guise in which “preferential treatment of government debt” is embodied in the capital requirement of banks. Reinhart and Rogoff (2011c) in support of this have claimed that as financial repression might not be a politically correct term, “prudential regulation will probably provide the aegis for a return to a system more akin to what the global economy had prior to the 1980s.” It is to the macro prudential element of this regulation, I now turn.

## Fighting the Previous Crisis

### **Private Debt in Financial Regulation 1988-**

Given the dramatic increase in government debt which are a consequence of the financial crisis of 2008, it is not surprising that the high levels of private sector debt and the weakening link between money (liability) and credit (asset) which preceded it have drawn attention from regulators who have targeted private sector credit as a reference point in the Basel III countercyclical capital buffer (CCB) (BCBS 2010a, 2010b). The Basel Committee on Banking Supervision is the primary standard-setter for the prudential regulation of banks and provides a forum for cooperation on banking and supervisory matters. Its mandate is to strengthen the regulation, supervision and practices of banks worldwide with the purpose of enhancing financial stability (BCBS, 2013a). Its primary area is in establishing and promoting global standards for the regulation and supervision of banks as well as guidelines and sound practices (BCBS, 2013a).

While Basel I and Basel II concerned themselves solely with the stability of the individual bank (microprudential regulation), Basel III in addition addressed risks and trends in the wider economy (macroprudential regulation) due to criticisms that the regulation of the previous regimes were designed in such a way that unintentionally amplified business cycles. However, though the macroprudential aspect of Basel III (the countercyclical capital buffer) was a novel addition to the Basel framework, the focus on bank assets (lending) was not new to Basel III. The shift in regulatory/supervisory focus had begun much earlier.

While the regulations of the nineteenth century in Sweden and the UK had targeted bank liabilities which were with few exceptions to be backed

with assets (cash or securities perceived as safe), in the post Second World War era regulation evolved which conversely targeted bank assets (loans) to be backed with liabilities (capital), or capital to asset ratios. In other words, emerging from a period of sustained financial repression there was a marked switch from banks liabilities/private sector assets to banks assets/private sector debt as the choice balance sheet aggregate of financial regulation. During the era of financial repression following the Second World War, this process began as we have already seen when banks received “directives that primarily concerned the asset side of their balance sheets” (Turner, 2014, p. 185) as was similarly the case in Sweden (Jonung, 2013a).

The end of Bretton Woods in 1973 implied freer flowing international capital. As Reinhart and Rogoff (2009, p. 7) note “since the early 1970s, financial and international capital account liberalisation took root worldwide. So, too, have banking crises”. In 1974, twenty six Central Bank Governors in the G10 set up the Basel Committee in International Banking and reached the first agreement subsequently called Basel I in 1988. Jackson et al (1999) show that it had a profound effect on the recapitalisation of the international banking sector but as Dewatripont et al (2010, p. 79) outline, its immediate impact was a recapitalisation of banks to such an extent that it sparked accusations of prompting a credit crunch where banks would potentially prefer to buy Government Bonds (for which the Capital Requirement was 0%) than lend to firms and households for which risk was weighted at 100%, incurring the full 8% capital to asset ratio charge. It thus appears that financial repression in terms of public debt may not have fully dissipated at that stage as supported by Reinhart et al (2011) findings on debt liquidation.

Basel I and Basel II (which were also known as the Basel Capital Accord) focused primarily on capital expressed as a percentage of *risk weighted* assets (Dewatripont et al, 2010). The given asset’s riskiness is weighted by rating agencies whose judgements determine the risk weight of the asset against which capital should be held by a given bank. Under the standardised approach of Basel I and II, total capital of 8% needed to be held against assets which received 100% risk weightings and no capital needed to be held against assets which received 0% risk weightings. To illustrate by way of simple example, a loan of €1 million which draws a 50% risk weight will require a bank to hold €40,000 in equity against that loan ( $€1 \text{ million} \times 50\% \times 8\%$ ). Of the total capital amounting to 8%, under Basel I half of the equity needed to be higher quality Tier 1/Core Capital which included retained earnings and cash. The proportion of this of the

total 8% was allowed to decline by half (to 2% of the total 8%) under Basel II rules (see Tarullo, 2008 for a detailed review of the operation of Basel I and II). To compound matters, these rating agencies have been accused of using point-in-time or procyclical ratings (King and Sinclair, 2003). This was borne out by the favourable ratings which mortgages and mortgage backed securities received in the period before the financial crisis and their subsequent downfall to the status of “junk” once the crisis transpired.

Though this regulatory approach incorporates capital which represents a bank liability, its focus is one-sided and skewed towards asset measurement. Turner (2014, pp. 199-201) has questioned the Basel framework’s flawed focus on capital ratios which is viewed as a buffer in the event of shocks to asset portfolios rather than something that incentivises managers and shareholders to act prudently-it “assumes away risk shifting”, turns “capital regulation into an engineering problem” and in the process, “completely ignores human behavior.” This “engineering problem” was apparent in its most extreme form through the Advanced Internal Rating Based (AIRB) approach (in place of the Standardised Approach) developed in Basel II, which effectively granted approved individual banks the right to measure credit risk internally (Dewatripont et al, 2010, p. 83).

Recent work has been highly critical of the incentive structures embodied in Basel II and their pro-cyclical effects of amplifying the cycle both before and after financial crisis of 2008 (Dewatripont et al, 2010; Drummond, 2009; Goodhart, 2008; Jablecki and Machaj, 2009; King and Sinclair, 2003; Levine, 2010; Moosa, 2008; Rajan, 2010; Shin, 2010). It was reasoned that during good times when a wider variety of loans received lower risk classification an increase in lending (assets to capital) would occur, while during downturns the numerator (lending) would be cut in order to arrive at capital ratios that were consistent with the Basel requirements. As ratings of the instruments were more (less) favourable when both individual assets and macroeconomic performance improved (worsened), less (additional) capital was required, which amplified procyclicality.

While the relatively stronger growth in credit (compared with money and deposits) may be seen as a justification for the orientation by financial regulators towards assets, the “funding gap” which must be filled to facilitate such growth has triggered interest in “non-core liabilities” as an indicator of vulnerability and as a reference for regulators (Bruno and Shin, 2014; Hahm et al, 2014; Shin, 2010). Indeed, in the apparent absence of cross border mergers in the Eurozone at least, “money” (bank liabilities)

was free flowing across borders but the asset side tends to remain fixed and local. In light of this, Greenlaw et al (2012) continue to assert that the “greatest failure” of the 2011 stress tests conducted by the European Banking Authority was “the lack of attention to bank funding issues.” The EU Stress Test of 2014 did perform some stress tests on the “cost of funding” however, though the vast majority of the tests still focused on asset risk (EBA, 2014) or “shocks to asset portfolios” (Turner, 2014, p. 201).

### **The Countercyclical Capital Buffer of Basel III**

The countercyclical capital buffer (CCB) of Basel III will be phased in between January 2016 and the end of 2018 and it is not due to become fully operational until 2019 (BCBS, 2015a). It relies upon the deviation of private sector credit (as a percentage of GDP) from its long term trend as a reference point from which to deploy a capital buffer in a linear manner as a function of the size of the gap ranging between 0-2.5% of risk weighted assets. The objective of the buffer is both to constrain credit growth during boom periods and to enable banks to release more credit during downturns through the levels of capital banks are obliged to hold.

Research on this macroprudential tool is in relative infancy due to the ongoing implementation process. The documents which formalised the buffer (BCBS 2010a, 2010b) have opened the door to researchers who typically use past data in a counterfactual manner (Edge and Meisenzahl, 2011; Drehmann and Gambacorta, 2012; Ibanez-Henrandez et al. ,2015; Repullo and Saurina, 2011) or target the tools adopted by the Basel Committee for measuring private sector credit and deploying the buffer (Drehmann et al, 2010; Drehmann and Tsatsaronis, 2014; Orphanides and Van Norden, 2002; Repullo and Saurina, 2011). Others have developed alternative methods such as “dynamic provisioning” in the Spanish case to test novel ways of arriving at a countercyclical capital buffer (Jimenez et al, 2012) and found support for their effectiveness.

However, all of the data used in previous research and all that is available to national supervisory authorities who are charged with implementing the CCB, will by definition be historical data. Therefore, any counterfactual testing must allow for the fact that the data itself may have been altered had the counterfactual actually transpired. This echoes the Lucas Critique (1976, p. 41) which recognises that “given that the structure of an econometric model consists of optimal decision rules of economic agents, and that optimal decision rules vary systematically with changes in

the structure of series relevant to the decision maker, it follows that any change in policy will systematically alter the structure of econometric models.”

In this sense, researchers are limited by using economic history which has transpired to conjecture about an alternative pre/post crisis economic history which has not. By extension, the greater the number the assumptions, the more ambitious the methodology and elaborate the testing, the lower the confidence one can place in the results and implications. Drehmann and Gambacorta (2012) recognise this when they find “material” effects on lending from their simulation of the buffer for Spain during the period 1986-2007 in which they estimate a cumulative reduction of 18% on private sector credit and an increase of 2% during the crisis years 2008 and 2009. Benes and Kumhof (2015) find that the CCB has sizeable effects on macroeconomic volatility leading to significant increases in welfare while also reducing the need for countercyclical adjustment in policy interest rates.

Furthermore, such counterfactual studies are by definition all limited by an inability to incorporate Goodhart’s Law (Goodhart, 1975) which generally states that when a measure becomes a target, it ceases to be a reliable measure. This may prove particularly relevant for *gap* variables which can be manipulated by national authorities through data revisions and discretionary policy concerning the choice of trend (and enforcement), such as the credit to GDP gap as suggested by Basel III. The capital to asset ratios of banks which were to subsequently fail (such as Northern Rock) comfortably met the Basel II requirements and were deemed adequate by national supervisors before the crisis of 2008 (see Dewatripont et al, 2010, pp. 87-8; Turner, 2014, p. 206). The target measure of capital-to-asset ratios evidently had little predictive quality.

### **Countercyclical or Procyclical?**

The essence of the existing research centres upon the question of effectiveness. Do the countercyclical buffer and its design achieve what the Basel Committee for Banking Supervision intends?

Drehmann et al (2010) found that credit’s deviation from its long term trend contains “leading indicator properties for financial distress.” They found that a HP Filter with lambda value of 400,000 performed particularly well providing “strong and reliable signals.” This lambda value produces a straight line trend around which private sector credit (as a percentage of

GDP) deviates. Drehmann and Gambacorta (2012) find that the buffer would reduce credit growth during booms and attenuate the credit contraction once it is released. Ibáñez-Hernández et al (2015) find that the credit to GDP ratio is also an effective early warning indicator of banking crises. Benes and Kumhof (2015) agree that not only does the buffer perform well, but that it has the ancillary effect of reducing the need for countercyclical policy interest rate adjustments.

Repullo and Saurina (2011) conclude that the credit to GDP gap which is the reference indicator used to trigger the countercyclical capital buffer was an unsuitable point of departure as it was negatively correlated with economic growth which would then suffer from activating the buffer in downturns in a procyclical manner. They counterfactually trigger the countercyclical capital buffer across seven developed economies during the period 1986-2009 and find the same result, suggesting instead that credit growth would be a more appropriate indicator as recommended by Ibáñez-Hernández et al (2015). Schularick and Taylor (2012) provide support by having shown that credit growth is a good predictor of financial crises. Drawing on the work of Orphanides and van Norden (2002) who discount the reliability of output gap estimates in real time, Edge and Meisenzahl (2011) look at economic downturns in contrast to counterfactual pre-crisis testing. They find that due to ex post revisions of data, the buffer which had already been triggered in the previous period had subsequently proven a false positive. With particular focus on the US recession of 2001, they find that the buffer would have acted as “an additional drag” on the economy. Namely, it would have behaved in a procyclical manner in a downturn.

Nonetheless, the buffer will be dependent upon when national “authorities believe that credit growth is an unacceptable level” (Turner, 2014, p. 207). While the political nature of this may leave authorities vulnerable to lobbying during booms who may interpret the credit to GDP gap or macroeconomic conditions with political bias, the fact that the buffer can be released immediately would mitigate against the problems discussed by Edge and Meisenzahl (2011). Indeed, in the first post-Brexit Financial Stability Report issued by the Bank of England in July 2016, the countercyclical capital buffer was set to 0% “with immediate effect” which the Financial Policy Committee (FPC) estimated would raise banks’ “capacity for lending to UK households and businesses by up to £150 billion” (BOE, 2016). As recently as March 2016, the FPC had judged that risks associated with domestic credit were “no longer subdued” as they had

been following the financial crisis and had begun to supplement regulatory buffers with the UK countercyclical capital buffer.

The question of the countercyclical capital buffer's effectiveness still remains an open one to date, as the instrument is not fully phased in. As discussed by Jonung (2005), policy makers and regulators must be mindful of not "looking ahead through the rear view mirror" by attempting to fight the previous crisis in the design of regulation and macroeconomic policy. Arguably, the countercyclical capital buffer might suffer from such bias as in its very essence it recognises that procyclicality was a major feature of the *pre-crisis* regulation which is why it in turn has been designed to counter. Due to the infancy of the tool, further exploration on historical data while welcome, should bear these caveats in mind. This dissertation joins the debate by taking a regional approach which incorporates Finland, Ireland, Sweden and the UK in a counterfactual study over the period 1986-2013.

## Summary of Papers

*Paper 1: Financial Aggregates for the United Kingdom, 1844-1880 (co-authored with Nicholas Dimsdale, Jason Lennard and Ryland Thomas).*

During the period which followed the Bank Act (1844-1880), four financial crises occurred in the United Kingdom in the years 1847, 1857-8, 1866-7 and 1878-9 (Turner, 2014, pp. 72-88). In addition to these, events such as the Irish potato famine (1846-9), the Lancashire Cotton Panic (1861-5) and intermittent agricultural depressions make this era one of special interest in the study of economic and financial distress. Furthermore, the passing of the Bank Act represents a watershed in terms of monetary history by constraining the growth of notes throughout the United Kingdom.

Though Keynes (1930, p. 17) wrote of the "prodigious growth of bank money" in the six decades which followed the Bank Act of 1844, no money series exist to date which are consistent with official definitions to enable the measurement of such trends in the early period 1844-70. In the absence of this data, researchers remain largely uninformed on matters such as crisis magnitudes (ECB, 2012; Anderson et al, 2016), seasonal trends and consumption behavior (Andrews and Janssen, 2005; Hancock, 2005). In addition, bank assets which typically proxy bank lending (Reinhart et al,



2012; Schularick and Taylor, 2012) are unavailable prior to 1880 (Sheppard, 1971) in the most concentrated period of banking crises in 200 years of U.K. economic history and the maturing phase of the industrial revolution.

This paper fills this gap. We construct new monthly and annual time series for the monetary base and broad money of the UK respectively for the period 1844-70 and bank assets for the period 1844-80. The new monetary aggregates are constructed from a number of contemporary sources which include the Bank of England Archive, the archives of the Royal Mint, and commercial bank archives across the United Kingdom and British Parliamentary Papers. In following the definitions of the Bank of England (Capie and Webber, 1985), it is possible for researchers to track the development of money from the beginning of the modern monetary system to the present.

The results are broadly consistent with the economic history of the period. The 1840s, 1850s and 1860s taken as individual decades, each exhibit the characteristics one would expect from the literature. The period 1844-50 shows stagnation in money growth and bank assets which reflect the commercial crisis of 1847 and the Irish famine. The most acute contraction over the whole period took place from the commercial crisis/potato famine beginning in 1847 experiencing the largest cyclical downturn of 12 per cent in 1849 in broad money. Bank assets fell by 19% from 1846 to 1849, a credit contraction that is unmatched by the crises of 1857-8 (-8%), 1866 (-3%) and 1877-8 (-8%).

The comparatively dramatic decline in lending may reflect the weak underlying conditions of the economy, as the 1847 crisis has been referred to a “commercial crisis” (see Turner, 2014, pp. 72-75). The contrast between the depressed conditions of the 1840s and the growth of the 1850s is striking, where broad money expanded by 69% and narrow money by a total of 30% in the decade, driven largely by gold discoveries and large trade surpluses which allowed for lower interest rates and the boom conditions which preceded the 1857-8 crisis (Turner, 2014, pp.75-6). The 1860s exhibit a flatter and more stable growth rate and the decline following the 1866 crisis hardly merits mention when compared with the contractions resulting from the key crises of the first two decades. Over the entire period 1844-70, broad money increased by 72.4% which comprises the first 26 years of “prodigious growth of bank money” following the Bank Act.

*Paper 2: Monetary Aggregates for Ireland, 1840-1921 (co-authored with Jason Lennard)*

In paper 2, we construct new monetary data to shed light on the relatively unknown characteristics of Irish business cycles during the period 1840-1921. In the absence of consistent GDP estimates for the period, monetary aggregates can be employed to identify macroeconomic trends, tracking activity, lending, crises and cycles (Anderson et al, 2016; ECB, 2012; Fisher, 1932, pp. 30-2; Schularick and Taylor, 2012). As we have already seen in the case of the Irish economy, bank note circulation and bank deposits have been recognised as reliable “barometers of economic activity” (Ó Gráda, 1994, p. 178; Cullen, 1972, p. 137).

Drawing on a vast array of primary sources, we construct both annual and monthly narrow money (M0) series for the period 1840-1921 and an annual series of broad money (M3) using definitions consistent with the Bank of England and by extension Capie and Webber (1985). By following these definitions, it was necessary to produce the first Irish coin and reserve series of their kind over the period, while earlier efforts have been made regarding notes and deposits (O’Rourke, 1998). Through the daily account books of the archives of the Royal Mint, we constructed a monthly coin series for the entire period which commenced in 1826, as it was necessary to begin with the starting stocks which were produced upon the amalgamation of the British and Irish currencies in that year. We employ the new money series to analyse trends and cycles in the Irish economy, in a similar vein to Hickson and Turner (2008, 2005a) who use equity prices as a means of observing economic activity. By producing the monetary base on a monthly frequency, we are also able to measure seasonality in what was a highly agricultural economy.

Our results most strikingly reveal the magnitude of downturns in the Irish economy throughout the period. Most notable of all is the collapse in the monetary base of 48% between November 1845 and August 1849 during the Irish Famine. To our knowledge, such a decline has no precedent in modern economic history. In contrast to the behavior of money, Hickson and Turner (2008) found that the Irish stock market was relatively unaffected by the famine, as the regions to which it was relevant were only marginally connected with the market economy. The agricultural depressions outlined by Ó Gráda (1994, pp. 251-2) of the early 1860s and the late 1870s saw sharp contractions of 18.71% and 16.89% respectively.

By calculating monthly mean values of the base, we observed pronounced seasonality which matched the agricultural cycle discussed in great detail by contemporaries. We notice a marked decline in this seasonality in the second half of the period which we attribute to structural change and the declining share of labour employed in agriculture.

Over the period prior to World War 1, broad money grew at an average rate of 2.2% leading to a fivefold increase in 74 years, while during wartime the base alone increased by a factor of 3.5. The entire period however was one of broad money growth with the base remaining comparatively stable. Both the mean duration of expansions in broad money (4.4 years) and the mean amplitude of expansions (28.10) dominated the contractions which were usually temporary crises or depressions.

### *Paper 3: Public Debt Dynamics in Ireland 1950-2015*

In paper 3, through constructing a new and consistently defined long run government debt series, I study public debt dynamics during key fiscal episodes in Ireland over the period 1950-2015. No other long run study exists on the dynamics of Irish government debt which the new standardised data enables. Alternative sources including the Government of Ireland *Finance Accounts*, the National Treasury Management Agency Accounts and the Department of Finance's *Budgetary and Economic Statistics* were employed to compare three critical fiscal events in modern Irish economic history- the 1950s crisis, the fiscal crisis of the 1980s and the subsequent debt reduction in the context of the presently high public debt ratio.

The Irish government debt ratio is currently at a height not witnessed since 1986. At its peak in 2013, it stood at 125% of GNP which can be contrasted with the debt ratio which existed in 1986 of 129% of GNP (Finance Accounts, CSO). While some important comparative work has been conducted which highlights the 1980s episode as a means of examining current debt ratios in context (Bergin et al, 2011; Kearney, 2012; McCarthy, 2009), the specific public debt dynamics facing the governments of the 1980s have not been analysed in isolation to date through using the standard debt dynamics formulae with consistently defined data. Perhaps more importantly, the determinants of the subsequently dramatic debt reduction (1987-2007) have not been formally measured using the standard approach (Crafts, 2016; Escolano, 2010). This paper effectively fills this gap.

The “fiscal crisis” (Honohan, 1994) of the 1950s has received comparatively little attention (see Honohan and Ó Gráda, 1998). While the debt ratios which were reached in the aftermath of that macroeconomic crisis would hardly worry policy makers in today’s environment, the episode is chosen as a comparative case study reviewing the use of austerity to achieve fiscal balance in an environment of unfavourable macroeconomic conditions.

The most recent fiscal crisis of the 1980s in Ireland was not the result of a financial crisis which by contrast contributed to the currently high government debt ratios. Instead government borrowing and fiscal policy in general drove the public debt trajectory upwards from the end of the 1970s (Honohan, 1987; McCarthy, 2009). For this reason, an international case study of Sweden is employed to compare the case of another small open Northern European economy which through rescuing its banks, experienced marked increases in public debt which it subsequently succeeded in reducing. Additionally, Eichengreen and Panizza (2014) find that small open economies were “unique” in their ability to reduce debt by maintaining long term primary surpluses, inviting further comparative analysis among countries with these characteristics. The paper attempts to understand the dynamics of how the national debt was reduced in Sweden, following its banking crisis by employing the debt reduction formulae.

The results are relevant for policy makers in the current environment of high public debt ratios. In the case of all three Irish crises, negative real interest rates preceded each. Firstly, the 1950s episode shows that public debt continued to increase following the crisis due to higher interest rates and lower inflation, despite a recovery in growth demonstrating the futility of fiscal contraction in generally depressed conditions. As we have already seen, in the 1950s Ireland did not import the inflation from Britain that would provide it with the negative interest rates of the late 1970s.

Following the fiscal crisis of the 1980s, I identify two distinct periods of debt reduction using the decomposition technique (Crafts, 2016) following the peak of the Irish government debt ratio. The debt reduction of the first period 1988-1994 was driven entirely by cumulative budget surpluses and in the second period (1995-2001) it was shared approximately equally between favourable real growth/interest rate dynamics and cumulative budget surpluses. While similar external demand conditions assisted Sweden’s export growth during the same period, uniquely its public debt reduction was entirely driven by budget surpluses during the period 1994-2001. In

both cases, larger budget surpluses were only attainable with relatively high economic growth and buoyant external demand.

*Paper 4: Preventing the Past: A Counterfactual Countercyclical Capital Buffer in Northern Europe 1986-2013*

In the final paper, post-crisis financial regulation is tested upon four countries with varying business cycles and monetary regimes in Northern Europe- Finland, Ireland, Sweden and the UK. More specifically the macro prudential tool of Basel III, the countercyclical capital buffer, is retrospectively activated in the region during the period 1986-2013 in an effort to assess its sensitivity to the financial/credit and business cycles in each state and determine its effectiveness by rigidly adhering to its application.

The paper contributes to the debate using a regional approach and joins those studies which have attempted to assess the countercyclicality of the instrument (Drehmann et al, 2010; Repullo and Saurina, 2011), those which have addressed the reliability of the private sector credit to GDP gap as a reference point from which to trigger the buffer (Ibáñez-Hernández.et.al, 2015; Orphanides and Van Norden , 2002; Repullo and Saurina, 2011) and those which have reviewed its counterfactual operation during periods of previous economic distress (Drehmann and Gambacorta, 2012; Edge and Meisenzahl, 2011).

Using the World Bank database to maintain consistency with Repullo and Saurina (2011), I adopt an adjusted version of their approach to test whether the credit to GDP gaps which were produced by a counterfactual buffer (in this region of Northern Europe) would have triggered the buffer in a countercyclical manner by taking the business cycle in to consideration during the period 1986-2013. Given the emphasis placed upon real credit in the literature (Ibáñez-Hernández.et.al, 2015; Repullo and Saurina, 2011; Schularick and Taylor, 2012), I subsequently test whether real credit may provide a more appropriate reference than the credit to GDP gap from which to deploy the buffer. In addition I look at whether the manner in which the buffer (if adhered to rigidly) is calculated is pro or counter cyclical during the two major crisis episodes which occurred in 1992 and 2008. Finally, I address issues of measurement surrounding the choice of base year for the trend and the unwelcome implications for policy makers which they might produce.

The first set of results lend some support Repullo and Saurina's (2011)

conclusion that the credit to GDP gap and the resulting buffer exhibit procyclicality, particularly with reference to the Nordic pair. However by adjusting for oversights on their part regarding calculations I find that by their definition, the instrument would have acted counter cyclically in Ireland and to a lesser extent the UK prior to the financial crisis of 2008. When the crisis and post crisis periods were included, its performance deteriorated across the sample. The results also support other's findings (Ibáñez-Hernández.et.al, 2015; Repullo and Saurina, 2011) that real credit growth is a more useful indicator from which to deploy the buffer as it is positively correlated with the business cycle and does not suffer from a deterioration of performance during distress periods, unlike the credit to GDP gap.

However, the buffer performs very well in the three year period preceding each financial crisis as was intended (BCBS, 2010b), becoming operational in 95% of all tested cases. The extent of the buffer varied dramatically however, depending on choice of base year for calculating the trend. Its post crisis performance is less flattering, as only 14% of the results produced "true positive" values, i.e. the buffer was "off." This was largely due to the private sector credit to GDP ratio moving upwards due to a falling GDP denominator, confirming the fears and supporting the results of Edge and Meisenzahl, (2011). However, as this paper discusses, the Basel Committee have stressed that if national authorities see fit, the buffer can be released with "immediate" effect which at best could mitigate the problem of rigidly adhering to the rule (BCBS, 2010b). At worst, granting more "discretion" to what national authorities may be viewed as an admission of the one sided nature of the tool.

## Discussion

This dissertation has considered the financial system from a variety of perspectives in Northern Europe during the period 1840-2015. It begins by addressing primarily money (bank debt) in the United Kingdom following the Bank Act of 1844 and concludes in the post war era by reviewing the assets of the financial system through aspects of lending, the reciprocal of which is public and private sector debt. While papers 1 and 2 construct aggregates which produce nominal amounts of money and financial assets

the definitions of which are unlikely to materially alter, papers 3 and 4 which range from the post war era to the present, relate to a world of developing national accounts, changing definitions, and trend and cyclical components of growth in a variety of aggregates. In addition, it has become the norm in that period to express these as a percentage of national output to derive a meaningful interpretation.

Papers 1 and 2 concentrate primarily on the construction of nominal financial series in order to fill “gaps” that still exist in the literature. The years 1844-1880 are generally considered to encompass the maturing phase of the industrial revolution in Britain. In Ireland, the period 1840-1921 is one in which living standards rose considerably as a result of the mass emigration which occurred during the famine of 1846-9 and the post famine era until independence (O’Rourke, 1995).

Where money is concerned, the debates, variety of opinions and emphasis on the role of money in the economy continue to evolve through history as we have seen, reflecting its central importance to the macroeconomy. With this in mind, these contributions of long run monetary series are produced in an empirical tradition which can be further utilized by researchers in future years for a wide variety of purposes and theories which have yet to emerge. In a recent tribute to the memory of Charles Feinstein, it was observed that he consistently held that theories came and went, though good data endured: ‘I think that the assets I construct are more likely to prove durable if I do one type of work rather than another. It might be more exciting and more intellectually demanding to try and do more speculative and theoretical research, but I doubt that it would make a lasting or worthwhile contribution.’ His contribution, he said later, was to provide the data, not to test hypotheses (Offer, 2008).

In the case of the United Kingdom, we can now observe consistently defined narrow money at a monthly frequency and broad money at an annual frequency from the Bank Act of 1844 until the present day. While it is not possible to fully claim that the Act unintentionally *caused* deposit growth as a means of lending instead of note issuance, the new broad money series reflects this tendency following the Bank Act, though undoubtedly some degree of financial sophistication had emerged prior to it. For instance in Ireland as early as 1837, a very large circulation of cheques passed from hand to hand which was not represented by what was called note currency. These gained widespread use as a means of evading a law which prohibited the drawing of bills of less than £50, which the Bank of Ireland alone had a right to do (P.P., 1837, p. 264). This was another classic unintended

consequence of financial regulation giving birth to sophisticated financial instruments.

By constructing aggregates for both the United Kingdom and Ireland, we effectively emerge with a measure of regional variation in the period 1840-1921. While it is acknowledged that the Irish numbers are included in the UK total, we are nonetheless able to delve deeper into the traditional narrative which paints the characteristics of the 1840s as volatile, the 1850s as expansive and the 1860s as an era of moderation with a crisis are to a large extent represented by the new UK monetary and asset series. For instance between 1844 and 1850 as paper 1 shows, UK money remained effectively unchanged. However, paper 2 which addresses the Irish money stock over the longer period 1840-1921 shows the value of constructing regional series, especially where long run economic data is in short supply and the stage of economic growth and nature of the regional economy differ significantly from the central economy. Specifically, it finds that the Irish monetary base falls by almost one half (48%) between November 1845 and August 1849 though the Irish famine, a contraction which to our knowledge has no equivalent in modern economic history.

Though Ireland's growth rates in the monetary aggregates matched those of the UK in general though the expansive 1850s, the "lost" money of the 1840s through emigration meant that its level was significantly lower. Over the period 1861-70, there is an initial expansion following the depressions of 1859-62 and an increase in British exports responding to increased postbellum US demand (Turner, 2014, p. 79) until the crisis and subsequent decline in money following 1866-7 which concludes in a "flat period" as the German reunification wars culminating in the Franco-Prussian war of 1870. Again, looking solely at the region of Ireland during the same decade, uniquely we find broad money growing throughout the 1860s by a total of 44% in paper 2. This reflects the existing evidence that through the mid-1860s until 1875 at least, according to a Manager of the National Bank of Ireland, "under every heading, according to the statistics, the wealth of the country has increased" (P.P. 1875, p. 157).

As outlined by O'Rourke (1995), living standards in Ireland increased dramatically in the post famine era until World War 1 through all measures of real wages, though this was initially concentrated in the agricultural sector. By conducting seasonality analysis on the monthly variation of the base, paper 2 observes a decline in this behavior in the second half of the period 1840-1921 which attributes this to a decline in the agricultural sector's share of the economy. Similarly, Ó Gráda (1994, pp. 242) suggests



that per capita incomes trebled between the famine and 1914 suggesting improvement for the individuals remaining, which should be contrasted with the poorer performance of national income for the period which has been estimated at 0.5% per annum between 1848 and 1914 by Lee (1973). Between 1850 and 1913, the data series in paper 2 shows the money supply to have quadrupled in Ireland despite the mass emigration which had occurred. However in the context of the exchange equation, if national income is growing at a slower rate (0.5%) than broad money (2.2% per year) the implication is that velocity has fallen during the period. This reflects an increase in financial development as suggested by contemporaries. Further research can be pursued in the areas of financial development and causality between growth and finance when national income statistics are produced. However, the latter are likely to involve measurement issues regarding their construction which consistently defined monetary series drawn from primary sources can avoid which draw on official definitions over the long run.

Decomposing the series can also be used to illuminate the characteristics of financial crisis, such as that of the Munster Bank in 1885 (Ó Gráda , 2012). For example, while it has been suggested that this was an isolated incident without affecting the financial system, it was possible to observe on a monthly frequency reserves against the note issue which reveal a fall of 16% between December 1884 and July 1885, despite the fact that the Munster Bank was not a note issuing entity. This implies that other banks faced pressure as a result of the difficulties experienced by the Munster Bank. These findings not only place numbers on the historical narratives, but can reveal other dynamics previously overlooked. The series hopefully suggest that further study of the episodes is required.

Consistently defined public debt and primary balance series were constructed for Ireland for the period 1950-2015 as the first step in paper 3 which contributes to the growing debate on fiscal policy. Though the series produce nominal figures, they are typically expressed as a percentage of output for meaningful interpretation in contrast to the series in paper 1 and 2. While recent studies on fiscal policy have combined a number of fiscal databases (Eichengreen and Panizza, 2012; Reinhart and Rogoff, 2011a; 2011b) and others through the same methods have arrived at the broad conclusion that the vast majority of post war debt reductions from previous episodes have occurred due to a combination of high inflation, low interest rates and higher output growth (Abbas et al, 2014b; 2011), few studies with the exception of Crafts (2016) and Fregert and Gustavsson (2008) attempted

individual country analysis over the long run in Northern Europe. Paper 3 again highlights the importance of the individual country in place of a collection of alternatively defined data series. In Ireland's case as we have seen, there was no "golden age" which disqualified it from fitting the general post war global picture. This uniqueness, combined with Eichengreen and Panizza's (2012) suggestion that successful budget surplus persistence was more likely among open economies prompted a post war study of Ireland's public debt. The paper presents evidence that Ireland's strongest period of debt reduction following the fiscal crisis of the 1980s was shared approximately equally between a favourable "r-g" configuration and budget surplus accumulation which was the dominant driving factor over the whole period 1987-2001. It did so (like Sweden) in a context of supportive international demand, a context which Abbas et al (2013) doubt is likely to return in the short term. Nonetheless, paper 3 adds to the literature showing that the contraction of the 1980s in real terms was considerably more acute (Bergin et al, 2011) by showing that debt service was also costlier as a proportion of tax revenues with less favourable maturity structures than exist at present.

The aftermath of the financial crisis that produced a return to such high levels of public debt has also seen a revision to the Basel Capital Accords in Basel III. Private debt in Northern Europe has played a leading role in all of the financial crises experienced at country level since the EMS crisis to the present. Paper 4 shows the macroprudential regulation of Basel III in a generally more positive light than Repullo and Saurina (2011) who deem the countercyclical capital buffer a procyclical instrument. While paper 4 finds similar results over the whole cycle, it identifies the post crisis era as one in which the tool is not suited to across all sample countries-Finland, Ireland, Sweden and the UK. However, what the paper stresses is the built in mechanisms that reduce this inherent weakness- something which critics (Edge and Meisenzahl, 2011; Repullo and Saurina, 2011) fail to mention in following a rigid application of the buffer in their studies. While a robotic operation of the tool would lead to procyclicality according to the results in paper 4, its strength lies in its predictive power during the pre-crisis period (i.e. prevention) and it could be complemented with credit growth as paper 4 shows does not suffer from procyclicality with reference to triggering the buffer. While this view is in line with a renewed academic interest in credit growth as a strong predictor of financial crisis (Ahnland, 2015; Schularick and Taylor, 2012), it also supports the findings of Repullo and Saurina (2011) and Ibáñez-Hernández et al (2015).

Both paper 3 and paper 4 overlap in terms of the nature of measurement and implications for policy makers. Throughout paper 3, the issue of definition was referred to in measuring the fiscal stance of the government. For instance, though Ireland met its obligations under the Stability and Growth Pact (SGP) of achieving a fiscal balance greater than a 3% deficit of GDP each year during the period 2000-7, Benetrix and Lane (2010b) and Kearney (2012) had highlighted that despite these “headline” government figures, the structural or “through the cycle” balance was considerably negative or procyclical. Lane (2010b) and Benetrix and Lane (2010b) attributed this to the difficulty attached to defining output gaps and trends in an economy as open as Ireland’s which exposed the Department of Finance and political authorities to a false sense of security. In 2012 the Swedish Fiscal Policy Council has stressed that a surplus equivalent of 1% of GDP *over a business cycle* “implies a lower risk of a procyclical fiscal policy” (SFPC, 2012). Nonetheless, issues regarding measurement and interpretation remain as there “is a recurrent plea for increased clarity concerning the surplus target; that is the requirement of net lending being one percent of GDP over the business cycle” (Jonung, 2013b).

Similarly, paper 4 also experiments with alternative trend lines and finds that the operation of the buffer is highly sensitive to the base year and is thus vulnerable to political influence. In other words, macroprudential policy like fiscal policy may become directly or indirectly procyclical due to the interpretation of a trend and the gaps which it reveals or rigid adherence to a set of predetermined rules. In the case of fiscal policy, it was clear in the pre-crisis era that the criteria of the Stability and Growth Pact were redundant in Ireland’s case and Europe at large (Bénétrix and Lane, 2013). The Basel Committee have adopted an increasingly flexible approach (BCBS, 2015b) to the interpretation of the countercyclical capital buffer policy documents (BCBS 2010a, b), which while providing the necessary flexibility in a downturn has the disadvantage of exposing supervisors to political pressures during boom periods. In the context of the historically high levels of Swedish private debt (Andersson and Jonung, 2016), it is not difficult to imagine political lobbying to keep buffers “off” using the Riksbank’s negative interest rate policy and the post crisis environment as justification for a low risk outlook, though by all predetermined calculations it would have been “on” since 2008. In the context of the historically high levels of Irish public debt, it is equally feasible that resorting the “softer” obligations of the SGP as a measure of fiscal prudence in the short term is a more politically favourable alternative. Both scenarios occur in

environments where measurement remains open to some degree of interpretation.

Similarly however, rigid interpretations of measurements plague the Irish Central Statistics Office at present and thus affect paper 3 and paper 4 (if extended to 2015). By following the ESA 2010 rules of national accounting, due to the extremely open nature of the Irish economy and the variety of foreign corporations, the new European accounting standard produced the growth figure of 24% in real GNP for 2015. This comes in the aftermath of a publication from Eurostat which claimed that the new ESA 2010 rules would not affect growth rates, only levels of national output (Eurostat, 2014). A prominent Irish economist, Colm McCarthy reacted in the press following their release by stating that “international statistical conventions should provide an intelligible framework for countries to produce economic statistics which reflect their true level of economic activity. Eurostat has failed to deliver to this simple standard” (McCarthy, 2016). GNP and GDP are the denominators of a wide variety of aggregates used in this dissertation such as private sector credit, primary balance and government debt. Changes in accounting rules at both domestic and international level consistently alter the frames of reference and dilute the consistency of long run individual series. This will continue from economic history to the economic future, but will present a number of challenges going forward to the construction of longer run series.

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# Paper 1. Financial Aggregates for the United Kingdom, 1844-80\*

By Nicholas Dimsdale, Seán Kenny, Jason Lennard and Ryland Thomas

## Abstract

In this paper, we construct new monthly and annual time series for the monetary base and broad money respectively for the period 1844-70 and bank assets for the period 1844-80. The new monetary aggregates are constructed from a number of contemporary sources which include the Bank of England Archive, the archives of the Royal Mint, bank archives across the United Kingdom and British Parliamentary Papers. In following the definitions of the Bank of England (and by extension Capie and Webber), it is now possible to track the development of money from the beginning of the modern monetary system to the present.

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\* This paper is an extended version of the Data Appendix in *UK Macroeconomic and Financial Cycles 1700-2014: Data, Analysis, Synthesis* (forthcoming). Dimsdale, N., Kenny, S., Lennard, J. and Thomas, R. Palgrave MacMillan, London.

# 1. Introduction

Recent research has shown that monetary aggregates, such as narrow and broad money, and financial aggregates, such as bank assets, are associated with financial crises.<sup>1</sup> For instance, the broad money supply (*M3*) can be used to yield valuable information on economic distress.<sup>2</sup> Bank assets, which appear on the other side of the financial sector's balance sheet, are typically utilised as a measure of lending and private leverage (when expressed as a percentage of GDP).<sup>3</sup> Financial regulators review balance sheet leverage by monitoring bank assets expressed as a multiple of equity, a useful measure for analysing the degree of risk taking within a banking system.<sup>4</sup> They also serve as a good predictor of oncoming financial distress.<sup>5</sup> The liquidity of the banking system, a key variable for analysing bank fragility in crises, can be gauged by dividing assets by cash reserves.<sup>6</sup> In recent times, bank assets have served as an appropriate indicator of the size of the financial sector which was found to be an important driver of post-crisis fiscal costs.<sup>7</sup>

Additionally, these variables have also been shown to play a causal role in the process of economic development. King and Levine and later Levine alone studied the effects of various financial indicators on economic development and found statistically significant results in every instance.<sup>8</sup> Ögren confirmed that indicators of financial development, such as broad money growth and total bank assets, Granger-caused GDP growth.<sup>9</sup>

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<sup>1</sup> Schularick and Taylor, 'Credit Booms gone Bust'.

<sup>2</sup> ECB 'Money and Credit Growth after Economic and Financial Crises'; Bordo 'The Impact and International Transmission of Financial Crises'; Friedman and Schwartz, *A Monetary History of the United States*; Schularick and Taylor, 'Credit Booms gone Bust'.

<sup>3</sup> Schularick and Taylor, 'Credit Booms gone Bust'; Reinhart et al., 'Debt Overhangs: Past and Present'.

<sup>4</sup> The inverse is the leverage ratio. See Basel Committee on Banking Supervision, 'Basel III Leverage Ratio Framework and Disclosure Requirements'; Minsky, *Stabilizing an Unstable Economy*, pp. 261-5.

<sup>5</sup> Schularick and Taylor, 'Credit Booms gone Bust'.

<sup>6</sup> Demirgüç-Kunt and Detragiache, 'The Determinants of Banking Crises'.

<sup>7</sup> Laeven and Valencia, 'Systemic Banking Crises Database: An Update'.

<sup>8</sup> King and Levine, 'Finance and Growth'; Levine, 'Financial Development and Economic Growth'.

<sup>9</sup> Ögren, 'Financial Revolution and Economic Modernization in Sweden'.

Monetary aggregates are often used to track activity in the real economy.<sup>10</sup> For instance, the new monthly narrow money series (*M0*) may serve as a measure of seasonality in the real economy which cannot be observed in other aggregates, particularly as GDP data during the period 1844-70 is of annual frequency. Given the high frequency, the new series can be used to time real economic activity in the market economy. As a macroeconomic variable, money is likely to “contain corroborative information about the *current* level of nominal spending in the economy.”<sup>11</sup> For instance the main component of the monetary base, the public’s holding of currency (*PC*), can shed light on consumption as notes and coin bear no interest to the holder with the implication that they are typically held for transaction purposes.<sup>12</sup>

For the United Kingdom, no accurate time series for these variables exist before 1870 in the case of the monetary aggregates and 1880 in the case of bank assets. As a result, the existing series miss the heyday of British financial crises and all of the period characterized by the Industrial Revolution. For instance, financial crises occurred in 1847, 1857-8, 1866 and 1878.<sup>13</sup> The next major financial crisis in the UK was not until 2008.

The purpose of this paper is to fill this gap by constructing new series for narrow and broad money for the years 1844 to 1870 and for bank assets between 1844 and 1880. In doing so, we can consistently track the development of the modern financial system since its beginning with the Bank Act of 1844 until the present day.

## 2. Previous Research

Many notable British economists throughout history produced estimates of coin in circulation, the predominant medium of exchange, for various benchmark years. Gregory King, for example, estimated the stock of coin in England and Wales in 1688 to be £3 million in gold and more than £8 million in silver. By 1780, Sir James Morrison, Third Clerk to the Master of

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<sup>10</sup> Fisher, *Booms and Depressions*, pp. 30-2; ECB ‘Money and Credit Growth after Economic and Financial Crises’.

<sup>11</sup> McLeay et al., ‘Money Creation in the Modern Economy’.

<sup>12</sup> Andrews and Janssen, ‘Publication of Narrow Money Data’.

<sup>13</sup> See Turner, *Banking in Crisis*, pp. 72-88 for descriptions.

the Mint who later rose to Deputy, estimated that the gold coinage had topped £26 million.<sup>14</sup> William Newmarch, President of the Royal Statistical Society and author of *A History of Prices* with Thomas Tooke, put the stock of gold coin at £36 million in 1844 and £69 million in 1856.<sup>15</sup> By 1868 William Stanley Jevons judged gold coin in circulation to be £80 million, silver coin £14 million and copper and bronze coin to be £1 million.<sup>16</sup> From 1905 onwards, the Royal Mint produced official figures.

There have been few papers, however, which reveal the course of money between these benchmarks, which limits our understanding to general trends. Huffman and Lothian in the *Journal of Money, Credit and Banking* produce an annual series of high-powered money, which is the sum of coin outside banks, notes outside banks and bankers' and other private deposits at the Bank of England for the period 1833-79.<sup>17</sup> Theirs is a slightly broader definition than ours, given the inclusion of other private deposits at the Bank of England. The authors find that the base was relatively flat at an average level of £84 million in the 1840s before taking off in the 1850s. The average annual growth rate of the series between 1850 and 1870 was 2.97 per cent. However, the series is problematic for a number of reasons.

Firstly, with respect to coin outside banks, the authors work backwards from Sheppard's estimate for 1880, deducting the total coined and net exports in each year. However, the authors resort to using Imlah's series for net exports of gold and silver *bullion* and specie for the period before 1857.<sup>18</sup> This is problematic for two reasons. One, consider a year of strong net exports of bullion and specie, such as 1857, a year in which £6.5 million was exported on net, Huffman and Lothian's series falls by £6.5 million relative to 1856. However, the likelihood that the composition of bullion and specie flows consisted of pure British coin is minimal. Custom House returns show that British gold coin made up just 8.84 per cent of total exported bullion in that year.<sup>19</sup> Two, consider a year of strong net imports, such as 1855, a year in which £7.8 million of bullion and specie was imported on net. Huffman and Lothian's series rises by the full amount on

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<sup>14</sup> Previous estimates summarised in Tooke and Newmarch, *A History of Prices*, p. 703.

<sup>15</sup> Tooke and Newmarch, *A History of Prices*, pp. 700-1.

<sup>16</sup> Jevons, 'On the Condition of the Metallic Currency of the United Kingdom'.

<sup>17</sup> Huffman and Lothian, 'Money in the United Kingdom'.

<sup>18</sup> Sheppard, *The Growth and Role of UK Financial Institutions*; Imlah, *Economic Elements in the Pax Britannica*.

<sup>19</sup> P.P., 1858.

the logic that this would all find its way into the Mint. However, in reality the bullion would also find its way into the Bank of England, allowing the Issue Department to increase its circulation of notes, leading to double counting in the monetary base.

Furthermore, not all bullion would have been used for monetary purposes. A portion of the imported bullion would have been used for jewellery and manufacturing processes. Additionally, a robust coin series would account for bronze and copper coin (average of £0.65 million), for withdrawals of gold and silver coin (£14.4 million and £2 million respectively), coin held in the Issue Department of the Bank of England (average of £6.65 million with a maximum of £12.61 and a minimum of £1.53 million) as well as that in the Banking Department (average of £0.75 million), melting of gold coin by bullion dealers and jewellers (amounted to £27.84 million), and the exports of gold coin by migrants (amounted to £11 million).

Huffman and Lothian's series for notes can also be improved. The authors use the term "notes outside banks" but a more appropriate term would be "notes outside issuing institution" because there is no adjustment made for banks' cross-holdings of other banks' notes. While there would have been a low level of crossholdings of country bank notes, because of a well-developed clearing system, country banks held significant sums of coin and Bank of England notes as a reserve against their own note issue.<sup>20</sup> Huffman and Lothian's series, in not accounting for this fact, therefore suffers an additional element of double counting, which was not constant over time.

Officer's monetary base for the equivalent period sums coin in circulation, Bank of England notes in circulation as well as Scottish and Irish bank notes (less coin held against them) and bankers' balances.<sup>21</sup> The series' strongest merit lies in its length (1791-1932). However, it suffers from similar problems to Huffman and Lothian's. Officer's annual estimates were based, among other things, upon balance of payment flows of specie which were added to a stock of specie estimated for 1830. It does not take melting into account, copper coin is not included, it assumes that all bullion was held at the Bank of England and it does not consider the impact of

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<sup>20</sup> See Capie and Webber, *A Monetary History of the United Kingdom*, pp. 287-8 for a description of the clearing system.

<sup>21</sup> Officer, 'The U.S. Specie Standard'.

emigration. In addition, English private bank notes are excluded from Officer's series which averaged £3.45 million.

The only comparable series available for broad money is a composite of two other series. Hills et al. splice backwards from Capie and Webber's figure for 1870 using the growth rate of Collins's series for the net liabilities of the joint stock banks of England and Wales.<sup>22</sup> Splicing partially overcomes the omission of coin and the net liabilities of English and Welsh private banks and the Irish and Scottish banks in general, but is only a good approximation if these items were a constant share of broad money over time.

### 3. Data Construction

#### Monetary Aggregates

The two monetary aggregates, narrow money ( $M0$ ) and broad money ( $M3$ ), are defined as:

$$M0 = PC + R \quad (1)$$

$$M3 = PC + D \quad (2)$$

where  $PC$  is notes and coins in circulation with the public,  $R$  is banks' reserves and  $D$  is net sterling commercial bank deposits held by the public. In the underlying sources we have used the last observation for each period, so that the monthly  $M0$  series is month-end and the annual  $M0$  and  $M3$  series are year-end.

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<sup>22</sup> Hills et al., 'Three Centuries of Data'; Capie and Webber, *A Monetary History of the United Kingdom*; Collins, 'Long-term Growth of the English Banking Sector and Money Stock'.

*A.1 Stocks*

The coinage of the United Kingdom in the mid-Victorian era consisted of gold, silver and copper/bronze – bronze was introduced in 1860 and copper demonetised in 1873.<sup>23</sup> We have estimated separate circulations for each of the three metals. In each case, it was necessary to begin with a starting stock from which to add and subtract flows from.

**Table 1. Coin Stocks**

	Stock (£)
<i>Gold</i>	
December 1844	41,657,153
March 1868	74,833,000
<i>Silver</i>	
December 1868	14,000,000
<i>Copper</i>	
December 1868	1,000,000

Source: See text.

The opening stock for gold coin coincides with the end of the Great Recoinage that began on 9 June 1842. Recoinages provide a window through which the stock of coin in circulation can be accurately gauged. A contemporary observer, William Newmarch, who later became President of the Royal Statistical Society, estimated that there was £36 million of gold coin outside the Bank of England at the close of 1844, based on the logic that £12 million of light gold coin was withdrawn from circulation during the recoinage, and that “very competent authorities” believed that this was one-third of the total outside the Bank of England.<sup>24</sup> Thus, we add the stock of gold coin in the Bank of England at the time (£5,657,153) to arrive at the figure in table 1.<sup>25</sup>

The estimate of the gold stock for March 1868 was produced by another prominent contemporary, William Stanley Jevons.<sup>26</sup> Particularly in the case of gold coin, Jevons’s estimates were scientific exercises. He circulated a

<sup>23</sup> Craig, *The Mint*, pp. 324-5.

<sup>24</sup> Tooke and Newmarch, *A History of Prices*, pp. 700-1.

<sup>25</sup> Bank of England Archives, 9A47/1; Bank of England Archives, 12A54/1.

<sup>26</sup> Jevons, ‘On the Condition of the Metallic Currency of the United Kingdom’.



letter to a number of “bankers and gentlemen” asking them to take a sample of their gold coin holdings and report the year in which each coin was issued. In total, 321 responses from 213 locations were received. The results of this exercise showed that 18,671 sovereigns in every 100,000 were issued in 1863 or 1864. The number of sovereigns issued in those years was £14.58 million, of which £1.75 million had been exported by 1868 and £0.6 million lay in the Bank of England. What remained, roughly £12.25 million, was then multiplied by 5.36 (100,000/18,671) to give a total sum of sovereigns in circulation, in round numbers, of £65 million, to which a further £3.5 million of undistributed coin was added, giving a total of £68.5 million. Half-sovereigns totalled £12 million, having received the same treatment. However, Capie and Webber rightly correct Jevon’s estimate of the gold stock for melting and for unrecorded exports (more on this below).<sup>27</sup> This correction puts the gold stock at £74,833,000 in March 1868. In a similar way, Jevons also estimated the silver in circulation at £14,000,000 and copper at £1,000,000.

## *A.2 Flows*

In order to estimate the coin stock,  $C$ , of metal  $i$  at time  $t$ , we utilise the stocks in table 1 and the following formula:

$$C_{it} = C_{it-1} + A_{it} - W_{it} \quad (3)$$

where  $A$  are the additions to the coin stock and  $W$  are the withdrawals. In the subsequent sub-sections, we will discuss the items that we consider as additions and withdrawals to each coin stock.

### *A.2.1 Additions and Withdrawals through the Royal Mint*

In the period in question, gold coins were minted by the Royal Mint and entered circulation through the Bank of England’s Issue Department.<sup>28</sup> While others could take bullion to the Mint for coining, the lag between the

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<sup>27</sup> See Capie and Webber, *A Monetary History of the United Kingdom*, pp. 193-202 for a full explanation of the derivation of this figure.

<sup>28</sup> Craig, *The Mint*, p. 239; Capie and Webber, *A Monetary History of the United Kingdom*, p. 201.

handover of bullion and the receipt of coin was typically a number of weeks, which resulted in foregone interest. Therefore, in practice, one turned to the Bank of England for an instant supply of gold coin.<sup>29</sup> For this reason we utilise the Bank of England's records of receipts of gold coin, which is available on a monthly basis, from the Royal Mint rather than minting figures themselves.<sup>30</sup> This gives a more accurate chronology of the month in which the coin physically entered circulation. In total, £128 million was minted between 1844 and 1870, with the peak coming in 1853 when almost £12 million was coined. In the interest of robustness, our figures for gold coin have been cross-checked against those by Craig.<sup>31</sup>

The responsibility of withdrawing light gold coin again lay, in practice, with the Bank of England. As Jevons noted, it was impractical for individuals to uphold the law regarding light gold coin for it involved "every person [...having with them] a pair of scales capable of detecting light gold."<sup>32</sup> Even if this was the case, "it would so often be considered a discourteous act, that the practice [was] almost entirely abandoned by the public."<sup>33</sup> The reality was that a light gold coin could be passed on successively, until it eventually reached the Bank of England, who paid the holder just 1.5 pence below the Mint price.<sup>34</sup> As a result, we again utilise the Bank of England's records to ascertain the date in which they removed gold coin from circulation, as opposed to the date it was received by the Royal Mint, by which point it was no longer legal tender, but rather bullion.<sup>35</sup> This data has been collected on a daily basis until 1854 and on a weekly basis thereafter, with monthly/annual totals calculated and used in the final series. Unlike gold coin, silver and copper coin was issued and withdrawn directly by the Royal Mint.<sup>36</sup>

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<sup>29</sup> Challis, *A New History of the Royal Mint*, p. 484.

<sup>30</sup> 1844-70: Bank of England Archives, C66/3-4.

<sup>31</sup> Craig, *The Mint*, pp. 419-20.

<sup>32</sup> Jevons, 'On the Condition of the Metallic Currency of the United Kingdom'.

<sup>33</sup> Jevons, 'On the Condition of the Metallic Currency of the United Kingdom'.

<sup>34</sup> Craig, *The Mint*, p.308.

<sup>35</sup> 1844-53: Bank of England Archives C61/4-6; 1854-70: Bank of England Archives, C1/2-18.

<sup>36</sup> December 1844 - March 1850: The National Archives, MINT 6/56; April 1850 - March 1854: The National Archives, MINT 6/57; April 1854 - September 1857: The National Archives, MINT 6/5; October 1857 - September 1862: The National Archives, MINT 6/6; October 1862 - December 1866: The National Archives, MINT 6/7; January 1867 - December 1870: The National Archives, MINT 6/8.

### A.2.2 Net Exports

In the nineteenth century British coin was both imported and exported to the colonies and to other countries to settle balance of payments deficits or for use as currency, as was the case in Brazil, Egypt and Portugal, for example.<sup>37</sup> Annual data on the exports of British gold and silver coin is available for the full period.<sup>38</sup> Annual data on the imports of these coins is only available in these sources from 1858. Before this point, it was necessary to estimate the level of imports. To do so, we summed the total of exported British gold and silver coin, foreign gold and silver coin and gold and silver bullion to arrive at total exports of gold and silver bullion and specie for each year. We then deduct this from Imlah's net export of gold and silver bullion and specie to produce annual estimates of imported gold and silver bullion and specie.<sup>39</sup> The ratio of imported British gold coin to total imported bullion and specie in 1859 is used to produce a series for the earlier years. We repeat the exercise for the British silver coin import series. Unfortunately, this is one of the few series for which monthly data is not available. Therefore, we have apportioned the annual total evenly across the 12 months of the respective year.

### A.2.3 Coin Carried by Emigrants

In the nineteenth century emigrants from the United Kingdom are known to have carried gold coin with them because of its function as an international medium of exchange. This was not generally the case, however, with silver or copper coin as these were merely "token".<sup>40</sup> As in Capie and Webber, we calculate unrecorded gold coin exported by emigrants as the number of emigrants per year multiplied by the average value of gold coin carried per emigrant. With respect to the number of emigrants, we use annual data from the *General Report of the Emigration Commissioners*.<sup>41</sup> Unfortunately, data on emigration is less than ideal for the period in question. While classified as an annual series of "total emigration from the United Kingdom", it is actually a series of passengers from the United Kingdom to extra-European

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<sup>37</sup> Dyer, 'The Modern Sovereign', p. 47.

<sup>38</sup> Copper coin was not traded in significant quantities. 1844-52: Tooke and Newmarch, *A History of Prices*, p. 709; 1853-7: P.P., 1858; 1858: P.P., 1888; 1859-63: P.P., 1864; 1864-8: P.P., 1869; 1869-70: P.P., 1871a.

<sup>39</sup> Imlah, *Economic Elements in the Pax Britannica*, pp. 71-2.

<sup>40</sup> Capie and Webber, 'Total Coin and Coin in Circulation in the United Kingdom'.

<sup>41</sup> P.P., 1871b.

countries. However, Wilcox argues that “until 1860 one would not be far wrong in treating all passengers [...] as persons who sailed for overseas countries with a view to changing their abode.”<sup>42</sup> What’s more, it seems reasonable that the bulk of emigration in this period would have been to the New World and that there would have been little intra-European emigration from the United Kingdom. With regard to the average value of coin taken per emigrant, Capie and Webber, based on advice from Dudley Baines and Charlotte Erickson, use an average of £2.50 of gold coin per migrant for the 1870s, which Baines informs us was based on a month’s wages for a working class man.<sup>43</sup> We accept this figure for the 1870s and interpolate backwards using changes in nominal wages.<sup>44</sup> Along with net exports, this is the other series for which monthly data was not available. Therefore, we apportion the annual total equally over the respective months.

#### *A.2.4 Melting*

Historically, gold coin was commonly melted as an input for jewellery production and manufacturing, while heavy coin was melted for profit. The inclusion of two stocks for gold coin allows us to calculate the level of melting as a residual. We interpret the difference between £74,833,000 (Jevons’s stock for March 1868) and £99,644,572 (our series exclusive of melting for the same month) as the sum of melting between December 1844 and March 1868. We apportion this evenly between these intervals to give an average level of melting of £88,930 per month or £1.07 million a year, which we also apply to the period April 1868 to December 1870. This is a slightly lower average level than that used by Capie and Webber for the period 1870-1905 (£1.16 million).<sup>45</sup> As a robustness check, our final figure for gold in circulation for December 1856, £71 million, is close to Newmarch’s independent estimate of £69 million.<sup>46</sup>

#### *B. Notes*

A variety of banks issued notes in the nineteenth century, including private, joint stock and chartered banks, as well as the Bank of England. Monthly

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<sup>42</sup> Wilcox, *International Migrations*, p. 622.

<sup>43</sup> Capie and Webber, *A Monetary History of the United Kingdom*, pp.194-5.

<sup>44</sup> Feinstein, ‘Pessimism Perpetuated’.

<sup>45</sup> Capie and Webber, *A Monetary History of the United Kingdom*.

<sup>46</sup> Tooke and Newmarch, *A History of Prices*, pp. 701.

circulation data has been collected for each class of note-issuing institution. For the Bank of England, Parliamentary Papers have been used in addition to archival material.<sup>47</sup> For the other institutions, data has been gathered from Parliamentary Papers and the *Bankers' Magazine*.<sup>48</sup>

### *Deposits (D)*

Data on gross deposits has been collected on the largest possible sample of banks from various archives, the *Economist* and secondary sources. The banks, together with the underlying sources are shown in table 2, while the coverage in terms of branches is shown in table 3. In order to estimate the gross deposits of the entire UK banking system from this sample, we follow the approach of Capie and Webber, Collins and Kenny and Lennard.<sup>49</sup> Specifically, the level of deposits ( $D$ ) at time  $t$ , is calculated as the sum of deposits ( $d$ ) of sample bank  $i$ , multiplied by the ratio of bank branches in the population of joint stock and private banks ( $B$ ) to the number of bank branches in the sample ( $b$ ).<sup>50</sup>

$$D_t = B_t \frac{\sum_{i=1}^n d_{it}}{\sum_{i=1}^n b_{it}} \quad (4)$$

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<sup>47</sup> December 1844 - July 1849: P.P., 1850; August 1849 - August 1853: P.P., 1853; September 1853 - February 1855: P.P., 1855; March 1855 - July 1856: P.P., 1856; August 1856 - July 1857: P.P., 1857a; August 1857 - December 1870: Bank of England Archives, C1/5-18.

<sup>48</sup> December 1844 - July 1857: Ibid; August 1857 - December 1870: *Bankers' Magazine*, various years.

<sup>49</sup> Capie and Webber, *A Monetary History of the United Kingdom*; Collins, 'Long-term Growth of the English Banking Sector and Money Stock'; Kenny and Lennard, 'Monetary Aggregates for Ireland'.

<sup>50</sup> Information on bank branches was taken from the *Banking Almanac*, various years. Excludes agencies and sub-branches. In some cases, there was a delay between the formation of a new bank and its appearance in the *Almanac*. In these cases, it was assumed that the bank had a head office with no branches. Equally, if there was a missing entry, we assumed that the bank had as many branches as the previous year.

**Table 2. Banks Included in Sample along with Sources**

<b>Bank</b>	<b>Sources</b>	<b>Bank</b>	<b>Sources</b>
<b><i>England and Wales</i></b>			
Bank of London (by Royal Charter)	Thomas (1934)	Lloyds Banking Company Ltd	RBS Archives, RB/1365, Lloyds Archives, H/05/ROP/1
Bank of Manchester	RBS Archives, BMH/47	London and County Joint Stock Bank	RBS Archives, WES/39
Bank of Stockport	RBS Archives, BST/21	London and South Western Ltd	Barclays Archives, Acc3/1481
Barnard & Co of Bedford	Pressnell (1956)	London and Westminster Bank	RBS Archives, LWB/232, LWB/263, <i>The Economist</i> (various years)
Bedford Bank	Bedfordshire and Luton Archives, BD155-83	London Joint Stock Bank	Thomas (1934)
Bilston District Bank	RBS Archives, CST/2	Manchester and County Bank	RBS Archives, COU/120
Birmingham and Midland Bank	Holmes and Green (1986)	Midland Banking Company Ltd	Barclays Archives, Acc1/17
Birmingham Dudley Town and District Bank	Barclays Archives, Acc1/73	National Provincial Bank of England	RBS Archives, NAT/1286
Bradford Banking Company	HSBC Archives, B43/3-9	Northamptonshire Union Bank	RBS Archives, NOR/76
Bradford District Bank Ltd	RBS Archives, BRD/81	Parrs Banking Company Ltd	RBS Archives, PAB/9
Bucks and Oxon Union Bank	Lloyds Archives, F3977, F3995	Preston Banking Company	HSBC Archives, AN 0021
Burton, Uttoxeter, and Ashbourne Union Bank	Lloyds Archives, A/32/6/1	Samuel Smith & Co	RBS Archives, SSD/54
Carlisle and Cumberland Banking Company	Barclays Archives, Acc25-75	Sheffield and Hallamshire Bank	RBS Archives, RB/1365
Carlisle City and District Banking Company	HSBC Archives, UK F 0009	Sheffield Banking Company	RBS Archives, SBC/5
City Bank, The (by Royal Charter)	HSBC Archives, UK E 0016A, UK 34/1-2	Smith Ellison & Co	RBS Archives, SEC/29/1
Commercial Bank of London	Thomas (1934)	Stephens, Harris and Stephens	Lloyds Archives, B194-8, B302
Consolidated Bank Ltd	RBS Archives, BMH/47	Stuckeys Banking Company	RBS Archives, STU/8
Gillet and Tawney of Banbury	Pressnell (1956)	Union Bank of London	RBS Archives, UNI/15
Hampshire Banking Company	Lloyds Archives, A/53/6/3	Union Bank of Manchester	Barclays Archives, Acc6/41
Hoare's Bank	C. Hoare and Co. Archives, HB/5/1/2-7	Unity Joint-Stock Mutual Banking Association	Thomas (1934)
Leicestershire Banking Company	HSBC Archives, UK K 16-17	Wilts and Dorset Bank	Lloyds Archives, B3178
Leyland, Bullins & Co	Pressnell (1956)	William Whiteley	RBS Archives,

of Liverpool			GM/213
<b>Scotland</b>			
Bank of Scotland	Bank of Scotland Archives, BOS/4/7/4/2, Saville (1996)	Dundee Bank	Boase (1867)
British Linen Company	Bank of Scotland Archives, Acc.2009/026/1108	Perth Banking Company	Munn (1981)
Caledonian Banking Company	Bank of Scotland Archives, NRAS945/7/2/1	Royal Bank of Scotland	RBS Archives, RB/257/3
Central Bank of Scotland	Bank of Scotland Archives, CBS/4/1-3	Union Bank of Scotland	Lloyds Archives, UBS 1/10/1, UBS 1/10/3-4, UBS 2/1/14
Clydesdale Banking Company	Munn (1988)		
<b>Ireland</b>			
Bank of Ireland	<i>Thom's Irish Almanac</i> (1873)	Northern Banking Company	<i>Thom's Irish Almanac</i> (1873)
Belfast Banking Company	<i>Thom's Irish Almanac</i> (1873)	Provincial Bank of Ireland	<i>Thom's Irish Almanac</i> (1873)
Hibernian Bank	<i>Thom's Irish Almanac</i> (1873)	Royal Bank of Ireland	<i>Thom's Irish Almanac</i> (1873)
Munster Bank	<i>Thom's Irish Almanac</i> (1873)	Ulster Banking Company	<i>Thom's Irish Almanac</i> (1873), Dillon (1889)
National Bank of Ireland	<i>Thom's Irish Almanac</i> (1873)		

**Table 3. Size of Sample for Deposit Estimates as a Percentage of Total Branches, 1850-70 ( % )**

Year	England and Wales	Ireland	Scotland
1850	18	91	19
1860	21	96	43
1870	43	98	43

Source: See text.

In a few instances, the underlying balance sheets combined deposits and notes together. In order to make use of this information, we calculated an average deposit to demand liability ratio for each region and year from the balance sheets with the necessary level of disaggregation. These ratios were then used to disentangle the deposits from the aggregate figure.

Due to regional variation in deduction items, we calculate individual gross deposit series for England and Wales, Ireland and Scotland. The first deduction item is interbank deposits. In the nineteenth century, as today, banks held deposits with other banks as an interest-bearing contingency.<sup>51</sup>

<sup>51</sup> See Kenny and Lennard, 'Monetary Aggregates for Ireland', for a full discussion.

For England and Wales and Scotland, we use the aforementioned balance sheets to derive an average time-invariant ratio of other banks' deposits to total deposits. For Ireland, we use returns filed to the Select Committee for Banks of Issue for 8 of the 9 joint stock banks in 1875.<sup>52</sup> These figures are first multiplied by, and then deducted from, the respective gross deposit series. The second deduction item is cheques and notes in transit and collection. Here, we use the ratio of these items to gross deposits in each region from Capie and Webber to derive a series of cheques and notes in transit and collection.<sup>53</sup> Following the Bank of England, and by extension Capie and Webber, 60 per cent of these items are then deducted from the gross deposit series.<sup>54</sup>

Finally, the Bank of England's Banking Department also held private deposits. In the underlying sources, these were often recorded as "other deposits".<sup>55</sup> This item included balances held by bankers. These sums have therefore been deducted from other deposits to yield private deposits held by the non-bank public at the Bank of England and added to total net deposits of the United Kingdom.

### *Reserves (R)*

In the nineteenth century banks' reserves consisted of notes and coin and balances with other banks. In terms of the latter, it is only the balances with the Bank of England that are of concern, as interbank holdings do not represent the "ultimate reserve". Bankers' balances at the Bank of England are available on a weekly basis from 1828 in the *BEQB*.<sup>56</sup> In terms of notes and coin held by banks, we used the balance sheets listed in table 2 and equation (4), with deposits replaced by notes and coin held, to estimate separate "cash" series for England and Wales, Scotland and Ireland. Where cash was included with bankers' balances, we used the less aggregated balance sheets to calculate average cash to total reserve ratios for each region and year, and multiplied these by the reserves of the banks in question. For Ireland, we used the annual cash to demand liability ratios

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<sup>52</sup> P.P., 1875.

<sup>53</sup> Capie and Webber, *A Monetary History of the United Kingdom*, pp. 296-8.

<sup>54</sup> *BEQB*, 'Reserve Ratios: Further Definitions'; Capie and Webber, *A Monetary History of the United Kingdom*, pp. 302-3.

<sup>55</sup> 1844-9: P.P., 1850; 1850-2: P.P., 1853; 1853-4: P.P., 1855; 1855: P.P., 1856; 1856: P.P., 1857a; 1857-70: Bank of England Archives, C1/5-18.

<sup>56</sup> *BEQB*, 'Bank of England Liabilities and Assets'.



discussed in Kenny and Lennard, which were multiplied by the current series of Irish notes and deposits.<sup>57</sup> Cash was further split into reserves against the note issue and till money. For Ireland and Scotland, reserves against the note issue were published from January 1846.<sup>58</sup> For the 13 months prior to this date, we spliced backwards using the growth in the Irish and Scottish note issues. For England and Wales, we derived this figure by apportioning cash on the basis of notes to demand liabilities. The series for till money was calculated as total cash less reserves against the note issue. In addition to the reserves of the commercial banks, the Bank of England's Banking Department's reserve of coin and notes is also considered as till money.<sup>59</sup> Similarly, the Issue Department's reserve of gold coin is considered as a reserve against the note issue.<sup>60</sup> The series for reserves against the note issue and till money is deducted from notes and coins outstanding to give currency held by the public, while till money and bankers' balances constitute total reserves ( $R$ ).

## Bank Assets

Finally, we construct an annual asset series for joint stock banks. We focus on these banks in order to be consistent with Shephard's series, which begins in 1880.<sup>61</sup> Similar to deposits and cash, bank assets are calculated using the balance sheets from table 2 and equation (4), where deposits are substituted for assets.

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<sup>57</sup> Kenny and Lennard, 'Monetary Aggregates for Ireland'.

<sup>58</sup> *Bankers' Magazine*, various years. Data was incomplete for November 1846, August 1851 and November 1852. In these cases, we used comparable data from P.P., 1857b.

<sup>59</sup> December 1844 - June 1850: P.P., 1850; July 1849 - July 1853: P.P., 1853; August 1853 - February 1855: P.P., 1855; March 1855 - June 1856: P.P., 1856; July 1856 - July 1857: P.P., 1857a; August 1857 - December 1870: Bank of England Archives, C1/5-18.

<sup>60</sup> December 1844 - December 1852: Bank of England Archives, 9A47/1-2; January 1853 - December 1870: Bank of England Archives, C1/1-18.

<sup>61</sup> Shephard, *The Growth and Role of UK Financial Institutions*.

## 4. Results

Figure 1 shows the new narrow money series in comparison to the existing estimates of Huffman and Lothian and Officer. The new series show a lower rate of growth in comparison to Huffman and Lothian, which addresses the concern of Capie and Webber; namely that it shows “a rate of growth that is too high.”<sup>62</sup> The endpoint of the new *M0* series at December 1870 differs from Capie and Webber’s by only 0.6 per cent, the former being calculated independently without splicing or similar treatment. The level of Officer’s series remains consistently lower, though in log differences the correlation coefficient with our series is 0.55.

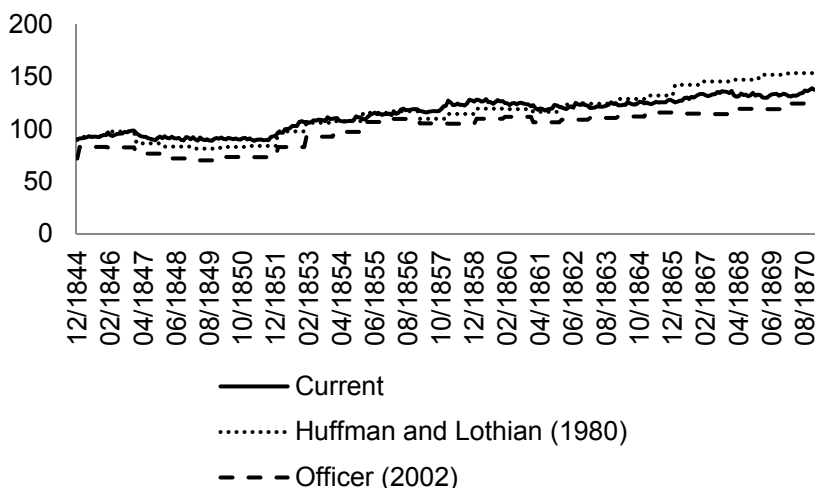
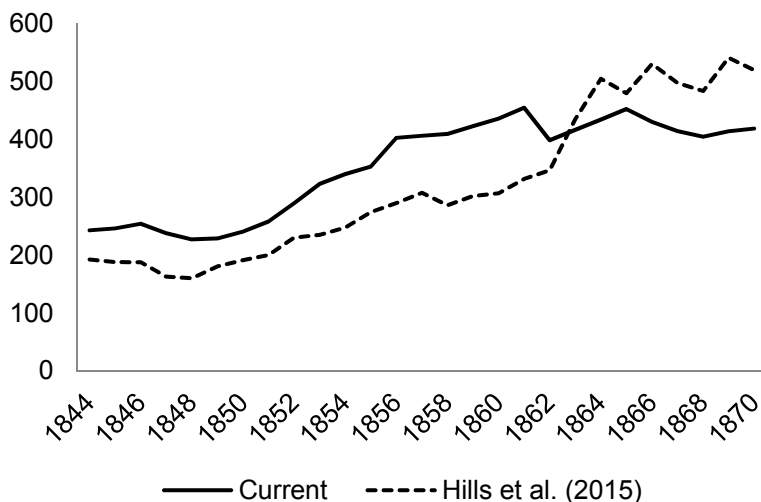


Figure 1. Comparison of New Narrow Money with Existing Estimates (£ millions)

Figure 2 shows the new broad money series in relation to the existing estimates of Hills et al., who spliced back from Capie and Webber’s figure for 1870 using the growth rate of Collins’s series for net liabilities of joint stock banks. The most notable differences are the higher level of the new series and the absence of the break in 1862. Between 1862 and 1864 Collins’s series increases by 46 per cent while during the same interval the new series increases by 9 per cent.

<sup>62</sup> Capie and Webber, *A Monetary History of the United Kingdom*, p. 34.

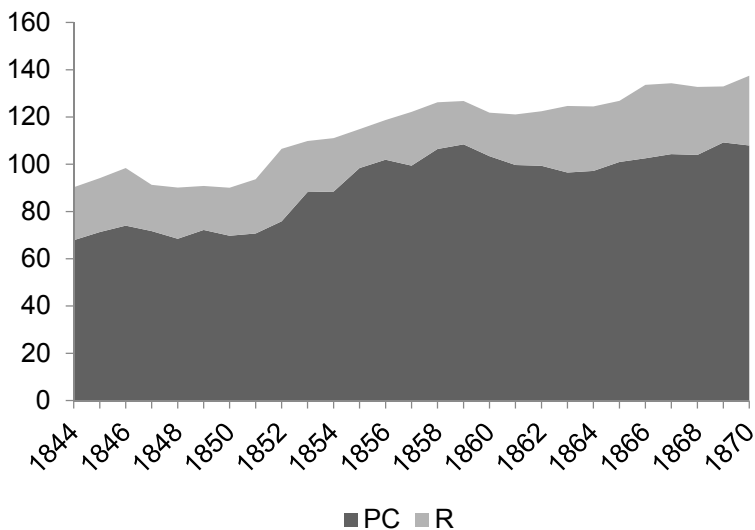


**Figure 2. Comparison of New Broad Money with Existing Estimates (£ millions)**

Figures 3 and 4 show the components of the narrow and broad money supply respectively. As one would anticipate due to the restrictions under the Bank Act of 1844, the scope for expansion in *PC* through note issuance was relatively limited. Nonetheless, the monetary base continued to grow substantially throughout the 1850s due to the growth in (primarily gold) coin. This increase has been associated with the discovery of gold in California which led to an £80.7 million increase in the European stock of bullion, much of which flowed to the UK due to a doubling of its exports between 1847 and 1857.<sup>63</sup> Instead, lending via deposits was increasingly pursued as an alternative.<sup>64</sup> Consequently, the relative growth in *D* in broad money is perhaps the most striking feature of the two graphs.

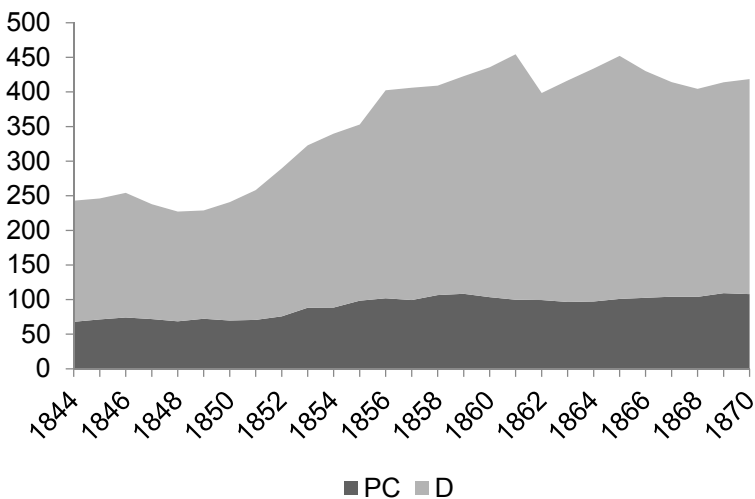
<sup>63</sup> Turner, *Banking in Crisis*, pp. 75-6.

<sup>64</sup> See McLeay et al., 'Money Creation in the Modern Economy'; Collins, 'Long-term Growth of the English Banking Sector and Money Stock'.



**Figure 3. Components of Narrow Money (£ millions)**

*Note:* December figures only.

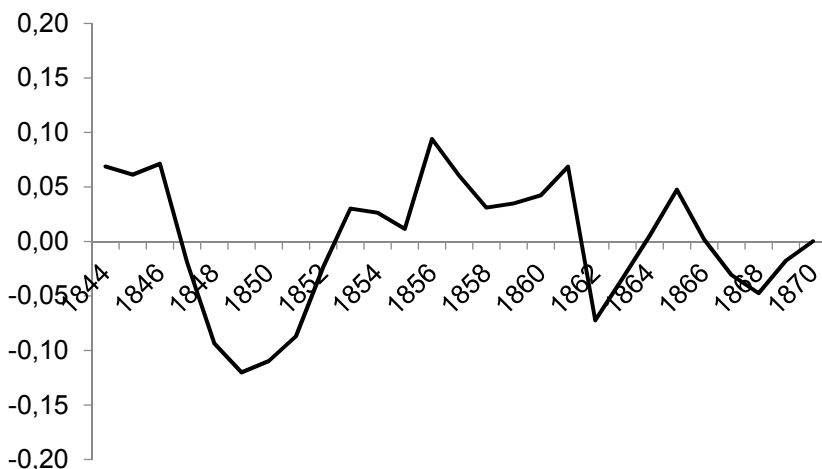


**Figure 4. Components of Broad Money (£ millions)**

Table 4 shows the decadal relative changes in narrow money, broad money and bank assets. The mid to late 1840s reflect stagnation associated with the commercial crisis and Irish potato famine with no significant change in either measure of the money supply. The second decade, on the other hand, is characterized by a pronounced expansion in both monetary aggregates. This can be attributed to growth in currency in the hands of the public and deposits. The 1860s exhibit a slower rate of growth in the monetary base which is more stable on average than the earlier decades. However, the volatility resulting from depressions in agriculture and cotton of the early 1860s, the decline which follows the 1866 crisis and military concerns regarding the European continent is considerably more apparent in the broad money series. As figure 5 shows, the cyclical behaviour of broad money confirms this pattern during the 1860s. The most acute contraction took place from the commercial crisis/potato famine beginning in 1847 experiencing the largest cyclical downturn of 12 per cent in 1849. The resumption of growth in broad money with respect to its trend did not occur until 1853, which peaked in 1856 before the onset of the crisis the following year.

**Table 4. Relative Changes in Narrow Money, Broad Money and Assets, 1844-70 (%)**

	<i>M0</i>	<i>M3</i>	Bank Assets
1844-50	-0.3	-0.9	-2.6
1851-60	30.2	68.8	34.3
1861-70	13.5	-7.9	40.2
1844-70	52.5	72.4	112.3



**Figure 5. Cyclical Component of Broad Money (Percentage Deviations from Trend)**

*Note:* Cycle decomposed with a Hodrick-Prescott filter with  $\lambda = 100$ .

Figure 6 shows the new series for joint stock bank assets. This variable, which is often used as a proxy for credit, reflects the financial crises of the era more clearly than the liabilities of the banks (deposits and notes). There are distinctive contractions in the crises of 1847-9 and 1858, the latter of which is not as discernible in the annual deposit series. The crisis of 1866 and the aftermath, however, are largely mirrored in both monetary series. The fall in bank assets during the crisis of 1878 was the most significant since the commercial crisis of the 1840s. Indeed, the severity of that crisis and its impact on both the banking system and shareholders has been claimed to have caused “the death blow to unlimited liability” in British banking.<sup>65</sup> Between 1844 and 1880, the assets of the joint stock banks increased by 156 per cent.

The trend in assets following the recovery from the commercial crisis of 1847-8 is one of pronounced growth with minor interruptions. As can be seen from figure 6, the typical asset cycle of the 1850s, 1860s and 1870s is characterised by a short burst of intense growth followed by a brief plateau culminating in a subsequent decline coinciding with each financial crisis in the period.

<sup>65</sup> Acheson and Turner, ‘The death blow to unlimited liability in Victorian Britain’; Button et al. ‘Desperate Adventurers and Men of Straw’.

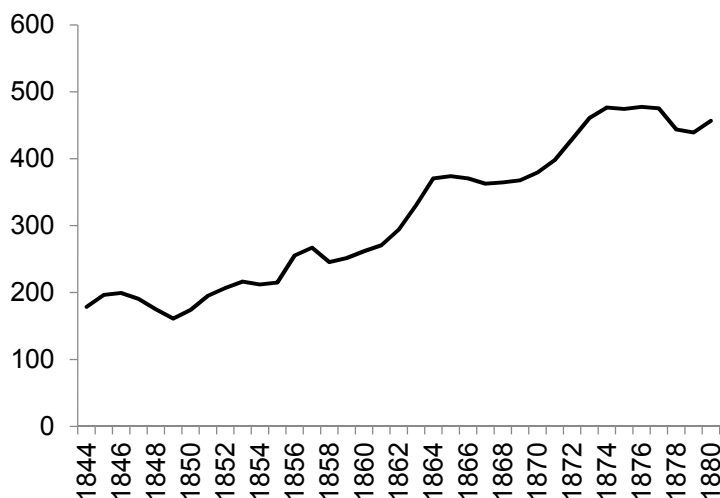


Figure 6. Joint Stock Bank Assets (£ millions)

## 5. Conclusion

The purpose of this paper has been to quantify developments in the financial history of the United Kingdom by constructing three new series: the monetary base (1844-70), broad money (1844-70) and bank assets (1844-80). The volume and richness of the primary sources has enabled us to work back to the Bank Act of 1844, which marks the beginning of the modern banking structure. In keeping to definitions of narrow and broad money that are consistent with the Bank of England, and by extension Capie and Webber, we now have a long-run understanding of money's development from the Bank Act of 1844 to modern times. In addition, it is possible to observe the behaviour of bank assets over the same period as a result of the new series, which can be linked to the existing asset series that begins in 1880.<sup>66</sup>

The results are generally consistent with the economic history of the period. In the 1840s, a decade blighted by catastrophe, the intertwined effects of the Irish famine and the bursting of the railway mania are visible

<sup>66</sup> Sheppard, *The Growth and Role of UK Financial Institutions*

in each of the three series. In the 1850s we find a pronounced upward-sloping trend, which is consistent with the strength of Britain's international trade position. We also find a moderation of the growth rate in the 1860s as the industrialisation process reached maturity.

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# Paper 2. Monetary Aggregates for Ireland, 1840-1921

Seán Kenny and Jason Lennard

## Abstract

This paper constructs new monetary aggregates for Ireland between the eventful years of 1840 and 1921. On the basis that money is essential to transactions, and might therefore contain information about nominal spending, the data is used to shine light on the somewhat elusive subject of cycles in the Irish economy in this period. We find that the monetary aggregates were highly responsive to the major episodes that have been discussed in the literature, such as the Great Famine, the agricultural crises of the 1860s and 1870s and the failure of the Munster Bank in 1885.

## 1 Introduction

In the conduct of monetary policy, modern central banks monitor a broad range of indicators in order to assess the underlying state of the economy. These can include various measures of output, prices, yields and money.<sup>67</sup> The inclusion of the latter is based on the logic that money, as a medium of exchange, is essential to the purchase of goods and services. Therefore, it is likely to “contain corroborative information about the *current* level of nominal spending in the economy.”<sup>68</sup>

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<sup>67</sup> Smaghi and Gros, *Open Issues in European Central Banking*, p. 160.

<sup>68</sup> McLeay et al., ‘Money Creation in the Modern Economy’.

In the absence of annual estimates of national income for Ireland between the Famine and independence, we construct various monetary aggregates, which are directly observable, in order to draw similar inference about the turning points and amplitude of the Irish business cycle. This is similar in spirit to Hickson and Turner's study of Irish equity prices and O'Rourke and Polak's study of property transactions.<sup>69</sup>

Specifically, using archival sources and contemporary publications, we construct new monthly estimates of the narrow money supply and annual estimates of the broad money supply. With respect to previous research, O'Rourke summed notes in circulation and bank deposits to give a measure of broad money.<sup>70</sup> The new series builds upon this work by adding series for coins and reserves, which varied in importance over time, as well as correcting the deposit series for adjustment items and missing banks. As a result, the final series are consistent with standard definitions of money and, by extension, with the equivalent series for the wider United Kingdom.<sup>71</sup>

The paper is organised as follows: section 2 describes the construction of the aggregates. Section 3 is split into three sub-sections: the first analyses the cyclical behaviour of the narrow and broad money series. We find that the turning points in broad money coincided with the major episodes of the period. The second compares the results with previous estimates. The final sub-section studies the seasonal component of the monthly narrow money series, which clearly tracked agricultural income, as would be predicted by a standard money demand function for a largely agricultural economy. However, the degree of seasonality declined over time with structural change.

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<sup>69</sup> Hickson and Turner, 'Pre- and post-Famine Indices of Irish Equity Prices'; O'Rourke and Polak, 'Property Transactions in Ireland, 1708-1988'.

<sup>70</sup> O'Rourke, 'Monetary Data and Proxy GDP Estimates'.

<sup>71</sup> Capie and Webber, *A Monetary History of the United Kingdom*.

## 2 Data and Methodology

### 2.1 Definition

The two monetary aggregates, narrow money ( $M0$ ) and broad money ( $M3$ ), constructed in this paper are defined as:

$$M0 = PC + R \quad (1)$$

$$M3 = PC + D \quad (2)$$

where  $PC$  is notes and coins in circulation with the public,  $R$  is banks' reserves and  $D$  is net sterling commercial bank deposits held by the public. In terms of geographic scope, both  $PC$  and  $D$  refer only to money held in Ireland, while a component of  $R$ , bankers' balances, refers to money held with British banks such as the Bank of England. This treatment more accurately reflects the role of  $M0$  as the ultimate banking reserve. In the underlying sources we have used the last observation for each period, so that the monthly  $M0$  series is month-end and the annual  $M0$  and  $M3$  series are year-end.

A number of exclusions are implicit in this definition. Firstly, public deposits – which were held at the Bank of Ireland – are not included. Secondly, we have also omitted foreign currency deposits. Technically, our  $M3$  series is therefore sterling  $M3$ . In any case, we have not found any evidence of foreign currency deposits in Ireland between the Famine and independence, so that it is likely that  $M3$  and sterling  $M3$  were equal to one another. The two exclusions are based on the logic that these balances are only weakly correlated with the domestic economy.<sup>72</sup> Third, the deposits of savings banks have also been omitted. This exclusion, in addition to the two above, ensures comparability with Capie and Webber's series for the United Kingdom.

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<sup>72</sup> Capie and Webber discuss the reasons for excluding these items in detail. See Capie and Webber, *A Monetary History of the United Kingdom*, pp. 15-6.



## 2.2 Currency in the Hands of the Public (PC)

### 2.2.1 Coin

In this section we briefly discuss the construction of the series for gold, silver and copper coin. In hindsight, it is now clear that coin was a relatively small component of both monetary aggregates. Therefore, we only briefly discuss its construction in this section in order to devote more attention to points of greater significance. Interested readers are directed to the appendix for a detailed explanation of how the coin series were constructed.

Unlike elsewhere in the wider United Kingdom, gold coin did not circulate in Ireland among the public in this period.<sup>73</sup> However, it was an important component of bank reserves, which is discussed below in section 2.4. Therefore, our series for gold coin is equal to that held by the banks. In contrast, both silver and copper coins (later bronze) did circulate among the Irish public.

The silver and copper coin series were constructed using the benchmark stocks displayed in table 1, the official additions and withdrawals through the banking system that were recorded in the daily account books of the Royal Mint and a residual.<sup>74</sup> The residual captures unobserved flows arising from factors such as migration to the colonies and trade with Britain. The level of the silver or copper coin series  $C$  at time  $t$  is:

$$C_t = \left( \alpha + \sum_{i=0} A_{t-i} - \sum_{i=0} W_{t-i} \right) \varepsilon_t \quad (3)$$

where  $\alpha$  is the opening stock,  $A$  and  $W$  are official additions and withdrawals respectively and  $\varepsilon$  is an error term which captures all unobservable flows. The residual operates in an identical manner to that employed by Capie and Webber.<sup>75</sup> It is calculated as a linearly descending ratio from the previous benchmark (set to 1) to the next benchmark (to which 1 descends). The terminal value of the ratio is calculated by dividing the Royal Mint's estimate by the unadjusted stock at the benchmark year.

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<sup>73</sup> See appendix for a detailed discussion.

<sup>74</sup> National Archives, MINT 12/9, 12/18, 6/51, 6/52, 6/53, 6/54, 6/55, 6/56, 6/57, 6/65, 6/5, 6/6, 6/7, 6/8, 6/9, 6/10, 6/11, 6/12, 6/13, 6/14, 6/16, 6/17, 6/18, 26/9, 26/10, 26/11, 26/12.

<sup>75</sup> Capie and Webber, *A Monetary History of the United Kingdom*, p. 202.

**Table 1. Coin Stocks, 1840-1922**

<b>Metal</b>	<b>Stock (£)</b>	<b>Source</b>
<i>Silver</i>		
September 1826	1,448,452	Mint 12/18
April 1871	1,000,000	Mint 9/242
June 1914	2,098,243	Mint 20/757, Mint 26/12
March 1922	2,962,667	Mint 20/757
<i>Copper</i>		
July 1825	212,764	Mint 12/9, Mint 12/18
April 1871	72,430	Mint 6/6, Mint 6/7, Mint 6/8
March 1922	66,660	Mint 20/757

Source: See text.

### 2.2.2 Notes

A small number of banks issued notes in Ireland in 1840: the Bank of Ireland, the Belfast, National, Northern, Provincial and Ulster joint stock banks and Ball & Co., a private bank in Dublin.<sup>76</sup> This note-issuing structure developed over several centuries and, to some extent, persists to the present day. Private banks issued notes in Ireland from at least 1709 and did so with little government interference.<sup>77</sup> This continued until 1783 when an Act of Parliament prevented banks with more than six partners issuing notes; it also paved the way for the establishment of the Bank of Ireland.<sup>78</sup> In the wake of the crisis of 1820, in which 16 out of 31 private banks failed or suspended, there was a series of banking reforms ending with the Banking Copartnership Regulation Act of 1825.<sup>79</sup> This Act enabled the establishment of joint stock banks, on the condition that they did not issue notes if they were based within 65 miles of Dublin.<sup>80</sup> The “exclusion zone” was attacked continuously as “unjust”, even “a modern Pompeii”.<sup>81</sup> The Bankers (Ireland) Act of 1845 marked the end of this brief period of relatively competitive free banking and the beginning of a new era of stability purchased at the expense of free competition manifested in informal collusion where the Bank of Ireland would continue to act as a

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<sup>76</sup> P.P., 1840, p. 741.

<sup>77</sup> In this year they are explicitly mentioned in 8 Anne, c.11.

<sup>78</sup> 21 & 22 Geo. III, c.16.

<sup>79</sup> Hickson and Turner, ‘The Genesis of Corporate Governance’; 6 Geo. IV, c.42.

<sup>80</sup> See Hickson and Turner, ‘The Genesis of Corporate Governance’ for a discussion of legislation concerning Irish commercial banking in this period.

<sup>81</sup> *Freeman’s Journal*, 12 June 1838; *Freeman’s Journal*, 3 August 1839.

quasi-lender of last resort until the 1920s.<sup>82</sup> The Act abolished the exclusion zone, prohibited any new banks of issue and imposed reserve requirements on existing banks of issue. Beyond a fixed fiduciary limit, the note circulation had to be backed one for one with specie, of which no more than £1 in 4 could be in silver coin with the rest in gold coin.

Data is available consistently over this stretch of history as a consequence of legislation passed in 1833, which required every bank in the United Kingdom to inform the Stamp Office in London of its weekly circulation.<sup>83</sup> As a result, aggregate circulation figures for the Irish banks were published in, among other places, the *Banking Almanac* and *Thom's Irish Almanac*.<sup>84</sup>

In line with the available evidence, we have not included Bank of England notes in the monetary series. Hall notes, “the 1845 Act specifically provided that these notes were not legal tender in Ireland, and since that date Bank of England paper practically ceased to circulate in the country.”<sup>85</sup> In addition, in 1858, Charles Haliday, the Governor of the Bank of Ireland, and John Barlow, a former Governor, told the Select Committee on the Bank Acts that Bank of England notes did not circulate in Ireland.<sup>86</sup> Equally, we have not made any adjustment for Irish bank notes circulating in Britain because, according to Barrow, post bills as opposed to bank notes were used to make payments across the Irish Sea.<sup>87</sup>

However, currency notes were made legal tender in Ireland following the outbreak of the First World War.<sup>88</sup> From August 1914 currency notes arrived in Ireland through the banking system, which received them from the Bank of England in exchange for specie. The value of currency notes in the hands of the Irish public during the war is unknown. The available evidence suggests that it was small. In September 1922, when the volume of currency notes outstanding in the United Kingdom was still near its peak, it was estimated by the Irish Ministry for Finance that £3.88 million circulated

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<sup>82</sup> 8 & 9 Vict. c.37; Bodenhorn, ‘Free Banking in Ireland’; Ó Gráda, *Ireland*, pp. 146, 358-9; Ó Gráda, ‘The Last Major Bank Failure Before 2008’.

<sup>83</sup> 3 & 4 Will. IV, c.83.

<sup>84</sup> For the years 1840-5, we use figures in the *Banking Almanac*, 1849; for the years 1846-1921, we use figures in *Thom's Irish Almanac*, various years.

<sup>85</sup> Hall, *The Bank of Ireland*, pp. 235-6.

<sup>86</sup> P.P., 1858, p. 270.

<sup>87</sup> Barrow, *The Emergence of the Irish Banking System*, p. 172.

<sup>88</sup> 4 & 5 Geo. V, c.14.

in the Free State.<sup>89</sup> However, this included the amount in banks, which following the introduction of currency notes had agreed to use these notes as reserves for their own issuance.<sup>90</sup> In addition, the public had little incentive to exchange notes given that Irish bank notes were legal tender and that currency notes could only be converted into specie at the Bank of England. If we adjust the estimate of currency notes in the Free State to the whole of Ireland on the basis of population, the worst case scenario is that by the end of our period, we underestimate *M3* by roughly 2 per cent, while the pre-1914 data is unaffected.<sup>91</sup> In consideration of these facts, we have decided to make no direct adjustment for currency notes in the hands of the public, although their role as reserves is perfectly captured by the statistics in Thom's Irish Almanac.

## 2.3 Deposits (*D*)

*D* is the sum of private sector deposits held in the joint stock and private banks less adjustment items. This was the most important component of the broad money supply in quantitative terms in this period. It is therefore welcomed that an aggregate gross deposit series for the major joint stock banks was collected officially from 1840 and continued beyond 1921.<sup>92</sup> The official statistics include the private deposits of the Bank of Ireland, the Irish deposits of the National and Provincial banks of Ireland and those of the Belfast, Hibernian, Munster, Northern, Royal and Ulster banks.<sup>93</sup>

From the late 1870s *The Economist* also published figures for the deposits of the Irish joint stock banks. However, we prefer the official series for three reasons. Firstly, it runs consistently over the entire period. Secondly, while the correlation is high between the two, the level of *The*

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<sup>89</sup> UCD Archives, P67/173.

<sup>90</sup> Hall, *The Bank of Ireland*, p. 322.

<sup>91</sup> Population figures from Mitchell, *British Historical Statistics*, pp. 11-3.

<sup>92</sup> 1840-63, Hancock, *Report on Deposits and Cash Balances in Joint Stock Banks in Ireland, 1840-69*; 1864-72, Hancock, *Report on Statistics of Savings Invested in Ireland in Joint Stock Banks and in Savings Banks, and in Government Funds; and on Statistics of Bank Note Circulation in Ireland, 1860-1872*; 1873-1902: *Banking and Railway Statistics, Ireland*, various years; 1903-1911: *Banking, Railway and Shipping Statistics, Ireland*, various years; 1912-21: Saorstát Éireann, *Statistical Abstract*.

<sup>93</sup> *Thom's Irish Almanac*, various years. The National and Provincial had head offices in London. The former also had branches there.

*Economist* series is systematically higher, which is a result of the unwanted inclusion of public deposits at the Bank of Ireland and the English deposits of the National and Provincial. Thirdly, because the official returns were anonymous the deposit figures were therefore less likely to be biased.

Despite its merits the official series also has weaknesses. Firstly, the statistics exclude the joint stock banks that failed within a few years of establishment. However, the omitted banks, Dublin Banking Company, English and Irish Bank, London and Dublin Bank, Provident Bank of Ireland and Tipperary Joint Stock Bank, were small in terms of their branch network and therefore would have had relatively small deposits.<sup>94</sup> The average coverage of the official series in terms of branches is 96 per cent.<sup>95</sup> Secondly, the private banks of Dublin were another blindspot of the official statistics. Six were active during the period: Ball & Co.; Boyle, Low, Pim & Co.; David La Touche & Co.; Guinness, Mahon & Co.; James B. Kennedy & Co.; and Robert Gray & Co.<sup>96</sup> Thirdly, prior to 1864 an unknown number of banks did not include sight deposits in their official returns.<sup>97</sup> Unfortunately, these returns were anonymous so it is not possible to retrospectively ascertain how many banks did this. However, it is unlikely that sight deposits were significant before this point. The scraps of evidence from the available balance sheets show that the ratio of sight to time deposits in 1859 was 1:3 at the Northern Bank and 1:13 at the Ulster Bank.<sup>98</sup> Furthermore, the Bank of Ireland did not pay interest on demand

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<sup>94</sup> In the 1860s two foreign and colonial banks briefly had branches in Dublin: the European Bank and the General Exchange Bank. Neither have been included in the series because these banks mainly offered foreign exchange services. See Hall, *The Bank of Ireland*, pp. 249-50 for a discussion. Also, Capie and Webber do not include such foreign and colonial banks in their series for the wider United Kingdom.

<sup>95</sup> Data on branch numbers has been collected from Barrow, *The Emergence of the Irish Banking System*, p. 220 for the years 1840-4 and from the *Banking Almanac* for subsequent years. The information in this publication referred to the year before it was published. Includes head offices in Ireland but excludes head offices and branches in Britain, also excludes agencies and sub-branches. In a handful of cases, there was a lag between the establishment of a new bank and its inclusion in the *Banking Almanac*. In these cases, we assume that the bank had a single office.

<sup>96</sup> An R. Cane & Sons appears in a list of banks based in Dublin in the *Merchant's and Bankers' Almanac* for 1861, however, we adopt the rather strict policy of only including the private banks listed in *Thom's Irish Almanac*.

<sup>97</sup> Sight deposits are referred to as "cash balances" in the underlying sources.

<sup>98</sup> Ollerenshaw, *Banking in Nineteenth-Century Ireland*, pp. 91-2.

deposits until at least 1875.<sup>99</sup> Due to all of the above considerations, we deem the existing series to be sufficiently consistent in its construction.

In order to address the first two criticisms, however, we follow the approach of Capie and Webber and Collins by estimating the gross deposits of the population of commercial bank from the available sample based upon the assumption of a positive correlation between the size of a bank's branch network and the level of its deposits:<sup>100</sup>

$$D_t = B_t \frac{\sum_{i=1}^n d_{it}}{\sum_{i=1}^n b_{it}} \quad (4)$$

where  $B_t$  is the number of branches of the population of commercial banks,  $d_{it}$  and  $b_{it}$  are the level of deposits and number of branches respectively of sample bank  $i$ .

The final step is to deduct two adjustment items from  $D_t$  to yield total net deposits. The first is interbank deposits, which is an important step in any monetary series in order to avoid double counting. To see why, consider the following example: if a customer deposits £100 at bank  $i$ , bank  $i$  might invest £80 in long-term securities and keep £10 in cash and another £10 with bank  $j$ . It does so as a convenient halfway house between its other alternatives. Long-term securities earn interest but are relatively illiquid in times of crisis, while cash is liquid but does not earn interest. In the example above, the gross deposits of the system equal £110 as bank  $i$  has a liability of £100 to the customer and bank  $j$  has a £10 liability to bank  $i$ . In fact, the process would not stop there as bank  $j$  may then hold a fraction of bank  $i$ 's deposit with bank  $k$ . Because we are interested in deposits held by the public, interbank deposits should therefore be deducted from the gross deposit series,  $D_t$ .

The level of interbank deposits in the system was not systematically recorded. As in Capie and Webber, we use the ratio of interbank deposits to total deposits for a discrete number of periods to achieve a time-varying series for the entire period.<sup>101</sup> In 1875, eight of the nine joint stock banks in

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<sup>99</sup> P.P., 1875, p. 161.

<sup>100</sup> Capie and Webber, *A Monetary History of the United Kingdom*; Collins, 'Long-term Growth of the English Banking Sector and Money Stock'.

<sup>101</sup> Capie and Webber, *A Monetary History of the United Kingdom*, pp. 282-3.

Ireland filed returns to the Select Committee on Banks of Issue.<sup>102</sup> The summary of these returns show 0.92 per cent (£296,125/£32,077,872) of gross deposits belonged to banks, while the rest belonged to the public. Thus, we multiply  $D_t$  by this coefficient for all time periods in order estimate an interbank deposit series. This static approach might introduce bias if this proportion changed significantly over time. Unfortunately, the existing evidence on this subject is scarce. Using the balance sheets of the largest bank, the National, we can ascertain that in 1861 the same ratio stood at 0.7 per cent. In later years, the balance sheets are comparatively highly aggregated. In 1899 the ratio, with the erroneous inclusion of drafts and acceptances, was 2.2 per cent, which stands as an absolute upper bound.<sup>103</sup>

The second adjustment item is cheques in collection and items in transit. In the absence of any data before 1921, Capie and Webber calculated that these items represented 2.4 per cent of gross deposits in Ireland in that year, and worked backwards by multiplying this time-invariant coefficient by the gross deposit series for each year. As there is no existing data on this to our knowledge, we adopt the same approach in this paper.<sup>104</sup> While one may conjecture that cheques were not as significant in the earlier sample period, the evidence of contemporaries suggests that cheques circulated extensively as early as 1837 as a means of evading a law which had prohibited the drawing of bills of less than £50.<sup>105</sup> Therefore, although there are limitations to the approach, we employ Capie and Webber's static ratio. The resulting series needs a final adjustment before being deducted from  $D_t$ . In the process of clearing cheques, there is an interval between the time when the payee's account is credited at one bank and the time when the drawer's account is debited at another. During this period the value of the cheque appears as a deposit liability in both bank's balance sheets. We follow the Bank of England's policy, and by extension Capie and Webber's, by deducting 60 per cent of the estimated cheques and items in transit from the final gross deposit series.<sup>106</sup>

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<sup>102</sup> P.P., 1875, p. 559.

<sup>103</sup> Royal Bank of Scotland Archives, NB/118

<sup>104</sup> Capie and Webber, *A Monetary History of the United Kingdom*, p. 298.

<sup>105</sup> P.P., 1837, p. 264.

<sup>106</sup> Bank of England, 'Reserve Ratios: Further Definitions'; Capie and Webber, *A Monetary History of the United Kingdom*, pp. 302-3.

Thus, the effective multiplier that we apply to our estimated gross deposit series is  $0.0236 [0.0092 + (0.024 \times 0.6)]$ . The treatment described above (first, scaling the series up to account for the deposits of the missing banks, and then scaling the series down for adjustment items) has a very minor overall distortionary effect on the raw series. However, this was not necessarily evident ex-ante, but has become so ex-post. In addition, it is a crucial accounting procedure that makes it both consistent with our earlier definition of broad money and comparable to other studies.

## 2.4 Reserves ( $R$ )

The reserves of a nineteenth century Irish bank consisted of three things: (a) reserves against its note issue (in the case of a note-issuing bank), which was a requirement of the 1845 Bank Act; (b) till money to meet the everyday needs of its customers, such as withdrawals of deposits; and (c) balances with other banks, which were an interest-bearing contingency. Items (a) and (b) are deducted from the sum of coins and notes in circulation to give currency in the hands of the public ( $PC$ ), while items (b) and (c) make up  $R$  in  $M0$ .

The first step in arriving at (a), (b) and (c) is to calculate a series for total reserves for the Irish banking system as a whole. The calculations are based upon both published and unpublished balance sheets, which increased in quantity over time. For this reason, we will begin in the data rich years of 1912 to 1921 and work backwards. In this period, the joint stock banks of Ireland published disaggregated year-end balance sheets in *The Economist*.<sup>107</sup> Each bank reported figures for cash in hand and at the Bank of England, deposits and notes in circulation. Using this data, we calculate a cash to demand liability ratio for the joint stock banks and multiply it by our own series of the demand liabilities of the entire banking system. Between 1877 and 1912, *The Economist* reported a broader cash measure, which included erroneous non-cash items such as loans at call. Therefore, in order to overcome the change in levels, we have spliced backwards from 1912 using the growth rate in the broader cash to demand liability ratio. The level of the ratio in 1877 is linked with changes in the Bank of Ireland and the

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<sup>107</sup> *The Economist*, various years.



National's cash ratio back to 1840.<sup>108</sup> There were no balance sheets available for 11 of the 38 years in this period. The missing observations were filled with linear interpolation.

This approach could yield misleading reserve ratios in two circumstances. Firstly, if the ratio of true-cash items to non-cash items varied between 1877 and 1912, then our estimate is likely to be biased accordingly. Between the turbulent years of 1912 and 1921, the ratio was relatively stable around an average of 2.42 with a standard deviation of 0.46. Secondly, if the reserve ratios of the Bank of Ireland or the National were idiosyncratic between 1840 and 1877 then our estimate will also be biased. It is impossible to avoid this potential hazard given the lack of suitable balance sheets in sources such as the *Banking Almanac*, *Bankers' Magazine*, *Freeman's Journal*, Parliamentary Papers and the archive material of the Bank of Ireland, National and Provincial that we have been able to access. However, there was a statistically significant positive correlation between the reserve ratios of both the Bank of Ireland (1885-1921: 0.94) and the National (1877-1921: 0.85) and the banking system as a whole.

The sub-components of the reserve series are calculated as follows. Banks' reserve against the note issue (a), which consisted of gold and silver coin, was published in *Thom's Irish Almanac* every four weeks from January 1846.<sup>109</sup> This information was not systematically recorded before the Bank Act, so we have interpolated backwards using changes in the Bank of Ireland's reserves of specie.<sup>110</sup> In the absence of any consistent aggregate data on bankers' balances, we multiply the total reserve series by the National's ratio of balances with other banks to its total reserves.<sup>111</sup> This ratio, which has a mean of 12 per cent and a standard deviation of 2.58 percentage points, is only available for 12 years. It was therefore necessary to linearly interpolate the missing values. The series for till money (b) has been calculated as a residual by deducting (a) and (c) from the total reserve series.

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<sup>108</sup> Bank of Ireland, 1840-7: P.P., 1840, pp. 731-2; P.P., 1841, pp. 290-7; P.P., 1848, p. 280-352. National, 1840-77: Royal Bank of Scotland Archives, NB/118; *Thom's Irish Almanac*.

<sup>109</sup> *Thom's Irish Almanac*, various years.

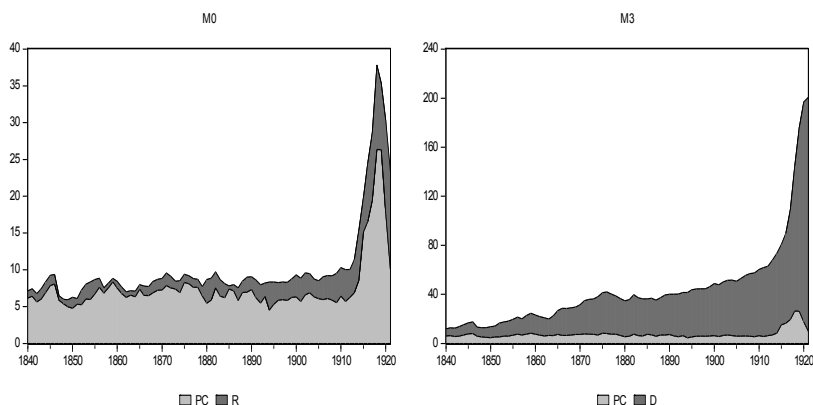
<sup>110</sup> P.P., 1840, pp. 731-2; P.P., 1841, pp. 290-7; P.P., 1848, pp. 280-352.

<sup>111</sup> Royal Bank of Scotland Archives, NB/118.

## 3 Results

### 3.1 Trends and Cycles

The first important fact that emerges from the data is the difference in the growth rates of the two series. Prior to the First World War, narrow money grew on average at 0.4 per cent per year, while broad money grew on average at 2.2 per cent, which led to a five-fold increase in 74 years.<sup>112</sup> The divergent paths of the series can be firstly attributed to the 1845 Bank Act's effective ceiling on note issuance, which channelled credit through "uncontrolled" deposit creation (*M3*) with cheques circulating in place of notes and secondly to the small changes in the opening and closing stocks of silver and copper coin.<sup>113</sup> In contrast, between July 1914 and November 1918, the monetary base increased by a factor of 3.5.



**Figure 1. New Annual Narrow and Broad Money Series, 1840-1921.**

*Notes and sources:* Millions of pounds on y-axis. The two series are available in the data appendix.

Having established the broad trends in the monetary aggregates, we now turn to cycles. Table 2 displays the peaks and troughs in the series as

<sup>112</sup> Average growth rates are calculated econometrically.

<sup>113</sup> Barrow, *The Emergence of the Irish Banking System*, p. 185; P.P. 1837, p. 264.

determined by the Harding and Pagan algorithm.<sup>114</sup> The algorithm defines a peak in the natural logarithm of a time series  $y$  at time  $t$  as  $y_{t-k}, \dots, y_{t-k+1} < y_t > y_{t+1}, \dots, y_{t+k}$ , where  $k$  is the symmetric window parameter and is equal to 1 for yearly data, and a trough as  $y_{t-k}, \dots, y_{t-k+1} > y_t < y_{t+1}, \dots, y_{t+k}$ , subject to the criteria that a cycle must last at least 1 year while a phase must last at least 2 years. The main advantage of this approach is the ease of interpretation. In log de-trended data, one looks for peaks and troughs in the growth rate of a cycle. As a consequence, a reduction in the growth rate of a contractionary (expansionary) cycle will be classified as an expansionary (contractionary) regime even though the level of the series continued to fall (rise).

**Table 2.**  
Broad Money Supply Turning Points

Peak	Trough	Amplitude (per cent)
1841	1842	-1.69%
1846	1848	-26.83%
1856	1857	-6.72%
1859	1863	-18.71%
1866	1867	-0.32%
1876	1880	-16.89%
1882	1885	-8.78%
1886	1887	-4.65%
1893	1894	-0.22%
1900	1901	-1.95%
1904	1905	-1.75%
Mean duration of contractions (years)		1.82
Mean duration of expansions (years)		4.40
Mean amplitude of contractions		-8.05
Mean amplitude of expansions		28.10

Source: See text.

In our discussion of the results of this exercise, we will incorporate insights from other cyclical indicators such as consumer prices, asset prices, real

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<sup>114</sup> Harding and Pagan, 'Dissecting the Cycle'.

interest rates, agricultural output, property transactions and nominal wages where they are available. The first result that emerges from table 2 is the sharp contraction during the Famine. The broad money supply contracted by a quarter and was entirely driven by reductions in narrow money (known as high powered money in this context) – the currency-deposit ratio and reserve-deposit ratio actually lent against the wind by applying upward pressure on the money stock. The annual narrow money series fell by 36 per cent during these years, and did not recover until 1871. However, the monthly monetary base shown in figure 2 gives a more detailed view. The peak actually came in November 1845 and the trough in August 1849 with a swing between the two of -48 per cent. To our knowledge, the scale of this contraction has no precedent in modern economic history.

The monetary aggregates appear to have declined more sharply than other cyclical indicators during the Famine. Property transactions, for example, increased 8 per cent between 1846 and 1848, which potentially reflects distress sales.<sup>115</sup> The stock market index, in contrast, decreased by 10 per cent, but this seems to not fully capture the extent of the catastrophe.<sup>116</sup> It may be that the markets had already priced in the risk of a future agricultural crisis or that the stock market index is more representative of the commercial economy as opposed to the subsistence economy.<sup>117</sup> Nominal wages were stagnant, which suggests that there were either nominal rigidities in the labour market or that the reduction in labour supply was offset by the reduction in labour demand. In terms of prices, despite the decline in the broad money supply, consumer prices increased by 24 per cent between 1846 and 1847.<sup>118</sup> These facts jointly give an impression of the severity of the supply shock. As a result of these volatile price dynamics, absolute real interest rates were extremely high during and immediately after the Famine (see figure 3).

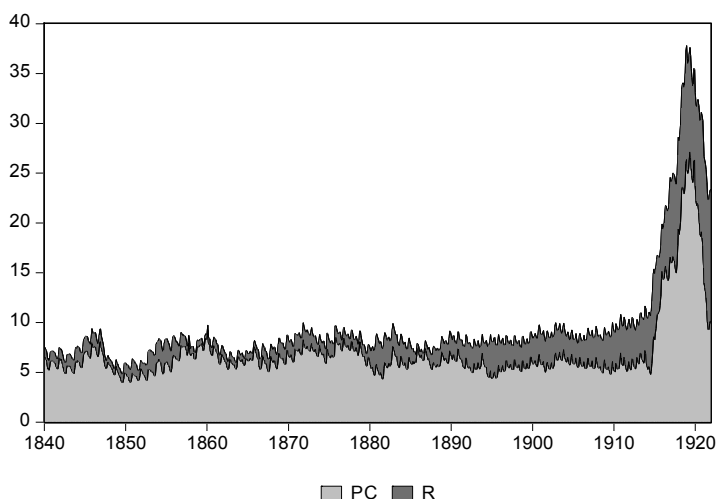
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<sup>115</sup> O'Rourke and Polak, 'Property Transactions in Ireland, 1708-1988'.

<sup>116</sup> Hickson and Turner, 'Pre- and post-Famine Indices of Irish Equity Prices'. The December figures of the index weighted by market capitalisation are used in the calculations.

<sup>117</sup> Hickson and Turner, 'Pre- and post-Famine Indices of Irish Equity Prices'.

<sup>118</sup> Geary and Stark, 'Trends in Real Wages during the Industrial Revolution'.



**Figure 2. New Monthly Narrow Money Series, 1840-1921.**

*Notes and sources:* Millions of pounds on y-axis. The series is available in the data appendix.

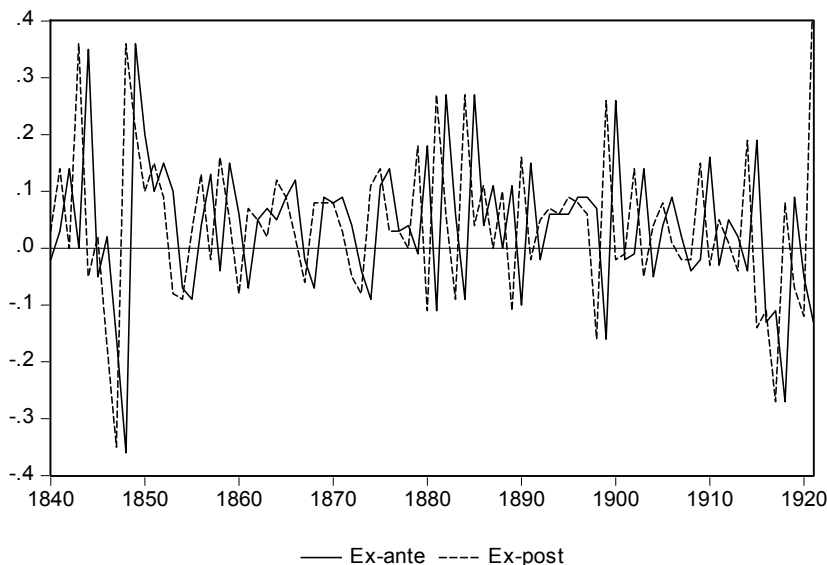
The next largest contractions in the broad money supply came during the recessions of the early 1860s (-18.71 per cent) and late 1870s (-16.89 per cent). The data supports Ó Gráda's view that although "no post-Famine recession matched that of the late 1840s, those of the early 1860s and 1879-81 were serious enough".<sup>119</sup> Each of these recessions was triggered by severe reductions in agricultural output, a sector in which roughly half the population was still employed in.<sup>120</sup> In the 1860s recession the volume of agricultural output fell by 22 per cent from peak to trough, while in the 1870s the same variable declined by 18 per cent. In contrast to the Famine, property transactions moved procyclically in the 1860s recession but were countercyclical once more in the recession of the late 1870s. The stock market index was again countercyclical but perhaps did not reflect the magnitude of the fall in agricultural output. In the first recession the index fell by 2 per cent and by 9 per cent in the next.

A mitigating factor during the contraction in the 1860s was the stimulus to the linen industry as a consequence of the outbreak of the American Civil War in 1861. Between that year and the trough in 1863, the quantity of linen

<sup>119</sup> Ó Gráda, *Ireland*, pp. 251-2.

<sup>120</sup> Turner, *After the Famine*, p. 108; Geary and Stark, 'Examining Ireland's Post-Famine Economic Growth Performance'.

exports increased by 34 per cent.<sup>121</sup> If money demand is considered to be a function of income and interest rates, then the large contraction in the money supply implies that the net effect of the positive demand shock to linen and the negative supply shock to agriculture was negative. It is worth noting that movements in the Bank of Ireland's discount rate applied upward pressure on money demand and supply.



**Figure 3. Real Interest Rates, 1840-1921**

*Notes and sources:* Year-end data on Bank of Ireland discount rate from Hall, *The Bank of Ireland, 1783-1946*, pp. 381-90. Inflation calculated from Kennedy's index of urban consumer prices in O'Day and Fleming, *Longman Handbook of Modern Irish History since 1800*, pp. 569-71. The real ex-ante rate assumes static expectations so that  $\pi_t^e = \pi_{t-1}$ . The series are available in the data appendix.

The other major contractions occurred around bank failures. The first was the failure of the Tipperary Bank in 1856 due to “gigantic” fraud by one of its owners, John Sadleir.<sup>122</sup> As a consequence, the public temporarily lost confidence in the banking system, which resulted in the Belfast, David La Touche & Co and the National seeking help from the Bank of Ireland.<sup>123</sup>

<sup>121</sup> Solar, ‘The Irish Linen Trade’.

<sup>122</sup> *Bankers' Magazine*, 1857.

<sup>123</sup> Ó Gráda, ‘The Last Major Irish Bank Failure before 2008’.

There is evidence of contagion in the monetary base through the fall in reserves, which began to decline from January 1856, the month of Sadleir's suicide. However, by October narrow money had completely recovered from this brief crisis, which explains why broad money actually increased in 1856 relative to 1855.

The trough in narrow money in 1857 was associated with the wider international crisis, and should not therefore be confused with the short-lived Tipperary crisis. The monetary base began to decline in November 1857, when London's largest bill broker, Sanderson and Company, failed following the propagation of a banking crisis from New York to London.<sup>124</sup>

The growth of broad money relative to the monetary base after this crisis has natural implications for the reserve to deposit ratio. As we would expect, the ratio fell during the Tipperary Bank crisis from 15.2 per cent to 8.9 per cent in 1856. As deposits continued to grow throughout the period, a low of 2.7 per cent was reached in 1859, which initiated a long-term shift from the higher reserve ratios of the 1840's (which averaged 14.3 per cent) to a lower average of 5.4 per cent of the 1860s. The subsequent troughs of 3.2 per cent and 1.5 per cent mark the crises of 1866 and 1885 respectively.

The second major contraction associated with a banking failure was the Munster crisis of 1885. While previous research on this crisis has suggested little contagion, we find that the monetary base fell by 12.4 per cent between December 1884 (when concerns began to mount over the size of its overdraft) and July 1885 (when it closed its doors).<sup>125</sup> This was primarily driven by a drain in reserves (*R*), which accounted for 10.4 per cent of the decline, while the remainder (1.9 per cent) was due to a decline in currency in the hands of the public (*PC*).

While the turning points in the broad money supply have coincided with the significant events in nineteenth century economic history, it would be useful to know to what extent the series can shine light on the hitherto dark subject of historical Irish business cycles more generally. In the United States up until the 1970s, there had generally been a one for one correspondence between monetary and business cycles.<sup>126</sup> Although we cannot test this with Irish data, it is possible to test the extent to which the broad money supply has been a good indicator of historical business cycles in the United Kingdom more generally. To do so, we use the Harding and

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<sup>124</sup> Hall, *The Bank of Ireland*, p. 231-3.

<sup>125</sup> Ó Gráda, 'The Last Major Irish Bank Failure before 2008'.

<sup>126</sup> Cagan, *Determinants and Effects of Changes in the Stock of Money*, p.5.

Pagan algorithm to identify turning points in the UK broad money supply and UK nominal GDP at factor cost and code expansionary regimes as 1 and contractionary regimes as 0.<sup>127</sup> It is then possible to calculate a concordance index between the two variables for the overlapping years for which data is available (1870-1920):<sup>128</sup>

$$CI_{xy} = \frac{1}{T} \sum_{t=1}^T [C_t^x C_t^y + (1 - C_t^x)(1 - C_t^y)] \quad (5)$$

The concordance of the broad money supply and nominal GDP for the United Kingdom was 0.78, which implies that the two were in the same regime 78 per cent of the time and were therefore strongly pro-cyclical. Clearly, this is not *perfect* concordance nor is it direct evidence from Ireland. However, in the absence of higher frequency estimates of Irish GDP, table 2 provides a good approximation of the Irish business cycle along with information about the relative severity of each episode.

### 3.2 Comparison of Results

How do the new aggregates compare with previous estimates? The correlation between the first difference of the present estimates and O'Rourke's closest equivalent (the sum of notes and gross deposits) is 0.99. However, the root mean square error between the two series (in levels) is £2.7 million. The new series is systematically higher than O'Rourke's up until 1871, as the inclusion of coin and the deposits of previously omitted banks outweighs the inclusion of deduction items such as reserves and interbank deposits. After 1871, the new series is typically lower due to the rising *level* of reserves in the banking system.

It is also possible to check the relationship between the Irish money supply and that of the wider United Kingdom from 1870. In figure 4, we can see that the Irish share of UK *M3* was small yet stable— the average share was 5.9 per cent. An implication of the new results is that there is an implicit estimate of the *British* broad money supply, which is derived by deducting UK *M3* from Irish *M3*. The first difference of the Irish estimates

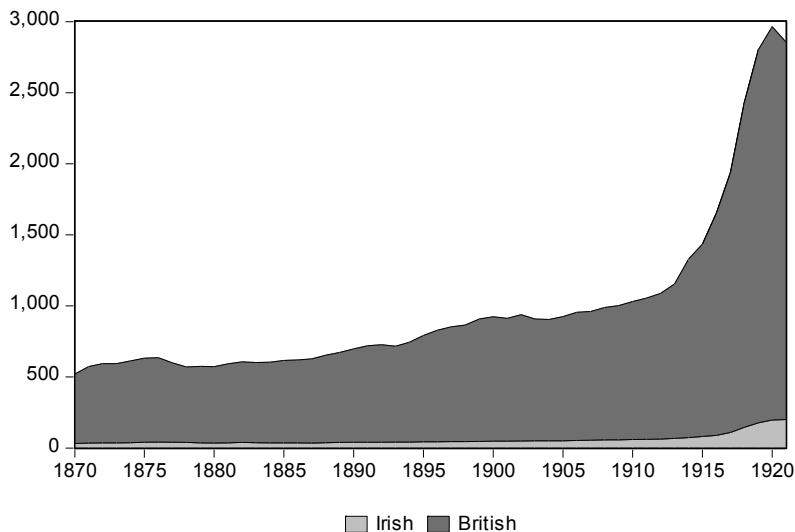
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<sup>127</sup> Capie and Webber, *A Monetary History of the United Kingdom*; Hills et al., 'Three Centuries of Data'.

<sup>128</sup> We've used the more user friendly notation of Claessens et al., 'Financial Cycles', as opposed to Harding and Pagan, 'Dissecting the Cycle'.



are highly correlated with the corresponding estimates for Great Britain (0.91), which implies that the Irish monetary system was closely integrated with Britain's.



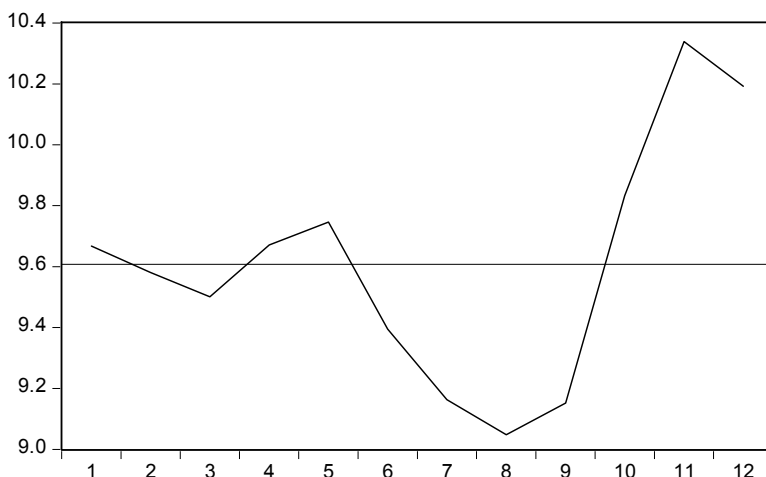
**Figure 4. Irish and Implicit British Broad Money Series**

Notes and sources: Millions of pounds on y-axis. Capie and Webber, *A Monetary History of the United Kingdom*.

### 3.3 Seasonality

The monthly narrow money supply exhibited a regular seasonal pattern. Figure 5 shows mean monthly levels, which were calculated with a regression with no intercept and a dummy variable for each month. The graph shows that narrow money was typically higher around the time of the harvest in the autumn and lower at other times of the year. Robert Murray, Inspector of the Provincial in 1841, described a similar path, “from about the 1<sup>st</sup> of October on to about the 1<sup>st</sup> of February the circulation is increasing, and from the 1<sup>st</sup> of February down to the 1<sup>st</sup> August it is usually

diminishing when it reaches its minimum, and it expands again after the harvest.”<sup>129</sup>



**Figure 5. Monthly Variation in Narrow Money Means**

*Notes and sources:* Millions of pounds on y-axis. Horizontal line represents sample mean of £9,607,588. The seasonally adjusted series is available in the data appendix.

Essentially, small farmers sold their produce at market to merchants in exchange for notes, which had either been withdrawn by the merchant from a bank account or borrowed from a bank. In both instances the narrow money supply would increase, with predictable consequences for the broad money supply and credit. In the former case, the broad money supply would decrease by a disproportionate amount because the money multiplier was always greater than 1. In the latter case, the broad money supply would be unaffected, but credit would increase instead. Once the harvest had been sold, narrow money would fall as the farmers deposited the season's earnings or paid their landlords who would in turn deposit the money. The merchants, who typically exported the produce to Britain, would then discount English bills at Irish banks. If the merchants funded their business through deposits, the broad money supply would then return to its previous

<sup>129</sup> P.P., 1841, p. 244.

level. If the merchants funded their business through credit, then credit would return to its normal level.

If we split the sample in December 1880 to give two equal sub-periods of 492 months each, we can crudely assess whether seasonality was increasing or decreasing over time. The coefficient of variation of the monthly means declined from 0.050 in the 1840-80 sub-sample to 0.032 in the 1881-1921 sub-sample. The reduction in the seasonality of the narrow money supply may be related to structural change. In 1841 53 per cent of the labour force was employed in agriculture. By 1911 agriculture's share had fallen to 47 per cent.<sup>130</sup> Clearly, the seasonal pattern in the narrow money supply was partly related to the income of merchants and farmers, as one would expect from a classic money demand function where money is related to the nominal interest rate and output. In this way, the seasonality in the narrow money supply is not only reflective of the regular intra-year fluctuations in agricultural income but also of wider national income.

## 4. Conclusion

Using archival sources and contemporary publications, we have constructed estimates of the broad and narrow money supply for Ireland from pre-Famine times to independence. The new estimates build upon earlier work on the broad money supply by adding series for coin, the deposits of hitherto missing banks, interbank deposits, cheques in collection and items in transit and reserves. In doing so, the aggregates are consistent with established definitions and, as a consequence, will facilitate comparisons across time and space.

Having discussed the construction of the series in some detail, we subsequently employed the new monetary data to analyse cycles in economic activity at both the annual and monthly frequency. We presented the turning points in the Irish broad money, which coincided with the major recessions that have been identified in the literature. The benefit of this approach is that the broad money supply is generally pro-cyclical, and as opposed to qualitative discussions, gives a firmer idea of the absolute and relative magnitudes of contractions and expansions. Secondly, we calculated

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<sup>130</sup> Geary, 'Deindustrialization in Ireland to 1851'; Geary and Stark, 'Examining Ireland's Post-Famine Economic Growth Performance'.

monthly means for the narrow money series, which clearly followed the path of agricultural income as discussed by a contemporary of the time, which we understood in terms of a money demand function for a country with a large agricultural sector. The seasonality of the narrow money supply declined in the second half of the period studied here, which we attributed to structural change.

In the interwar period that followed the conclusion of our series, the broad money supply fell from £200 million in 1921 to £140 million 1933.<sup>131</sup> However, the majority of this decline is due to the reduction in population associated with independence in 1922. If we adjust the two spot estimates on the basis of population, broad money per head was £46 in 1921 in the whole of Ireland and £47 in 1933 in the Free State. Unless there were significant discrepancies in nominal balances per head between north and south, this indicates a cooling off in the growth rate of broad money. In contrast to the period 1840-1921, during which average annual growth in broad money was 3.51 per cent, the implied annual growth rate in the years between independence and the Great Depression was just 0.22 per cent.

## Appendix: Constructing the Coin Series

### A.1 Gold Coin

Our gold coin series comprises only of that in the Irish banking system as gold coin did not circulate among the public. As a consequence of the suspension of cash payments in Ireland on 2 March 1797 gold coin never regained prominence in Ireland as a medium of exchange, despite the fact that in nineteenth-century Britain gold coin was the largest component of the monetary base.<sup>132</sup> When cash payments were eventually restored in 1821, people had become accustomed to paper money transactions in the intervening years. In 1826 “no gold circulated” and Bank of Ireland notes were preferred to gold by the people in normal conditions.<sup>133</sup> Deposits were

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<sup>131</sup> Moynihan, *Currency and Central Banking in Ireland, 1922-60*, p. 528.

<sup>132</sup> Kenny and Lennard ‘Monthly Estimates for the Monetary Base of the United Kingdom 1841-1870’; Capie and Webber, *A Monetary History of the United Kingdom*.

<sup>133</sup> P.P., 1826a, pp. 10, 13.

lodged in the paper of the Bank of Ireland or any other bank with the average citizen preferring “a good note to a sovereign.”<sup>134</sup>

Even where gold was given as payment during the period, a given trader having gold “forced upon them” would “immediately turn to some of the merchants in the town and beg to get a bank note for it.”<sup>135</sup> While a culture of metallic currency prevailed in Ulster in 1801, by 1848 a Northern Bank director stated that the region had “never any gold circulation.”<sup>136</sup> It was rarely demanded in time of panic. Instead, Bank of Ireland notes were preferred to gold by the people and the “only” gold demand came from those emigrating to America.<sup>137</sup>

In 1868 a Director of the Bank of Ireland stated that sovereigns were never in circulation in Ireland and appearing before the 1875 committee, the Secretary of the Bank of Ireland admitted that they had not imported gold in over thirty years.<sup>138</sup> This situation continued until the outbreak of World War I where much of the remaining gold in the banking system was concentrated in the Bank of England, from where it would not return as there appeared no advantage in doing so.<sup>139</sup> A century after the assimilation of the currencies, the entire coinage in active circulation consisted solely of British silver and copper coins.<sup>140</sup>

There were other mechanisms in which gold could have entered Ireland. Trade between the islands created flows of gold which were inconvenient to both the public and the banks. Indeed, 3 pence for each sovereign was charged at the Bank of Ireland tills upon receipt of sovereigns “with a view to putting a stop to the import of gold which is not required”, as they had to be shipped back to Britain at the expense of the Irish banks.<sup>141</sup> By 1840, hoarding by the poor was largely absent due to the advent of the savings bank system where it would find a better return.<sup>142</sup> Indeed, even the clearing system of the banks avoided gold, where each bank held exchequer bonds in

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<sup>134</sup> P.P., 1826a, pp. 27, 37.

<sup>135</sup> P.P., 1826a, p. 12.

<sup>136</sup> See Ó Gráda, *Ireland*, p. 60; P.P., 1848 p. 82.

<sup>137</sup> P.P., 1826a, pp. 10, 13; P.P., 1848, p. 86.

<sup>138</sup> P.P., 1868, p. 104, P.P., 1875 p. 159.

<sup>139</sup> Colbert, ‘The Free State Currency Problem’.

<sup>140</sup> McGowan, ‘Money and Banking in Ireland’.

<sup>141</sup> P.P., 1875, p. 159.

<sup>142</sup> Barrow, *The Emergence of the Irish Banking System*, p 193.

lieu of gold as a means of settlement instead of keeping the gold in the country uselessly.<sup>143</sup>

Gold however remained a crucial component of reserves (*R*), despite its evidently complete absence in the public holding of currency (*PC*). The law which had required the notes of banks to be redeemable at branch survived the Bankers Act 1845, ensuring that Irish banks had an “exceptionally wide distribution of gold.”<sup>144</sup> Due to these considerations, we take gold held in banks as the entire volume of gold coin.

## A.2 Silver Coin

In this section, we describe and justify the choice of the opening and closing stocks (displayed above in table 1), which are mainly based upon archive material from the Royal Mint or recoinages.

*September 1826: £1,448,452*

While our monetary series start in 1840, mainly due to the availability of deposit data, the obvious starting point for coin is the assimilation of the currencies in the 1820s. The first stock is the sum of silver received in Ireland from the Royal Mint between 12 June 1823 and 23 September 1826. The old Irish silver was then demonetized in 1826 and returned to London via the Bank of Ireland who had drawn them in from the public. Of the total, £500,000 was on account of the Public Service in Ireland.<sup>145</sup> The “further supply of £500,000” was suggested by the Bank of Ireland in a letter to the Chancellor of the Exchequer for the circulation of the country.<sup>146</sup> This left a total of £948,451 arriving through the banking system, which matched the sum of withdrawals and is supported by a contemporary in banking who stated a figure of “nearly £1,000,000 in silver coins”.<sup>147</sup>

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<sup>143</sup> P.P., 1875, p.161.

<sup>144</sup> 9 Geo. IV, c. 81; Colbert, ‘The Free State Currency Problem’.

<sup>145</sup> MINT 12/18, 12/21, 8/35, 6/51.

<sup>146</sup> Bank of Ireland Minute Book, 14 September 1824.

<sup>147</sup> MINT 6/51, 12/18; P.P., 1868, p. 104.

*April 1871: £1,000,000*

The next stock comes from correspondence between the Bank of Ireland and the Royal Mint.<sup>148</sup> The coins of 1826 were now “mere silver discs which it becomes increasingly difficult to pass.”<sup>149</sup> The subsequent withdrawals totaled £410,100, which almost equaled the “one half of which is unfit for circulation” that the Bank of Ireland had specified.<sup>150</sup>

*June 1914: £2,098,243*

The next stock is a reworking of the Royal Mint’s rounded estimate of “£2 millions”. It was calculated as the *approximate* ratio of Irish bank silver holdings to UK bank silver holdings multiplied by the circulation of silver coin in the UK. We improve on this method by obtaining the actual share of Irish banks’ holdings as a percentage of UK banks’ holdings and multiply it by the UK circulation to arrive at a figure for the Irish circulation of £2,098,243  $\left[ \left( \frac{576,776}{8,246,555} \right) \times 30,000,000 \right]$ .<sup>151</sup>

*March 1922: £2,962,667*

The closing stock reworks another estimate by the Royal Mint. As a consequence of the emergence of the Free State, the Royal Mint estimated the amount of coin in that part of Ireland only. The report calculated, from assumptions regarding coin per head, shares of denominations and population, that there was £2 million in silver coin in the Free State. If we use the same assumptions, but replace the assumed 3 million people in the Free State with the recorded population for the whole of Ireland of 4.444 million, it yields a new figure of £2,962,667.<sup>152</sup> Brennan’s estimate of £1.5 million, which O’Rourke rightfully suggests must refer to the Irish Free State, was later dismissed as “surely a very low figure” by British Treasury officials.<sup>153</sup> The stock “must exceed” that as it would only “be equivalent to about twice the Bank holdings”.<sup>154</sup>

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<sup>148</sup> MINT 9/242.

<sup>149</sup> *Ballinrobe Chronicle*, 18 July 1868.

<sup>150</sup> MINT 6/8, 6/9, 9/242.

<sup>151</sup> MINT 26/12.

<sup>152</sup> Mid-year. *Detailed Annual Report of the Registrar General for Saorstát Éireann*, 1923.

<sup>153</sup> O’Rourke, ‘Monetary Data and Proxy GDP Estimates’; UCD Archives, P67/174; MINT 20/757.

<sup>154</sup> MINT 20/757.

## A.3 Copper and Bronze Coin

*July 1825: £212,764*

As with silver coin, it was necessary to extend the copper series back to the assimilation of the currencies to arrive at an opening stock. The Assimilation of the Currencies Act 1825 instructed that Irish copper be called in to be fully replaced with the new British coin but it was largely mismanaged.<sup>155</sup> One newspaper explained that “no great change in the currency of a country was ever before attempted with so little foresight and attention.”<sup>156</sup> The public was not forthcoming with old English copper, as it carried a one thirteenth premium on the old Irish copper “harps”. This culminated in a Royal Proclamation on 12 July that gave Irish copper legal status equal to British coin.<sup>157</sup>

The result of this was that the old Irish coin still in circulation plus the new additions would now become legal tender and shipments of new coin ceased in May 1826.<sup>158</sup> A total of £35,084 in new copper coin had been added of which £18,750 was shipped to customs houses and £16,334 added through the banking system.<sup>159</sup> The total copper coin withdrawn officially during the period 1825-7 amounted to £59,426.<sup>160</sup> In contrast to the official additions, withdrawals of old copper coin through customs continued into 1827 and amounted to £22,896 compared with £36,530 through the banks.<sup>161</sup> Due to the fact that the full replacement of coin was never completed, we are subsequently left with the problem of ascertaining the stock of copper coin *before* the official shipments began. Three estimates are provided: the first in 1826 by the Treasury and two subsequent documents considering a recoinage in 1831 by the Royal Mint.<sup>162</sup> However, the source we choose avoids rounding and documents each shipment since 1804, which totaled £212,764 on net.<sup>163</sup>

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<sup>155</sup> 6 Geo IV, c. 79.

<sup>156</sup> *Freemans Journal*, 24 July 1826.

<sup>157</sup> Barrow, *The Emergence of the Irish Banking System*, p. 27, MINT 12/14.

<sup>158</sup> MINT 8/35.

<sup>159</sup> MINT 12/18, 6/51, 8/35, 12/13, 12/18, 12/21, 12/20.

<sup>160</sup> MINT 12/13.

<sup>161</sup> MINT 8/35.

<sup>162</sup> P.P., 1826b; MINT 12/13, MINT 12/9, 12/18.

<sup>163</sup> MINT 12/9, 12/18.



*December 1869: £72,430*

The next stock is calculated at the time of a complete recoinage. In the 1860s copper coin was gradually replaced by bronze coin, and completely demonetized in the United Kingdom in December 1869.<sup>164</sup> Thus, our stock is calculated as the sum of additions of new bronze coin up until the month of demonetization.

*March 1922: £66,660*

The closing stock is calculated in an identical manner to the closing stock for silver.

## A.4 Issues

In extreme events, such as silver scarcities, there is evidence that the banks may have bypassed the Royal Mint in their procurement of silver coin. While we have the minute books for some banks for some years, we are not able to systematically incorporate these qualitative sources into our series for silver coin. However, these are, of course, captured in the residual, although the chronology will be imperfect. Additionally, we cross checked additional sources where possible during such acute periods. For instance, the Mint daily account books show no silver additions in the early 1850s despite the “unusually low” levels according to a circular of the Provincial, which explained that the “the mint are [sic] not at present coining” due to the needs of the Crimean War.<sup>165</sup>

The Royal Mint’s daily account books document both the buyer (for additions) and seller (for withdrawals) of coin. In general, the parties involved in the transactions were banks. Thus, we can ascertain if the sales of silver, for instance, were bound for Ireland by the name of the purchasing bank. However, in the case of withdrawals of copper coin during the transition to bronze coin in the 1860s, the sums sold, and thus the actors involved, were small. During this period, the sellers of old bronze coin were listed as “sundry persons”, from which it is impossible to ascertain if this related to coin originating from Ireland. However, the public were

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<sup>164</sup> Craig, *The Mint*, p. 325.

<sup>165</sup> MINT 6/57, 6/5, 6/6; *Provincial Bank of Ireland Minute Book*, 10 June 1853.

incentivized by a 2 per cent premium on the old copper coins.<sup>166</sup> Thus, we assume that 98.04 (102/100) per cent of that added in new bronze coin in each month between July 1861 and December 1869 was withdrawn in old copper coin. Prior to the recoinage, copper coin was not systematically withdrawn in the United Kingdom through the Royal Mint, nor was it until as late as 1908 via the Comptroller and Accountant General of the Post Office.<sup>167</sup> From that year, the Annual Reports of the Deputy Master and Comptroller of the Royal Mint record annual totals of bronze coin withdrawn from Ireland. For the monthly *M0* series, the annual total is apportioned evenly across each month. In any case the annual totals were very small; the maximum was £780 in 1909.

Undoubtedly, the use of a residual to capture a broad range of unobservables is not ideal as it influences the series in certain periods. However, emigration was a dominant force that led to extensive outward unofficial flows. As Mokyr stated, between Waterloo and the Famine 1.5 million people left Ireland, while more than 4.5 million people emigrated between 1850 and 1913.<sup>168</sup> Both silver and copper were carried to Britain and the colonies as legal tender, often earning a considerable premium.<sup>169</sup> Even if we were to obtain an estimate of the average coin carried per emigrant, as is the approach of Capie and Webber for gold coin, there are problems with the existing emigration statistics, which suffer from “weaknesses and ambiguities” and display “important discrepancies”.<sup>170</sup> Indeed, the only document that covers overseas emigration by destination has been labeled a considerable underestimate.<sup>171</sup>

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<sup>166</sup> Craig, *The Mint*, p. 325.

<sup>167</sup> MINT, 26/9.

<sup>168</sup> Mokyr, *Why Ireland Starved*, p. 35; O'Rourke, 'The Economic Impact of the Famine in the Short and Long Run'.

<sup>169</sup> British copper and silver coin traded at a premium of 12.5 per cent against the Canadian equivalent where copper coins of “every nation” traded at half a British penny. See McGregor, 'Emigration to British America'.

<sup>170</sup> Hatton and Williamson, 'After the Famine'; Ó Gráda, 'A Note on Nineteenth Century Emigration Statistics'.

<sup>171</sup> Ó Gráda, 'A Note on Nineteenth Century Emigration Statistics'.

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# Paper 3. Public Debt Dynamics in Ireland, 1950-2015

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## Abstract

In this paper I construct a consistently defined series for Irish government debt and primary balances during the period 1950-2015. I employ the series to study the public debt dynamics of three episodes (the crises of the 1950s, the 1980s and 2010-15) in Ireland's modern economic history. By using traditional debt dynamic decomposition formulae, I measure the components which contributed most to public debt ratio reduction following previous high debt episodes. I also employ the case of Sweden for comparative purposes, in how it emerged from the increase in public debt in the aftermath of its banking crisis 1991-1993. The key findings which emerge are 1) the reduction of the public ratio following the 1980s episode was predominantly driven by cumulative primary surpluses, though a favourable growth and interest rate differential emerged as the key determinant in the late 1990s. Additionally, public debt in the 1980s was considerably more difficult to service in terms of tax revenues and maturity structures than the current event. 2) Public debt continued to increase following the crisis of the 1950s due to higher interest rates and lower inflation, despite a recovery in growth and continuous fiscal contraction. 3) In line with other research isolating the uniqueness of open economy debt reductions, I find that though Sweden (like Ireland) reduced public debt (1995-2001) in an environment of strong



international growth, it did so in a macroeconomic environment of higher interest rates and falling inflation, entirely through budget surplus accumulation.

**Key words:** Public Debt; Ireland; Public Debt Dynamics, Sweden, Crisis

**JEL Classification:** E62, F34, H60, H63, H69, N00

## Introduction

In 2013, Ireland's public debt to GNP ratio stood at 125%. Though the circumstances leading into it were dissimilar, in 1986 a ratio of 129% was reached (see Figure 1).<sup>172</sup> In other words, there is a precedent in recent economic history from which we can draw conclusions that are relevant to current debates. Ireland also experienced one other crisis in which fiscal policy played a role in the 1950s. To my knowledge, the three episodes have never been studied for comparative purposes, though some recent studies have assessed fiscal policy over the long run,<sup>173</sup> historical debt episodes in Ireland<sup>174</sup> and others have suggested why the two most recent events at least should be studied together.<sup>175</sup>

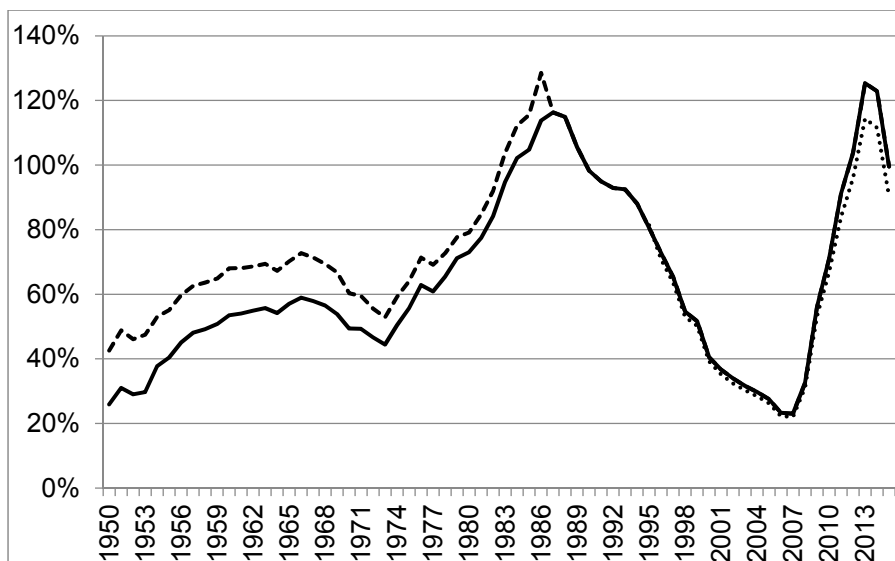
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<sup>172</sup> Central Statistics Office 'National Income and Expenditure Tables,' *Finance Accounts of Ireland*.

<sup>173</sup> Cronin and McQuinn (2014)

<sup>174</sup> Foley-Fisher and McLaughlin (2016 a, b)

<sup>175</sup> McCarthy (2009), ESRI (2009), Bergin et al (2011)



**Figure 1: Irish Public Debt to GNP Ratio (1950-2015)**

Notes: Dashed line represents the older methodology of accounting for public debt until 1987 and dotted line represents the new national accounting methodology ESA 2010 from 1995 (see data appendix). Source: Central Statistics Office of Ireland (ESA 1995 Methodology for National Accounting) and Finance Accounts of the Government of Ireland.

The attention afforded to fiscal policy in light of the great financial crisis of 2008 by contemporaries reinforces the need to understand the past in the context of the present. Namely, how was debt reduction achieved in Ireland at similar levels previously?

Beginning in the post-World War II era, following the official declaration of the Irish republic in 1949, this analysis traces three episodes associated with fiscal policy and public debt. The economic crisis of 1955/1956 provides an example of an event which, though not initially caused by fiscal policy, was aggravated by the restrictive fiscal response given the unfavourable underlying macroeconomic conditions. The debt ratio continued to rise through the period, though it never approached the levels it was to attain in the subsequent episodes. In contrast, the fiscal crisis of the 1980s was largely a result of government policy which combined with international shocks, culminated in the highest debt ratio that the state

has experienced to date.<sup>176</sup> The third crisis in public debt occurred in the aftermath of the great financial crisis of 2008 as a combined collapse in output and associated decline in fiscal revenues made the blanket guarantee that the incumbent government had granted creditors of the Irish financial sector unfeasible. Therefore, all three cases are unique in their causes and the aftermaths of the episodes of the 1950s and 1980s at least were notably different. Furthermore, as Ireland had not experienced a major bank failure since 1885 or major banking crisis since 1820, the resulting increase in public debt following the financial crisis had no contextual precedent domestically.<sup>177</sup> For this reason, an international comparison is appropriate and Sweden's debt reduction policies are briefly reviewed in the aftermath of its banking crisis 1991-1993.

Using the new series, the standard debt dynamics formulae and applying a similar framework to that of Crafts (2016), I contrast each episode individually and draw general conclusions based upon the specific results, taking the macroeconomic context into consideration in each case.

The paper is structured as follows. First, the calculations regarding fiscal sustainability and the determinants of debt ratio reduction are discussed. Secondly, the descriptions of each episode are presented with the results which form the basis for the general comparative analysis and conclusion that follows. Additionally, the data appendix explains the treatment and construction of each data series in turn.

## Debt Ratio Dynamics

In measuring the dynamics of Irish public debt, I address both the exchequer balance and the historical driving forces of debt ratio reduction.

Formula 1 shows that the change in the public debt ratio is driven by fiscal policy (the government primary balance), the rate of real interest and real output.

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<sup>176</sup> The methodology for calculating nominal outstanding public debt was changed in 1987 which is reflected in Figure 1. See Data Appendix.

<sup>177</sup> See Ó Gráda (2012) for details of the collapse of the Munster Bank in 1885, see Barrow (1975, pp. 17-23) and Hall (1949, pp. 127-133) for descriptions of the banking crisis of 1820, in which more than half of the total of Irish banks failed.

$$1. \Delta d = -b + (r - g)d$$

where  $d$  = the debt ratio,  $b$  is the primary budget deficit,  $r$  is the real rate of interest and  $g$  is the real rate of economic growth. The real rate of interest can be restated as the nominal rate  $i$  minus inflation  $\pi$ . Debt ratios will increase in consequence of an increase in government deficits and higher real interest rates which may be driven by lower inflation or higher nominal rates. In contrast, the negative sign attached to real economic growth implies a reduction in the debt ratio if economic productivity can be increased. Formula 2 displays the sustainability condition of debt at its current ratio.

Setting  $\Delta d = 0$ , we solve for the *required* primary budget balance  $b^*$  to achieve steady state condition of current  $d$ .

$$2. b^* = (r - g)d$$

Substituting 2 into 1,

$$3. \Delta d = -b + b^*$$

Formula 3 shows that the change in the debt ratio is a result of the *primary gap*, the difference between the actual primary budget deficit  $b$  and the required primary budget balance  $b^*$ . If they are equal, the formula shows that the debt ratio will remain unaltered between two periods. In order to further decompose the required fiscal balance, we develop Formula 2 to yield

$$4. b^* = (i - \pi)d - g(d) \rightarrow b^* = id - d(\pi - g) \rightarrow b^* = (i - \pi - g)d$$

As is apparent from Formulas 2 and 4, the required primary budget surplus will *increase* in line with both the debt ratio and where the real rate of interest on government debt exceeds real economic growth ( $r-g$ ). It will *decrease* where  $r-g < 0$  or in line with any rate of reduction in  $d$ . Under a balanced budget rule,  $b$  must equal at a minimum  $id$  (debt servicing) implying that when inflation  $\pi$  and real growth  $g$  are positive, the resulting budget balance  $b$  will exceed the required primary budget surplus  $b^*$  ( $b > b^*$  when  $\pi + g > 0$ ). Crafts (2016) outlines the consequences of the above

arithmetic. Where “normal” conditions persist with inflation and growth, the condition will be met. In conditions of price deflation *or* recession, it *may not* be. With both deflation *and* recession it *will not* be met.

In addition to examining the variance between the “required” primary budget surplus and the actual budget position as it transpired in the sub periods addressed in this paper, it is equally enlightening to observe the subsequent mechanism of debt ratio reduction and the key determinants. While there is no formula that allows an exact, clean additive decomposition of changes in the debt ratio,<sup>178</sup> the following formula comes very close. Abbas et al (2011), Escolano (2010) and Crafts (2016) all use slight variants on the same formula (which is a permutation on the above) to arrive at decomposing changes in public debt ratios, the last of which is adopted identically here as Formula 5. The additional variable stock flow adjustments term ( $sfa_t$ ) is a cumulative residual that captures valuation effects such as the impact of exchange rate changes for debt issued in a foreign currency, ‘below-the-line’ fiscal operations such as privatization, and errors in the data. The decomposition can be made for one period or cumulatively by taking sums, the latter being the method adopted here for each sub period.

$$5. \quad d_T - d_0 = \sum_{t=1}^T \left[ \frac{(r-g)_t}{(1+\pi+g)} \right] d_{t-1} + \sum_{t=1}^T -b_t + \sum_{t=1}^T sfa_t$$

What the above formula shows is that the evolution of the debt ratio depends solely on the real interest rate  $r$ , the real growth rate  $g$  (the first term) and cumulative exchequer balances  $b_t$  (the second term) with the residual error item ( $sfa_t$ ) comprising the difference. It is therefore possible to decompose reductions in debt ratios in a manner which ranks and measures the driving determinants of the reduction. Wherever appropriate in the text, the three terms are referred to separately as 1) the “ $r - g$ ” component which (if negative) drives the debt trajectory downwards as a result of economic growth exceeding real interest payments, 2) the “budget surplus component” which will drive down the ratio implied by the negative sign and 3) the “residual component” which can be positive or negative depending upon the underlying mechanism.

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<sup>178</sup> Escolano (2010)

## 2. Public Finance Episodes in Irish Economic History

### The Crisis of the 1950s

Following the signing of the Anglo-Irish Treaty in December 1921, the government of the Irish Free State which emerged did not materially alter the economic institutions and cultures inherited from the United Kingdom.<sup>179</sup> Indeed a member of the new parliament (*Dáil Éireann*) famously stated “we are the most conservative-minded revolutionaries that ever put through a successful revolution,”<sup>180</sup> exemplified by the fact that the parity with sterling was maintained and monetary and budgetary experimentation was “rejected out of hand.”<sup>181</sup> While the conservative governing party of *Cumann na nGaedheal* was subsequently replaced by the more radical *Fianna Fáil* in 1932 which was re-elected every term prior to 1950 (with brief interruption 1948-1951), the Free State’s public debt remained moderately low by international standards, despite an “economic war” in the 1930s with Britain.<sup>182</sup> The Free State was officially declared a republic in 1949 and it is from that juncture that this analysis commences.

Following the “near autarky” of the war years which had run down the capital stock, fiscal policy became comparatively “lax” in the post war recovery period.<sup>183</sup> A state capital expenditure programme which had commenced at the end of the 1940s had attracted much criticism from the infant central bank concerned about potentially jeopardizing the parity link with pound sterling.<sup>184</sup> Beginning with the 1949 Central Bank report, growth in state expenditure was consistently blamed for the increase in purchasing power which was not accompanied by a “proportionate increase in output in useful goods and services.”<sup>185</sup> Throughout the early 1950s, criticism was focused upon the growing size of the government sector, the

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<sup>179</sup> Ó Gráda and O’Rourke (1993)

<sup>180</sup> Knirck (2014)

<sup>181</sup> Ó Gráda and O’Rourke (1993)

<sup>182</sup> See O’Rourke (1991) for an account

<sup>183</sup> Ó Gráda and O’Rourke (1993)

<sup>184</sup> Honohan (1994)

<sup>185</sup> Moynihan (1975, p. 332) cites the Central Bank Governor Joseph Brennan’s definition of inflation.

negative effects of rising wages on export competitiveness and the dominance of the state in the capital market, crowding out much needed funding of the private sector.<sup>186</sup> The Ministry of Finance justified the relatively expansionary fiscal policy in the following terms: “The lower level of interest rates thus established is desirable for the stimulus it affords to investment and national progress.”<sup>187</sup>

Relatively little research to date has been conducted on the Irish economic crisis of 1955-56.<sup>188</sup> This has been deemed a “macroeconomic crisis” primarily associated with a growing balance of payments deficit due to unfavourable terms of trade and it did not ultimately result in a financial crisis.<sup>189</sup> Honohan (1994) described the event as a “fiscal crisis.” While the debt spike seen in Table 1 undoubtedly shows an expansion in the debt ratio during the period, the percentages pale in comparison to those of current times and it cannot be considered a public debt crisis as such. Instead, this episode was chosen as an example where fiscal contraction aggravated the economic difficulties of the era while the public debt ratio continued to increase in spite of the tighter fiscal policy.

Table 1 confirms the Minister’s statement regarding low interest rates at the beginning of the 1950s and long term nominal interest rates did not fall back to these levels again until 2004. While some authors have criticized as unnecessary a “fiscal contraction” in 1952, the below figures hardly lend support as the primary budget deficit was reduced by just over 1% of GNP from 7.2% in 1951 to 5.8% the following year.<sup>190</sup> The crisis which subsequently occurred in the middle of the decade has been reviewed by Honohan and Ó Gráda (1998). Controversially, Finance Minister Sweetnam persuaded the member banking system not to raise rates in step with London Bank rate in January 1955. The Irish central bank at that time operated in the manner of a Currency board not lending to bank or government, nor influencing credit through regulation or interest rate actions.<sup>191</sup> This “policy blunder” meant that the interest differential between the islands was not rectified until December and has been attributed to bringing about the

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<sup>186</sup> The paragraph borrows from Kavanagh (2015)

<sup>187</sup> Moynihan (1975, p. 420) quoting the Minister for Finance, James Sweetnam.

<sup>188</sup> See Honohan and Ó Gráda (1998) for the standard account.

<sup>189</sup> Honohan and Ó Gráda (1998), Ó Gráda and O’Rourke (1993)

<sup>190</sup> Ó Gráda and O’Rourke (1993)

<sup>191</sup> Honohan (1994)

balance of payments crisis.<sup>192</sup> The “draconian fiscal response” which followed has been credited with creating the subsequent recession.<sup>193</sup>

**Table 1: Fiscal Sustainability Data, Ireland 1950-1960**

	<i>d</i>	<i>i</i>	$\pi$	<i>g</i>	<i>b</i>	<i>b*</i>	<i>gap</i>
1950	42.6	3.0	1.0	0.8	-3.9	0.5	-4.4
1951	48.8	3.6	4.0	1.3	-7.2	-0.8	-6.3
1952	46.1	5.0	10.7	2.8	-5.8	-3.9	-1.8
1953	47.5	5.0	6.5	3.1	-5.0	-2.2	-2.8
1954	53.0	4.9	-0.3	1.0	-4.1	2.2	-6.3
1955	55.1	4.9	2.3	2.0	-2.5	0.3	-2.9
1956	59.8	5.8	2.8	-1.3	-2.6	2.6	-5.1
1957	62.6	6.1	3.3	0.6	-2.3	1.4	-3.6
1958	63.7	6.2	-2.2	5.8	-0.6	1.6	-2.3
1959	64.9	5.6	1.3	4.9	-1.2	-0.4	-0.8
1960	68.1	6.0	-2.4	4.5	-2.2	2.7	-4.9

Notes: GNP deflator for inflation. Ratios *d*, *b*, *g*, *b\** and *gap* are expressed as a percentage of GNP. Rounding numbers may affect primary gap result. Author's Calculations. CSO, Finance Accounts of Ireland, OECD

While the debt ratios (*d*) would not worry analysts in today's environment, one striking feature of Table 1 is that though the required primary balance *b\** was negative through the years 1951-1953 in the earlier part of the decade for debt to remain stable, the primary gap was consistently negative and the total debt ratio grew as a result, combined with increased government borrowing at favourable rates. Considering the low ratio of debt, it is reasonable to suggest that the government was not at that time concerned about debt sustainability, despite the protests of the central bank. Indeed, growth was poor throughout the 1950s in Ireland and it is considered a “lost decade” as it underperformed Western Europe which was experiencing a golden age of growth.<sup>194</sup> This may help explain weak tax revenue streams resulting in larger deficits and a willingness on the part of

<sup>192</sup> Honohan (1994) and Honohan and Ó Gráda (1998)

<sup>193</sup> Ó Gráda (2011)

<sup>194</sup> Ó Gráda and O'Rourke (1993)



policy makers to invest in public infrastructure or “national progress” in the words of the Minister for Finance, at lower rates.

Though the crisis that followed is described as occurring between 1955 and 1956, the effect on the real economy is slightly lagged as taking the years 1956 and 1957 together, the Irish economy did not grow. This was accompanied with fiscal tightening and a neutral primary balance in 1958. Ó Gráda’s (2011) view was that while not constituting the cause, fiscal policy may have “exacerbated the difficulties of the mid-1950’s.” As Table 1 displays, despite the fiscal contraction in the latter half of the decade, the debt ratio continued to rise through the remainder of the 1950s as interest rates rose and inflation summed to zero between 1957 and 1960, even as strong growth returned in 1958. The exchequer budget did not approach balance again until 1987 at the height of the second fiscal crisis.

The low level of initial public debt entering the crisis and the considerably higher ratio at the end of the period transpired *despite* fiscal contraction. The highest recorded level of emigration since independence occurred in 1958.<sup>195</sup> In August of that year, T.K. Whitaker’s book ‘*Economic Development*’ was published which stressed the hitherto neglected importance of education, reviewed long term prospects for development and has been said to represent “a watermark in the modern economic history of the country.” It followed a period of sustained criticism from the newly established Capital Investment Advisory Committee (in a series of three reports) of the reliance on subsidies “as a substitute for effort” and the belief in the need for increased private sector investment instead of the “traditional method of stimulating employment by ‘public works.’” Public investment was to be achieved by “diverting expenditure” from less productive areas and the rate of investment should depend more than in the past, upon the rate of current savings and economic growth. While some action by the state was to complement the development process in targeted productive areas, the Central Bank concurred that rigid planning, high taxation (due to high public expenditure) had adverse effects on the economy and viewed such policy with apprehension in light of their primary goal of convertibility at par with sterling.<sup>196</sup>

Table 1 summarizes the decade in the following manner: an increase in capital expenditure was initially accompanied by high inflation with low interest rates, relatively low growth and a balance of payments crisis which

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<sup>195</sup> Ó Gráda (2011)

<sup>196</sup> The paragraph borrows from Moynihan (1975, pp. 444-6)

prompted a fiscal contraction. In the aftermath of the crisis, due to an absence of inflation and increasing interest rates, even higher debt ratios prevailed than those at the beginning of the sub-period, despite the general policy goal of limiting state intervention.

## **The Evolution of Irish Public Debt in the 1980s**

As Honohan and Walsh (2002) outline, optimism regarding the Irish economy's potential for convergence at the beginning of the 1970's was largely derailed by the oil crises and the subsequent fiscal policy responses to them based upon outdated economic models. In other words, while fiscal policy had exacerbated the difficulties of the mid 1950s, it was largely responsible for the crisis which had begun in the late 1970s and was to persist through much of the 1980s.<sup>197</sup> Though it is not the purpose of this paper to discuss public expenditure, suffice it to say that expansionary fiscal policy from 1977 was seen as the principal tool with which to combat the stubbornly high unemployment that prevailed following the first oil crisis.<sup>198</sup> Borrowing seemed particularly attractive given temporarily negative real interest rates as was the case at the beginning of the 1950s.

According to Honohan and Walsh (2002), the unforeseen effect of this approach was to crowd out private investment, drive up tax rates and wages, put Ireland's public debt on an unsustainable path with limited fiscal space and to increase its vulnerability to the shock of the second oil crisis of 1979 when rates subsequently rose.<sup>199</sup> A number of short-termist demand management responses kept the economy out of equilibrium, inhibiting sustainable job creation for more than two decades<sup>200</sup> based upon various fiscal programmes such as the *National Development Plan* (1977-80) which envisaged considerably stronger macroeconomic performance than that which actually transpired.<sup>201</sup> As McCarthy (2009) noted in terms of growth, "what happened in 1988 was planned to happen in 1983 or 1984."

When it had become apparent that a debt crisis was inevitable, policy focus switched to fiscal sustainability and "most of the 1980s were wasted

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<sup>197</sup> Ó Gráda (2011)

<sup>198</sup> Honohan and Walsh (2002)

<sup>199</sup> Honohan and Walsh (2002)

<sup>200</sup> Honohan and Walsh (2002)

<sup>201</sup> McCarthy (2009)

undoing the damage of earlier fiscal recklessness.”<sup>202</sup> Table 2 reveals the required budget surpluses in order to maintain a stable debt ratio from 1977 through the most acute phase of the crisis (1982-1986) until the first years of stabilization beginning in the 1990s.

**Table 2: Fiscal Sustainability Data, Ireland 1977-1995**

	<b>d</b>	<b>i</b>	<b><math>\pi</math></b>	<b>g</b>	<b>b</b>	<b>b*</b>	<b>gap</b>
1977	60.9	12.9	14.5	5.3	-4.3	-4.2	-0.1
1978	65.4	12.8	10.4	5.5	-6.5	-2.0	-4.5
1979	71.2	15.1	13.8	4.0	-6.8	-2.0	-4.9
1980	73.0	15.4	15.5	2.6	-6.6	-2.0	-4.6
1981	77.4	17.3	18.4	1.8	-7.9	-2.3	-5.6
1982	84.2	17.1	17.3	-1.3	-5.9	0.9	-6.8
1983	94.8	13.9	11.2	-1.9	-2.9	4.4	-7.3
1984	102.2	14.6	7.2	1.1	-1.7	6.5	-8.2
1985	104.8	12.8	7.0	0.2	-1.8	5.9	-7.6
1986	113.8	11.2	7.5	0.1	-1.7	4.2	-5.9
1987	116.3	11.3	3.4	3.7	0.5	4.8	-4.3
1988	114.9	9.4	3.4	1.7	6.1	4.9	1.2
1989	105.6	9.2	4.9	4.7	6.2	-0.4	6.6
1990	98.3	10.3	1.9	6.5	6.3	1.8	4.5
1991	95.0	9.4	2.7	2.0	7.2	4.5	2.8
1992	92.9	9.3	3.5	2.5	4.9	3.1	1.8
1993	92.5	7.6	5.1	2.9	5.0	-0.4	5.3
1994	88.1	8.0	1.6	6.5	4.5	-0.1	4.6
1995	80.5	8.2	3.6	8.0	4.1	-2.7	6.8

Notes: GNP deflator for inflation. Ratios d, b, g, b,\*and gap are expressed as a percentage of GNP. Rounding numbers may affect primary gap result. Sources: CSO, Finance Accounts of Ireland, OECD. Author's calculations.

As noted by other observers regarding growth, the gap between projection and outcome was alarming<sup>203</sup> and government fiscal plans such as the latterly less optimistic *Building on Reality* (1985-7) were in danger of losing credibility as private sector planning and investment stalled with consistent deviation between actual and budgeted taxation outcomes.<sup>204</sup> It provoked the cynicism expressed by Ó Gráda and O'Rourke (1993) that “setting and meeting detailed medium-term growth targets in a small open economy is a difficult, if not downright pointless, exercise.”

<sup>202</sup> Ó Gráda and O'Rourke (1993)

<sup>203</sup> Ó Gráda (2011)

<sup>204</sup> See Honohan (1987) for a detailed review of how contemporary macroeconomic forecasts and “the fiscal objectives were being missed by a fairly wide margin.”

Table 2 displays that at the inception of the original *National Development Plan* in 1977 the required primary budget balance was negative for debt to remain stable. In other words, the debt ratio could have remained unchanged even by running primary budget deficits until 1982. However, it is noteworthy that during the comparatively strong growth of the late 1970s, the debt ratio nonetheless rose through further government borrowing at cheaper rates. The larger budget deficits, which transpired as the shock of the oil crisis and consequent interest rate hikes spread to the real economy, moved firmly in the opposite direction (of the required primary balance) to the steady state condition. Required budget surpluses  $b^*$  in the order of magnitude of 6% of GNP in the mid-1980s were persistently deviant from the norm of actual primary deficits which transpired. The cumulative primary “gap” (variance between required and actual primary budget balance) between 1982 and 1986 was an unprecedented negative balance of 35.6% of GNP. Indeed, it was not until 1988 that a positive variance was first recorded and the trend continued throughout the first half of the 1990s reducing the debt ratio.

## Reducing the Debt 1988-2002

Using the debt decomposition formula (5) as outlined in Section 1, I now address the reduction of debt during the following period of sustained economic growth. For illustrative purposes, the period can be split between two seven year periods to obtain a better understanding of the determinants of the reduction of the public debt ratio throughout the period 1988-2001 beginning with the closing debt ratio for the peak year 1987 of 116% of Public Debt to GNP (see Table 3).<sup>205</sup> One observes that there are two distinctive periods of varying conditions during which the public debt ratio was reduced. As can be observed from Table 2 until 1994, it was more politically difficult to decrease the sovereign debt ratio due to an unfavourable  $r$ - $g$  configuration, primarily by initially high nominal interest rates and lower inflation.

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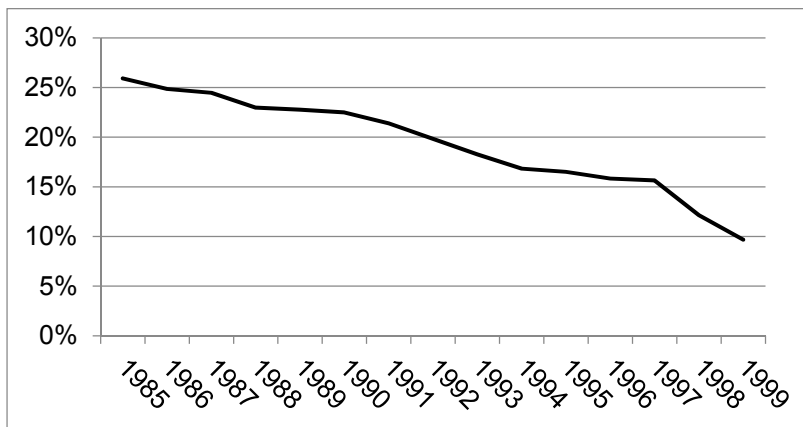
<sup>205</sup> In the interest of comparability with the post 1986 period, all debt ratios are calculated using the current methodology outlined by The Local Loan Fund (Amendment) Act, 1987. Had the pre Act method been employed, public debt to GNP reached a peak of 129% of GNP in 1986 compared to 114% of GNP using the new method for the same year.

**Table 3: Reduction of Public Debt Decomposed, Ireland 1988-2001**

	<i>Initial Ratio</i>	<i>Terminal Ratio</i>	<i>Decrease</i>	<i>Budget Surplus Component</i>	<i>Growth Interest Differential</i>	<i>Stock Flow Adjustment</i>
1988-1994	116	88	-28	-41	13	0
1995-2001	88	37	-51	-31	-32	12
1988-2001	116	37	-79	-72	-19	12

Notes: All ratios expressed as a percentage of GNP. Initial ratio is peak of 1987 implying that 1988 is the first year of debt reduction. Rounding may affect numbers Author's Calculations. Sources: Finance Accounts, National Treasury Management Agency, OECD, Central Statistics Office.

In other words, as growth rates averaging 4% for the initial period were insufficient to overcome the average real interest rates of 6%, the only remaining alternative to achieve debt reduction was through the politically unpopular mechanism of primary budget surpluses which averaged 6% of GNP for the period. A welcome aid to this policy was the underlying dynamic of falling total debt service costs in relation to gross government revenue which is suggested by Lane (1999), which I plot in Figure 2 below.



**Figure 2: Irish Public Debt Service as a percentage of gross Government Revenue, 1985-1999**  
Sources: Finance Accounts, Budgetary and Economic Statistics

The second half of the 1990s saw average real rates of zero on long term government debt while real growth of GNP catapulted to an average of 8% per year between 1995 and 2001. This more favourable  $r-g$  dynamic eased pressure on the exchequer primary balance as a means of lowering the ratio

and the burden was shared approximately equally between the two components. It is also apparent from Table 3 that when the favourable *r-g* configuration transpired, a significantly larger overall debt reduction was achieved of 51 percentage points compared to 28 percentage points in the earlier period. This division supports the observation made by Lane (1999) that the bulk of the reduction in the non-interest expenditure and in the total tax burden had taken place in the late 1980s with only a marginal decline in the 1990s. The debt ratio declined more considerably in the 1990s with the emergence of a favourable growth interest differentia to government debt reduction.

### 3. An International Comparison-The Case of Sweden

While the national debt ratios in Ireland at time of writing are similar to those resulting from the Irish fiscal crisis of the 1980s, the latter had its origins in the fiscal policy pursued by Irish governments through the late 1970s and the first half of the 1980s.<sup>206</sup> In the years preceding the most recent crisis, Ireland had successively reported fiscal surpluses meeting the requirements of the Stability and Growth Pact every year for the period 2001-2007. The official European methodology regarding general government debt however, hid the true state of the structural (through-the-cycle) budget balance which was considerably worse.<sup>207</sup> The financial crisis of 2008-2010 was the result of private sector borrowing and resulted from the bursting of a classic credit fueled property bubble culminating in a banking crisis, the most severe of its kind in Ireland since 1820.<sup>208</sup> The increase in public debt post 2009 was the result of the blanket guarantee on the liabilities of all Irish financial institutions, declining tax revenues and the fall in national income.<sup>209</sup>

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<sup>206</sup> Ó Gráda (2011); Ó Gráda and O'Rourke (1993)

<sup>207</sup> Bénétrix and Lane (2012, 2013)

<sup>208</sup> In terms of damage to the financial system, 16 out of 31 registered private banks failed. See Hall (1949, p. 127); Hickson and Turner (2005) for regulatory response.

<sup>209</sup> See Whelan (2014) for a summary of the crisis, Bénétrix and Lane (2012) for the implications for Fiscal Policy

As the future direction of the current debt trajectory is unknown, it is useful to compare the Irish sovereign debt case with the situation which was faced by the Swedish government in the aftermath of the latter's financial crisis 1991-3 which shared very similar characteristics with the later Irish episode.<sup>210</sup> Like Ireland, Sweden is a small open economy in Northern Europe which experienced its highest public debt ratio in the post war era in the aftermath of its financial crisis.<sup>211</sup> Though Sweden is not a member of the Eurozone, it submits a convergence programme which presents an update of the medium-term fiscal strategy as is required by the Stability and Growth Pact. Similarly to Ireland, Fiscal policy is assessed by the Swedish Fiscal Council established in 2007 which Ireland emulated in 2011, employing the original chairperson of the Swedish Fiscal Council, Lars Jonung, to chair the first independent evaluation of the Irish Fiscal Advisory Council in 2015.<sup>212</sup>

Indeed, many parallels were drawn with the Swedish case as the Irish crisis unfolded. A Commission of Enquiry specifically mentioned that the Swedish crisis should have acted as a deterrent to Irish authorities considering lax regulation.<sup>213</sup> Ireland adopted a version of "the Swedish model" to reconstruct the financial system using a version of the "good" and "bad" bank model. Bo Lundgren, Minister for Fiscal and Financial affairs during Sweden's crisis who received widespread media attention in Ireland, was invited to answer detailed questions from an Irish parliamentary committee on Sweden's methods of crisis resolution.<sup>214</sup> The Swedish chief economist of the Central Bank of Ireland, Lars Frisell, regretted as "unfortunate" that Ireland may "have been inspired by the successful guarantees enacted in Sweden" when it erroneously included the liabilities of banks such as Anglo Irish and Irish Nationwide Building Society in its blanket guarantee, due to factors such as the speed at which events unfolded and pressure at a European level.<sup>215</sup> This contrasted with the Swedish case where "the policy makers of yesterday designed their bank resolution

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<sup>210</sup> For a detailed discussion see Jonung et al (2009)

<sup>211</sup> Jonung et al (2009, p. 43)

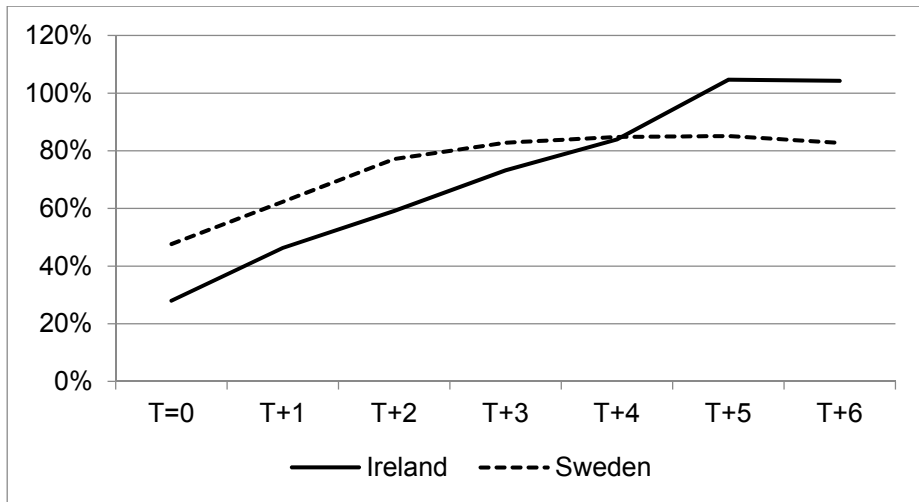
<sup>212</sup> Jonung et al (2015)

<sup>213</sup> 'Misjudging Risk' (2011)

<sup>214</sup> 'Ireland hopes Swedish Mr Fix-It has the answer to banking crisis', *The Irish Independent*, 9/07/2009

<sup>215</sup> Frisell (10/05/2015). For a summary of the similarities and differences regarding the Irish and Swedish crisis episodes see *Riksbank Financial Stability Report 1/2011* and Woods and O'Connell (2012).

policies in a more stable macroeconomic and financial global setting.”<sup>216</sup> The debt trajectory of both countries post crisis is shown in Figure 3.



**Figure 3: Public Debt to GDP Ratios of Ireland and Sweden from Crisis Event.**

Notes: Public Debt as Percentage of GDP. T=0 is 1991 for Sweden and 2008 for Ireland. Swedish debt data has been adjusted to calendar year end as outlined in data appendix. Author's Calculations Sources: Ireland-Central Statistics Office, Finance Accounts of Ireland and National Treasury Management Agency. Sweden-Fregert and Gustavsson (2008) and Krantz and Schön (2015).

While increases in both ratios are observed post crisis, Ireland's growth in public debt is the more acute with an increase of 77 percentage points when compared with Sweden's 35 percentage point increase.<sup>217</sup> As the comparative details of the bailouts are beyond the scope of this paper and are covered elsewhere,<sup>218</sup> I now review the public debt reduction process the Swedish state pursued in the aftermath of its banking crisis.

As Table 4 displays, Sweden's debt had fallen to 56% of GDP in 2002 from a peak of 85% of GDP in 1996. Recent studies have shown that during "high debt episodes" of "over 80% of GDP" the *r-g* component (or growth interest differential) was the most prominent factor in reducing the public

<sup>216</sup> Jonung (2009)

<sup>217</sup> Both are expressed in terms of GDP

<sup>218</sup> See Woods and O'Connell (2012), Bergin et al (2011) and Riksbank Financial Stability Report 1, 2011



debt ratios of countries.<sup>219</sup> Sweden's debt reduction also occurred following the flotation of the depreciated krona in an era when international demand could be relied upon to sustain Swedish exports.<sup>220</sup> In contrast to the textbook version of the temporary effect of a currency devaluation, the depreciation of the krona persisted throughout the 1990s (Jonung et al, 2009, p. 50).

**Table 4: Reduction of the Public Debt Ratio, Sweden 1996-2002**

	<b>d</b>	<b>i</b>	<b><math>\pi</math></b>	<b>g</b>			
					<b>b</b>	<b>b*</b>	<b>gap</b>
1995	84.8	10.2	3.5	4.8	0.9	1.7	-0.8
1996	85.1	8.0	1.4	1.4	3.7	4.4	-0.7
1997	82.8	6.6	1.9	1.9	5.5	2.3	3.2
1998	81.8	5.0	0.9	2.9	7.1	1.0	6.1
1999	74.4	5.0	0.8	3.7	9.5	0.4	9.1
2000	65.6	5.3	1.5	4.5	10.0	-0.5	10.5
2001	58.2	5.1	2.2	1.3	6.0	1.0	5.0
2002	56.1	5.3	1.9	2.2	3.3	0.7	2.6

**Reduction of Public Debt Decomposed**

	<b>Initial Ratio</b>	<b>Terminal Ratio</b>	<b>Decrease</b>	<b>Budget Surplus Component</b>	<b>Growth Interest Differential</b>	<b>Stock Flow Adjustment</b>
1995-2002	85	56	-29	-46	9	8

Notes: Ratios expressed as a percentage of GDP. Rounding numbers may affect primary gap result.

Sources: Fregert and Gustavsson (2008) and Krantz and Schön (2016), OECD, Swedish debt data has been adjusted to calendar year end (see data appendix). Author's Calculations.

From Table 4 however, it is clear from the annual figures that the *r-g* configuration was stacked against Sweden for the majority of the adjustment period. Real interest rates were consistently higher than corresponding growth rates implying that the budget surplus component had to become the driver of debt reduction. At the end of the twentieth century, markedly high

<sup>219</sup> Crafts (2016), Abbas et al (2011)

<sup>220</sup> Jonung (2009)

surpluses were maintained in an environment of stronger growth. In fact, using the decomposition formula, it is apparent from Table 4 that the cumulative effect of budget surpluses would have driven the debt ratio downward by 46%, if the unfavourable configuration of the  $r$ - $g$  component and stock flow adjustments had not placed upward pressure of a combined 17% on the debt ratio. These opposing forces resulted in a total decline of 29% in the public debt ratio.

When taken together, the above results may be summarized as follows. Sweden's debt reduction 1996-2002 was achieved solely through fiscal surpluses. Having initially deployed currency depreciation during the crisis which helped to achieve a temporarily strong recovery (with growth rates of 3.7% and 4.5% in 1994 and 1995 respectively), the only remaining routes to debt reduction in the event of the slowdown which followed were lower real interest rates or primary budget surpluses. The higher interest rates and lower growth rates which transpired in Sweden following 1995 made the budget surplus path the only viable option. The most pronounced reductions in the debt ratio were achieved by two consecutive budget surpluses of 9.5% and 10% of GDP, occurring in a period of relatively higher growth in 1999 and 2000 respectively. Notably, it occurred at a time when the required primary balance for debt sustainability was approximately zero.

## 4. Analysis

### Comparing Debt Service characteristics

While Figure 1 shows that Ireland had experienced similar debt levels in relatively recent economic history, the temptation to generalize for current policy makers should be tempered with a detailed review of the context in each period. Likewise, though the public debt of Sweden which resulted from its banking crisis has a number of useful insights for Ireland, there are caveats which are detailed below. What follows in the remainder of this section is a comparative review of the circumstances facing debt reduction "then" and "now" using the results of the previous section.

A recent historical study by Eichengreen and Panizza (2014) addressing a "surplus of ambition" among Eurozone policy makers in their recommendations to run primary surpluses of approximately 5% of GDP for

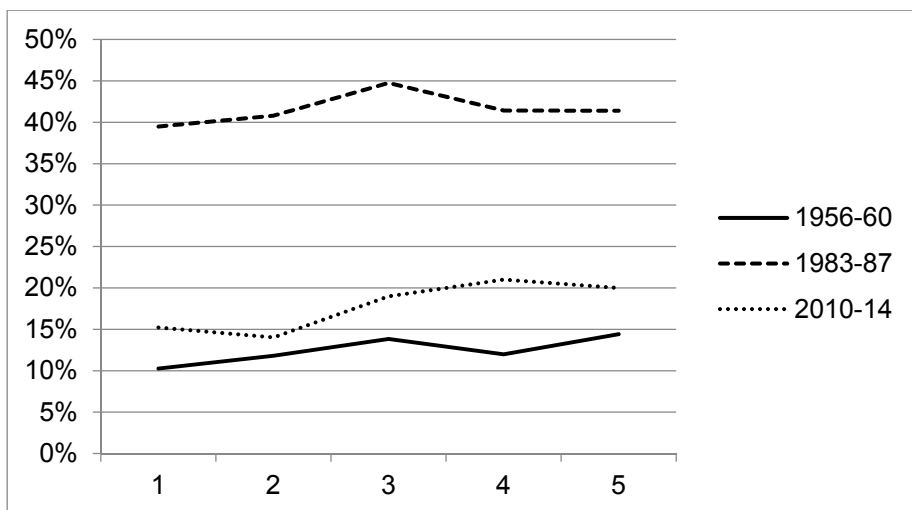
the coming decade, draws attention to Ireland's previously successful experience. The authors claim that Ireland enjoyed "exceptional circumstances" such as strong global growth and the ability to devalue which "crowded in" exports. Indeed, between 1995 and 2001, exports rose from 75% to almost 100% of GDP.<sup>221</sup> At time of writing, the subdued demand of the post crisis global economy contrasts starkly with the conditions of the 1990s. Indeed, as a member of the Eurozone Ireland might be expected to suffer from the asymmetric price trends that have developed within it,<sup>222</sup> potentially harming the demand for its exports. Due to the open nature of the Irish economy it is particularly dependent upon and thereby vulnerable to external demand. Whereas Lane (1998, 2010) stressed the importance of countercyclical fiscal policy in mitigating the effects of both recessionary and boom conditions for Ireland within the Eurozone, Kearney (2012) has pointed out that fiscal policy had been procyclical every year during the period 1977-2012 with the exception of the years 1987-1989, when the government was only in a position to consolidate its fiscal position thanks to the re-emergence of strong growth in external demand.

Declining debt service bills in the former period were driven by the realised *fall* of real interest rates, an option not currently available without a period of surprise inflation. However the relative effort required to effectively service the outstanding public debt is something that would benefit from a comparative analysis. The gross revenue used in Figure 2 includes a number of capital items (including EU grants) that might not present as comparative a measure across periods as tax revenue. Using tax revenues, the public debt of the 1980s is significantly more costly to service than the other two episodes. Indeed, it was not until 1994 that service payments fell below 30% of tax revenue and only in 1998 was the figure for the first time comparable to the same servicing proportions of the recent sovereign debt crisis. In other words, in the aftermath of the 1980s fiscal crisis, more than a decade passed of higher proportions of tax revenues being used to service debt than the most extreme year to date (2013) of the current episode.

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<sup>221</sup> Keane (2015)

<sup>222</sup> See Johansson and Ljungberg (2013) and de Grauwe (2013)



**Figure 4: Irish Public Debt Service as a percentage of Tax Revenue (5 year distress periods).**

Notes: The components of debt service are outlined in the Data Appendix. Sources: Finance Accounts. Author's Calculations.

The 1950s episode in the most acute phase more resembles the current servicing demand from the tax revenue stream. Indeed, the two most distant events share a similarity in the relative size of their liquid assets against which gross government debt can be netted.<sup>223</sup> These off-settable assets (as a percentage of total debt) averaged 10% for the five year period 1956-1960, compared with 2% for 1983-1987 and 12% between 2010 and 2014.<sup>224</sup>

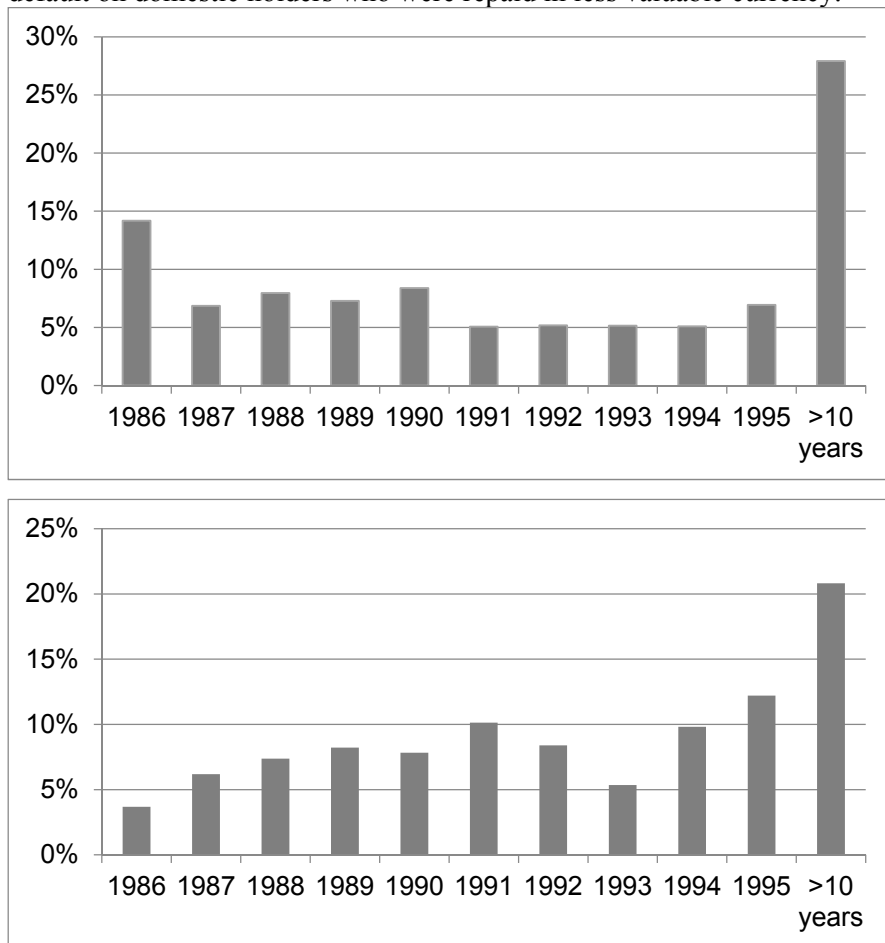
Much of the service pressure came from the front loaded maturity profile of domestic public debt in the mid-1980s which Figure 5 displays. As the 1985 accounts displayed, 14% of the total outstanding domestic currency debt was falling due within 1 year, the same year that the Irish pound was devalued by 8% in August.<sup>225</sup> The 1986 devaluation which has

<sup>223</sup> Under this heading were National Loans Sinking Funds, Savings Certificates Account, Exchequer Account, National Development Fund and Proceeds of Dollar Borrowings under United States Loan Agreements (in the earlier sample period). The Finance Accounts from 1992 removed National Loan Sinking Funds from this category and deducted it instead directly at source from the National Debt.

<sup>224</sup> Author's calculations. Source: Finance Accounts

<sup>225</sup> See Honohan and Conroy (1994)

been described as “timely” in terms of boosting exports<sup>226</sup> was a partial default on domestic holders who were repaid in less valuable currency.

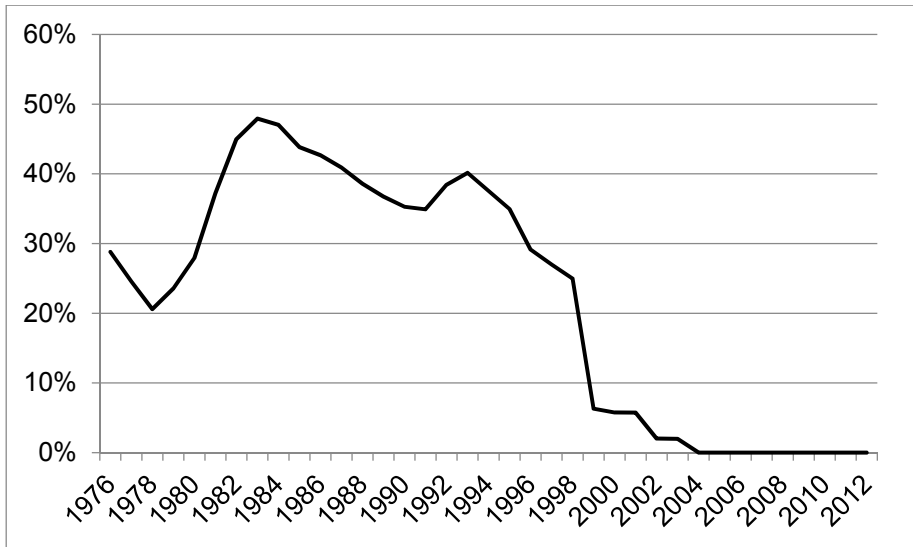


**Figure 5: Maturity Profile of Government Debt outstanding (Fiscal Year Ending 1985)**

Notes: Debt falling due each year as a percentage of outstanding type of Government Debt. Domestic Currency Debt (LHS) and Foreign Currency Debt (RHS). Sources: Finance Accounts. Author's Calculations.

As Figure 6 displays, the foreign currency element of government debt had virtually disappeared before adopting the Euro. By 2004, it was no longer a component of Irish public debt.

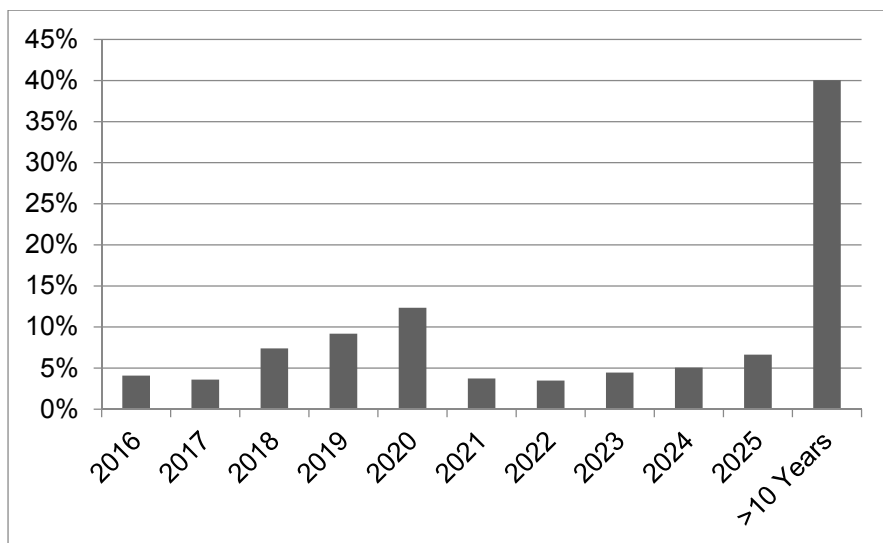
<sup>226</sup> Honohan and Walsh (2002)



**Figure 6: Foreign Currency Debt as a Percentage of Total Public Debt (1977-2011)**

Source: Budgetary and Economic Statistics (2013), Department of Finance

In contrast to the outlook in the 1980s, the maturity profile for the current government debt plotted in Figure 7 looks comparatively less challenging at first glance and is entirely denominated in the “domestic” currency of the euro. Almost 40% of it will fall due in the period following 2026. The only year which is comparable to 1986 (in terms of repayments of domestic currency debt as a percentage of the total) is 2020, when a temporary spike of 12.35% is due. The relative effort of debt servicing will be a function of output and tax revenue at that time.



**Figure 7: Maturity Profile of Public Debt at March 2016**

Notes: Maturity Profile of Government Debt by number of years as a percentage of outstanding Government Debt at end of March 2016. Source NTMA. Author's Calculations.

### *The Political Economy of Debt Reduction-Then and Now*

Using the debt decomposition results outlined above, I now address the macroeconomic environments of each relevant case and attempt to draw tentative conclusions on what we can learn from the historical episodes.

Starting with a comparison of the holders of domestic currency debt between the two most recent crises reveals a new pressure that evolved firstly due to euro membership and secondly due to the external nature of the troika agreements. The higher levels of foreign ownership on the eve of the 2008 crisis introduced a large amount of political economy to the events that played out in the following years which are beyond the scope of this work. A high proportion of foreign ownership persisted until February 2013, when the Irish central bank converted the promissory notes associated with the Irish Bank Resolution Corporation into standard government bonds.<sup>227</sup> This move largely explains the shift from non- resident into central bank in the last period.

<sup>227</sup> See Whelan (2012) for a description in the mechanism through which the promissory notes were operating.

**Table 5: Holders of Domestic Currency Debt**

	<b>Non Bank Domestic</b>	<b>Domestic Commercial Banks</b>	<b>Central Bank and MFIs</b>	<b>Non Resident</b>
1987	40.6%	43.4%	2.0%	14.1%
1997	53.1%	22.4%	0.0%	24.5%
2007	4.5%	0.0%	2.6%	92.9%
2014	4.2%	0.0%	39.4%	56.3%

Source: Central Bank of Ireland Securities Holding Statistics- 'Holdings of Irish Government Long Term Bonds.' Figures relate only to Government Bonds.<sup>228</sup>

In support of the general skepticism of Eichengreen and Panizza (2014), the Irish authorities of the early 1990s were in the politically comfortable position of being able to grant lower income tax rates which were financed by the reduction of debt servicing costs (Figure 2).<sup>229</sup> This assisted the political authorities in maintaining budget surpluses. We have seen however, that the relative debt service bill was twice as much as a proportion of tax revenue during the most acute period of the 1980s crisis. The shift towards a favourable *r-g* configuration in the second half of the 1990s made it politically possible to maintain surpluses which may otherwise have come under political pressure. This is something Eichengreen and Panizza (2014) do not discuss, though it may have supported their argument in terms of the questionable sustainability of budget surpluses in unexceptional or “normal” circumstances.

However, such “political auctioning” in the form of generous tax cuts ultimately proved misguided. The extremely open nature of the Irish economy makes the cyclical position “chronically difficult to ascertain,” making erring on the side of caution in fiscal policy paramount as evidenced by the insufficient surpluses to allow a discretionary countercyclical fiscal policy response to the 2008-2010 crisis.<sup>230</sup> The reduction of the debt ratio

<sup>228</sup> The source was cross checked with the Finance Accounts. For 1987 the central bank register has used only that total regarding “National Loans” of £12,509 million and omitted other “Medium and Long Term Indebtedness” amounting to £175 million. For 1997, the register records “Irish Government Bonds” of £17,009 million under the heading “Irish Pound Debt” omitting the £240.2 million other debt called “Medium and Long Term Indebtedness,” though this is included in the total national debt. In 2007 and 2016, the figures of €30,946 million and €116,339 million related to “Irish Government Bonds listed on the Irish Stock Exchange.”

<sup>229</sup> Lane (1999)

<sup>230</sup> Bénétrix and Lane (2012)



from the 1980s combined with persistent budget surpluses led to ever further calls for tax reductions throughout the 1990s<sup>231</sup> - “the larger the surplus, the deeper and more tempting is the pool.”<sup>232</sup> In this election year of 2016, debt reduction has been cited as a constant success of recent years. This may place downward pressure on tax rates from an austerity-fatigued electorate which could be exacerbated due to the recent alterations in the National Accounts ESA 2010 and their associated impact upon debt ratio “reductions” (see data appendix).<sup>233</sup>

Nonetheless, Eichengreen and Panizza (2014) overlook a number of important domestic and international factors when emphasizing the “exceptional” circumstances which aided Ireland during the late 1980s and throughout the 1990s. The first which should be mentioned was the magnitude of the initial fiscal adjustment in both cases. We have already seen that the relative servicing costs and the maturity structure were considerably less favourable during the 1980s event. It has been shown that though the fiscal adjustment in the form of nominal cuts was more contractionary following the recent crisis in the deflationary environment in 2008 and 2009, the initial contraction of the 1980s was the more severe in terms of real reduction due to the higher levels of inflation which prevailed.<sup>234</sup> More specifically, the austerity budgets of 1983, 1988 and 1989 taken together comprise a tightening by 10% of GDP against 7.5% between 2008 and 2011.<sup>235</sup>

In a similar vein, the interest rate hikes in the US of the early 1980s which were designed to combat high levels of inflation placed considerable international pressure upon state borrowing and debt ratios and it was unlikely that Irish GNP growth could overcome the rise in real interest rates until conditions normalized in the later 1990s. Such higher interest rates are not a feature of today’s macroeconomic landscape which by this metric alone should facilitate a comparatively “easier” debt reduction process.

Also overlooked was the fact that during the 1980’s episode, foreign currency debt at its peak in 1983 comprised 48% of the total (Figure 6)

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<sup>231</sup> Lane (1999)

<sup>232</sup> Eichengreen and Panizza (2014)

<sup>233</sup> For instance, the last year for which both ESA 1995 and ESA 2010 National Income Figures are reported was 2012. The change in accounting for GNP leads to a “reduction” in the debt ratio of almost 8 percentage points in that year.

<sup>234</sup> E.S.R.I. Quarterly Economic Commentary, Winter 2009

<sup>235</sup> Bergin et al (2011)

making the position of the state finances particularly vulnerable. Due to appreciation of foreign currency debt during the period of higher interest rates, it averaged 44% of all public debt during the most acute years 1981-1986. Though international assistance was not officially requested in the 1980s in contrast with the current sovereign debt crisis, all outstanding national debt is now denominated in the “domestic” currency of the Euro making currency risk a largely absent feature and leaving the central bank less exposed to a liquidity run.<sup>236</sup> During the episode of the 1950s, though foreign currency debt was initiated in the Marshall Plan, the proportion peaked in 1950 at 21% and by the 1955 had already fallen to only 13% of the total.<sup>237</sup>

While Eichengreen and Panizza (2014) point to the fact that Ireland does not enjoy the ability to devalue its currency as a member of the Eurozone, over 60% of Irish exports are typically sold to non-euro areas<sup>238</sup> mitigating some of the effects of asymmetric Eurozone price movements whilst simultaneously benefiting from the downward effect on the Euro exchange rate associated with quantitative easing at ECB level. Ireland’s relatively more painful internal devaluation via the fiscal policy channel has been given a temporarily softer edge due to Euro depreciation as it is not as dependent upon intra-Euro trade.<sup>239</sup> While internal devaluation has been both politically unpopular and economically difficult, not half of the weight of debt servicing costs of the 1980s and 1990s at their peak has been reached in the present as a proportion of current tax revenues.

Nonetheless, the associated moral hazard of low real interest rates in the early 1950s and mid 1970s enticed governments to borrow more by promising national development via capital investment, while in current

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<sup>236</sup> Lane (2010)

<sup>237</sup> Authors calculations based upon \$ exchange rates at fiscal year-end on the stated American debt.

<sup>238</sup> Central Statistics Office, Goods Exports and Imports Table GEI2015. The proportion of total exports for January to September 2014 and 2015 going to the Eurozone were 37% and 35% respectively.

<sup>239</sup> The real exchange rate can be depreciated within the Eurozone via fiscal policy. Lane (2010) describes a number of the following mechanisms. Lower levels of government spending reduce the amount spent on non-tradable goods, increases the supply of labour to the tradable sector (putting downward pressure on wages) making the latter more competitive, improving the current account balance. The conditions for which improvements in net exports is required are also associated with a slump in domestic demand, where policy makers face the tradeoff between the pursuit of external competitiveness and the maintenance of domestic demand through fiscal expansion.

times the low rates may enable authorities to proceed with slower fiscal adjustment. Though it is unlikely that the state will engage in excessive borrowing in the near term considering the ongoing political drive at European level towards debt reduction, a rise in interest rates now (as it did in the late 1950s and early 1980s) could prove especially problematic for debt ratios if according to Bénétrix and Lane (2012) significant debt reduction is not pursued with currently available savings on interest rates.

Linked to this is the Swedish experience. During the year 2016 (at time of writing), Ireland is forecast grow by 4.9% by the European Commission.<sup>240</sup> Sweden took advantage of its higher growth rates to book higher budget surpluses, though political temptations must have presented a challenge. Furthermore, though international demand was crucial to the Swedish recovery,<sup>241</sup> it was not accompanied by a favourable  $r$ - $g$  configuration in terms of debt reduction as Swedish interest rates averaged 9.09% (compared to Ireland's corresponding figure of 5.3%) for the six years following its crisis.<sup>242</sup> Though Ireland's debt ratio is considerably higher than Sweden's post crisis level, in contrast to latter's historical experience, the  $r$ - $g$  configuration for Ireland is currently favourable. According to the Swedish experience, potential rate rises need not spell doom for Irish public finances if fiscal authorities have pursued caution during better times and appropriate debt reduction. Lane (1999) had already advised on larger surpluses than were realized during the boom years, as well as the associated "uncertainty about the appropriate cycle-trend decomposition" which must reinforce the importance of adopting a prudent fiscal stance.<sup>243</sup> Furthermore, as we have seen, Sweden booked the highest surpluses during the years in which the required primary balance averaged zero.

While these generalizations may shed light on alternative scenarios for Ireland which like Sweden is a small and open economy, key differences remain between the two cases, not least the fact that Ireland does not have a central bank responsible for a national currency which would depreciate in time of crisis as Sweden's did helping the latter's exporters. Sweden's exports grew from a share of 28% to 45% of GDP between 1992 and

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<sup>240</sup> European Commission, Economic and Financial Affairs (2016)

<sup>241</sup> Jonung et al (2009), Jonung (2009)

<sup>242</sup> Authors calculations, Source OECD

<sup>243</sup> Bénétrix and Lane (2012)

2002.<sup>244</sup> Exchange rate depreciations against Eurozone partners are impossible for Ireland, conducted instead through more painful internal devaluation including the fiscal channel. Nonetheless, a weaker Euro has had a markedly positive impact on the Irish economy as discussed above.

## Conclusion

In this paper, I have set out to identify the public debt dynamics surrounding three fiscal episodes in post war Irish economic history.

The first two events which are considered occurred in an era when the country experienced the worst post war growth recorded in Western Europe 1946-1988.<sup>245</sup> The fiscal response to the crisis of the 1950s serves to highlight the futility of tightening fiscal policy in an environment of rising interest rates, falling inflation and domestic recession. As Crafts (2016) states, with both deflation *and* recession the stabilizing required primary balance *will not* be met. Indeed, even when growth picked up at the end of that decade, the deflationary drag meant that the public debt ratio continued to rise.

During the years before the 1955-56 and 1983-87 crises, primary deficits could have kept the debt ratios stable due to higher inflation and low interest rates. However, the primary gap in each case was negative i.e. the required budget balance was never achieved and the debt trajectory increased. The recovery from the episode of the 1980s has traditionally been attributed to the buoyant conditions of the 1990s (as was Sweden's) through export driven economic growth. It has generally been lamented that such a mechanism of debt reduction is not available in today's global economic climate. However, while international conditions certainly were favourable in the previous decades, we have seen that in terms of debt servicing costs, the Irish fiscal crisis of the 1980s at its peak required more than double the proportion of tax revenues than experienced in the current crisis or that of the 1950s.

The *r-g* configuration was generally unfavourable to Irish debt reduction until the late 1990s. In other words, the strong economic growth of the

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<sup>244</sup> Jonung et al (2009, p. 49)

<sup>245</sup> Ó Gráda and O'Rourke (1993)

1990s helped in terms of tax revenues for budget surpluses but it was not until after 1995 that lower interest rates, higher inflation and strong economic growth ( $r-g$ ) halved the burden of reducing public debt by 51% of GNP with cumulative budget surpluses.

Looking abroad for comparative purposes, it was seen that Sweden's public debt also increased significantly in the aftermath of its financial crisis. Like Ireland, growth helped it to book the increased tax revenues as budget surpluses to reduce its debt ratio. However in Sweden's case, the unfavourable growth interest rate differential actually put upward pressure on the debt trajectory leaving it with the sole option of budget surplus accumulation, though the debt reduction it achieved in percentage points was only one third of Ireland's in the 1990s. Both northern European economies are very open in nature which is a "striking" feature of all of the success stories of debt reductions in recent economic history according to Eichengreen and Panizza (2014). In support of their deduction, this paper shows the importance of individual cases treated in isolation. While Abbas et al (2013) can generalize that most historic high debt episodes were escaped from through favourable  $r-g$  configurations, it has been shown here that for at least two northern European countries, this was largely not the case, though relatively strong economic growth supported both incidences.

Nonetheless, the current outlook for Irish sovereign debt remains uncertain though recent years have produced favourable  $r-g$  configurations which may help alleviate the consequences of subdued global demand of the present. The maturity structure is comparatively more favourable than the comparatively frontloaded debt of the 1980s and no foreign currency debt has been issued compared to previous events. However, the fact that the majority of its holders are now non-national official sector will have implications for political economy which was not a prominent feature of previous debt episodes in Irish economic history. Eichengreen and Panizza (2014) in particular question whether it is realistic to expect consistent cyclically adjusted primary budget balances over the period 2020-30 of 5.6% of GDP to achieve the 2030 debt target. In addition, domestic political temptations exist in an environment of low rates on debt that is held predominantly by foreign actors. It remains to be seen which course the debt trajectory will take. It is hoped that this paper will provide current analysts with a helpful view from economic history.

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## Data Appendix

### The Finance Accounts 1949/50-2014

The nominal debt figures which comprise the ratios of this work were taken from the Irish Finance Accounts (1949/50-2014).

Due to issues regarding changes in reporting, at present no consistent long run series exists using the current methodology prior to 1983 which is the earliest year that the Department of Finance have adjusted for in their 'Budgetary and Economic Statistics' series. Additionally, inconsistency occurs with the data regarding the national accounts which required adjustments to make the whole period comparable. Both tendencies affect the long run series of deficits and debt expressed as percentages of national income. Minor breaks in reporting methods occur in 1967 and two major changes occur in 1954 and 1987.

The first and common issue across countries is a revision of the fiscal year end. Until March 1974, every annual set of Finance Accounts was produced to year ending March 31<sup>st</sup>. In 1974, a nine month set of accounts was prepared ending December 31<sup>st</sup>. The accounts for 1974 were adjusted to equal 12 months by taking the nine month set and adding them to

(three/twelve months multiplied by the set ending March 1974. As is standard accounting practice, each calendar year  $y$  prior to 1974 was calculated by

$$\frac{3}{12}(y_t) + \frac{9}{12}(y_{t+1})$$

where  $y_t$  equals the appropriate year which ends in March and  $y_{t+1}$  is the subsequent year ending March of which 9 months fall within calendar year  $y_t$ .

The *nominal debt figure* is the statistic reported in the Finance Accounts every year from 1949/50 until 2014 with some exceptions outlined below. In the Finance Accounts, “Supply Service” expenditure relates mainly to the current expenditure of the state and the “Central Fund” refers to the central government’s treasury account and the principal division from which debt service (and capital expenditure) are made.

In the accounts spanning 1950-1967, while “Public Debt” is recorded separately, the post 1967 period included all capitalised liabilities as National debt from that period and this is why the larger figure was chosen in the entire pre-1987 series as displayed in Figure 1. This amount now replaced the “Public Debt” for all years prior to 1967 to ensure consistency.

However, there is double counting which is specifically mentioned as a footnote to the national debt statement each year until 1967. The relevant items<sup>246</sup> as well as being included under debt were also recorded as assets in the accounts and the aggregated figure was officially reduced by this amount in a ‘netting’ process thereafter. I have deducted the same amounts for every year prior to the break in 1967 to ensure consistency with both the pre and post 1987 era.

Liabilities associated with the Housing Act 1932 were not included in the Capital Liabilities for the five years 1950-54 in the official accounts. I have included them in these years as the policy changed from 1955 when they appeared under that heading until 1987.

A significant break in accounting occurred via The Local Loan Fund (Amendment) Act (1987). The Act made adjustments in an attempt to eliminate circular transfers and credited “Liquid Assets” against the outstanding debt figure. Under this heading were National Loans Sinking

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<sup>246</sup> Items of double counting in assets included part of the American Loan Counterpart Fund, The National Loans Sinking Fund, The National Development Fund and the Principal Reserve of Savings Certificates Fund.

Funds, Savings Certificates Account, Exchequer Account, National Development Fund and Proceeds of Dollar Borrowings under United States Loan Agreements. These were listed as “Liquid Assets” from the accounts in 1957/58. For the years preceding that, the component parts were added to achieve the aggregate.

The 1987 Act additionally deducted, from the capitalised liabilities section of Total National Debt, monies raised under the Housing Acts 1932-66 and State Contributions towards loan charges of sanitary and miscellaneous services which had also been capitalized up until then. Taking all changes together, the retrospective effect on the 1986 figure was a reduction of 11% of nominal debt seen in the 1987 Accounts which gave a revised figure for the 1986 year end.

The Department of Finance’s ‘Budgetary and Economic Statistics’ series have made some ex post adjustments using the 1987 changes and cast back until 1983. I cross checked these with my own figures and using the same process extended back towards 1950. It is therefore to my knowledge, the first consistent long run series of nominal debt for Ireland. The pre and post 1987 changes are shown in Figure 1. It is the pre 1987 Act ratios which are used in the debt dynamics calculations in the sub section regarding the 1950s crisis, as these are the perceived debt ratios that policy makers at that time faced. In order to review the debt reduction process following the 1980s, it was necessary to use the post 1987 methodology to achieve consistency throughout the period 1977-2001.

The ***Government (Exchequer) surplus/deficit***  $b_e$  is calculated using the current method adopted by the Department of Finance, by adding the current  $b_c$  and capital  $b_k$  exchequer balances.

$$b_e = b_c + b_k$$

The Current Account Balance is calculated by deducting Current Expenditure from total revenue derived from tax and non-tax sources.

The capital balance is calculated by deducting “Capital payments” (previously referred to as “Issues”) from “Capital Receipts” and “Sinking Fund” payments. These transfers from the current account to the capital account are allocated to pay principal and interest due on the national debt. They are included in “current payments” but are added back in arriving at the exchequer balance having a zero net effect. This practice was adopted in the Finance Accounts from 1998 and had the ex-post effect of producing a

more favourable exchequer balance than previously. Prior to that year, the amount appeared only under Current Payments (under the broader aggregated heading of ‘Service of National Debt).’ In *Budgetary and Economic Statistics*, the Department of Finance have cast back the methodology as far as 1984. I have cross checked these with my calculations and extended back until 1950.

The **primary budget balance**  $b$  is calculated by adding interest on government debt  $i$  back to the exchequer surplus/deficit. This will always have a positive effect on the exchequer surplus and deficit as it will have the effect of increasing the former and reducing the latter.

$$b = b_e + i$$

**Interest on Debt**  $i$  is that which is charged directly to the Central Fund Services as is the practice by the Department of Finance. However, from 1990 the Department of Finance’s *Budgetary and Economic Statistics* from 1990 began including interest payments included in the Issues for Supply Services. I have omitted these to ensure consistency with the other periods. The effect on the series for the years 1990, 1991 and 1992 is an understatement of interest compared with the Department of Finance of 0.04%, 0.03% and 0.02 % respectively.

In 1991, for the first time “deposit interest received” was deducted from interest in calculating the national debt. While all other interest items refer the reader to a note in the supplementary accounts providing details of the composition of each entry, this was not done until 1997 regarding received interest. As the interest received up until this point averaged only 3.5% of total interest and it never surpassed 0.3% of total debt, it is not deemed an economically significant amount. It has been omitted to ensure consistency across the entire series.

As the National Treasury Management Agency (NTMA) began reporting on the National Debt from 1992, their interest figure was that which the Department of Finance attached to its accounts from that date and listed these figures in their *Budgetary and Economic Statistics* publication. Though it continued the practice (adopted since 1991) of netting “Deposit Interest Received” against the total sum of interest on the debt, it also began taking account of “Net interest movements on foreign accounts not taken to CSRA at year end” from 1992. Later, another umbrella item called “Other Movements” incorporated these and more to arrive at “interest.” These were all positive numbers, which had the effect of improving the primary balance

via larger interest payments. Such accounting policy changes have consistently occurred to mask and “massage” the true level of debt and exchequer balances according to some.<sup>247</sup> I have maintained the strict definition of “interest paid” through the entire sub period and removed all other temporary items.

Due to the questionable economic significance of interest received and the lack of comparability with data before the break in 1991, my stricter time consistent version of debt interest  $i$  is the following

$$i = (id + is)$$

where  $id$  is the interest paid on government debt (comprising national and foreign short, medium and long term loans) and  $is$  refers to the interest due on national savings schemes.

Where appropriate in the text, total debt service  $ds$  is made up of debt interest  $i$ , the sinking fund  $sf$  and expenses of issuance which are included under the Sinking Fund heading as they are trivial in size. These were available in footnote format back until 1950.

$$ds = (i + sf)$$

## **The National Accounts 1948-2015**

The Central Statistics Office (CSO) national income data for the period 1950-2015 was used in this study.<sup>248</sup> However, as with the Finance Accounts, a consistent approach throughout the period is not available.

The accounts 1948-1995 were calculated upon an European System of Accounts (ESA 1995) basis. This methodology was continued until 2012 from which date compliance with the updated ESA 2010 accounts was adopted. Therefore a discontinuity exists in the data which the CSO is currently updating. The CSO recently replaced all of the estimates post 1995 with the new ESA 2010 version leaving the pre 1995 data incomparable. I therefore use the original ESA 1995 series up until 2012 in order to maintain consistency with the historical series, specifically employing the nominal GNP and GDP levels and real growth rates of the old methodology.

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<sup>247</sup> See McCarthy (2002)

<sup>248</sup> National Income and Expenditure Tables, Central Statistics Office of Ireland

It is crucial to highlight that the growth rates were deemed unaffected as a result of the newly adopted ESA 2010.<sup>249</sup> Instead it is the *level* of GNP which is materially altered in current prices. Therefore, in the few cases where the post 2012 debt is mentioned, I have used the realized growth rates of 2013-15 in the new nominal income aggregates (ESA 2010) and extend these forward on the old national accounting basis (ESA 1995) to arrive at new levels of nominal GNP (ESA 1995). Since the 12<sup>th</sup> of July 2016 however, it is clear that this perception was misguided when Irish nominal GDP and GNP “grew” by 32% and 24% respectively. I tentatively include the CSO’s (July 2016) numbers in Figure 1 with the considerable disclaimer that they may be revised, though they adhered to the ESA 2010 methodology. They affect only the year 2015, which has not been used in any of my calculations. However, my treatment allows for a consistent comparison with the debt crisis of the 1980s and the economic crisis of the 1950s, the existing national income figures for which are not yet available in ESA 2010 format.

It is worth mentioning here that when applying the ESA 2010, average levels of nominal GNP and GDP in the pre-crisis years 1995-2007 are respectively 4% and 3% higher than the 1995 ESA methodology yielded. In the aftermath of the crisis the differences were even more pronounced having a significant downward impact on Debt Ratios (see Table 6). For instance in 2012 alone, the ESA 2010 methodology had the effect of reducing the debt to GNP ratio by almost 8% compared with the same ratio calculated under the ESA 1995 methodology. It is tempting to suspect that given the favourable impact this will have on struggling Eurozone members (bound to the ratios of the Stability and Growth Pact), the timing of ESA 2010 may be politically motivated at a European level. However, testing that hypothesis is beyond the scope of this paper as the idea here is to display its quantitative impact upon Irish debt.

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<sup>249</sup> Eurostat News Release 157/2014

**Table 6: Impact of Accounting Changes on Public Debt Ratios**

Year	Implied "Reduction" of Debt/GNP Ratio	Implied "Reduction" of Debt/GDP Ratio
2009	-2.79%	-1.95%
2010	-4.02%	-2.87%
2011	-7.17%	-4.77%
2012	-7.73%	-5.24%

Note: The Impact (expressed in percentage points of National Income) on public debt ratios of adopting the ESA 2010 methodology compared with ratios arising from the ESA 1995 methodology. Author's Calculations.

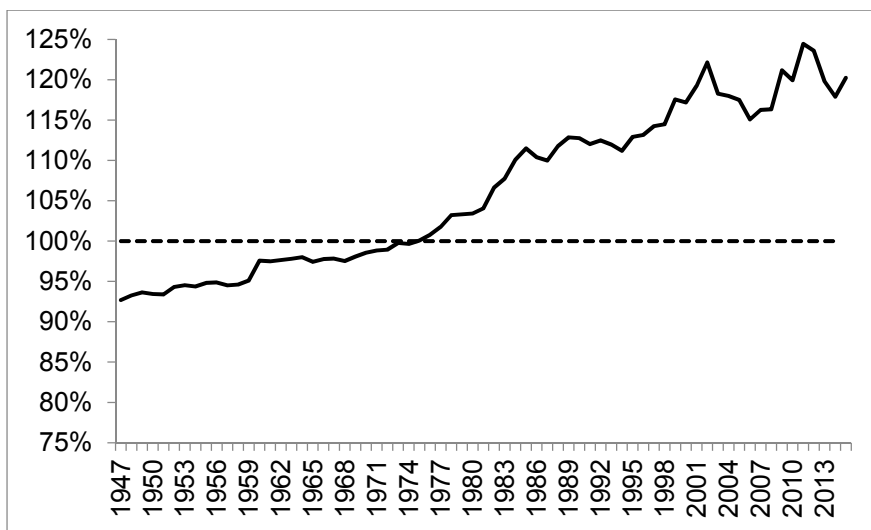
The measure of National Income chosen was Gross National Income (GNP) rather than Gross Domestic Product (GDP). The choice was made based upon a number of factors. Since the 1960s, Ireland's economy has been comparatively open relying heavily upon foreign investment and multinational companies which reside there. For most other European countries, the difference between GDP and GNP will be non-material but multinational transfer pricing creates a considerable difference in the Irish case. Net factor flows (which are deducted from GDP to arrive at GNP), which include that portion of the value of output that flows abroad due to foreign ownership of inputs, are considerable in the Irish case.<sup>250</sup> As mentioned elsewhere, GNP not only reflects living standards more appropriately in Ireland,<sup>251</sup> but the fact that taxes are levied on domestic aggregates such as personal income and consumer spending (the primary base) makes income (GNP) rather than output (GDP) the choice denominator for Irish fiscal ratios.<sup>252</sup> In this paper, I therefore follow McCarthy and Lawlor (2003), McCarthy (2009), Lane (1999) and Bergin et al (2011) in using GNP rather than GDP for the Irish case. Below I plot the relative GDP/GNP ratio for Ireland which shows the divergence which becomes prominent from the 1980's.

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<sup>250</sup> OECD 2006 provides an example of how more appropriate GNP/GNP is as a measure of domestic Irish activity

<sup>251</sup> Ó Gráda and O'Rourke (1993)

<sup>252</sup> McCarthy and Lawlor (2003).



**Figure 8: GDP/GNP Ratio for Ireland 1947-2015**

Source: Central Statistics Office 1947-2014. ESA 1995 Methodology. Author's Calculations





# Paper 4. Preventing the Past: A Counterfactual Countercyclical Buffer in Northern Europe, 1986-2013

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## Abstract

In this paper, the countercyclical capital buffer (CCB) of Basel III is tested on a sample of Northern European countries- Finland, Ireland, Sweden and the United Kingdom. The study tests whether the credit to GDP gap (the reference from which the CCB is triggered) and the buffer would have operated in a countercyclical manner in a counterfactual economic history of the period 1986-2013. The results display an increase in pro-cyclicality when crisis events are included compared to periods of relative stability. In contrast, I find that credit growth is a more appropriate common reference point as it would trigger the buffer in a countercyclical manner even when distress events are included. Finally, by testing the performance of the buffer on both the EMS crisis and the Great Financial Crisis, I find that the buffer reacts well in the years preceding both crisis events in contrast to the procyclical tendencies which it displays in the aftermath of crises.

**JEL Classification:** E32, E51, E61, F44, G01, G18, N14

# Introduction

The Basel III regulatory framework emerged in the aftermath of the Great Financial Crisis of 2008. While many alterations were made to the Basel II Capital Accord, perhaps the most novel element was the development of the counter-cyclical capital buffer (CCB) which was the first macroprudential tool adopted by the Basel Committee on Banking Supervision (BCBS). As the Committee wrote, “the primary aim of the countercyclical capital buffer regime is to use a buffer of capital to achieve the broader macroprudential goal of protecting the banking sector from periods of excess aggregate credit growth that have often been associated with the buildup of system-wide risk.”<sup>253</sup> In addition to this it aims to “ensure that the banking sector in aggregate has the capital on hand to help maintain the flow of credit in the economy without its solvency being questioned, when the broader financial system experiences stress after a period of excess credit growth. This should help to reduce the risk of the supply of credit being constrained by regulatory capital requirements that could undermine the performance of the real economy and result in additional credit losses in the banking system.”<sup>254</sup> By designing the buffer in such a manner, a build-up of bank capital should occur in periods of credit growth as a buffer for periods of distress during which such capital could be released with the objective of increasing lending during a downturn in a countercyclical fashion.

In this paper this macroprudential tool is analysed using Finland, Ireland, Sweden and the United Kingdom as reference countries over the period 1986-2013. This regional sample has been affected by two major financial crises during this era. The EMS crisis comprised the first group of episodes which affected to varying degrees all four of the countries in this study which occurred at the beginning of the 1990s. Likewise, the global financial crisis of 2008 had a dramatic impact on the region, though the effects of both episodes varied in intensity across countries.

The paper begins by briefly looking at the choice of sample countries, identifying common and unique features in each with regard to cycles and regimes. It proceeds by providing the arguments for the Basel countercyclical capital buffer (CCB) against the inherent problems of Basel II as discussed in the literature, followed by a description of the design of

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<sup>253</sup> BCBS (2010b)

<sup>254</sup> BCBS (2010b)

the buffer. The paper subsequently addresses the criticism that the CCB would conversely operate in a pro-cyclical manner. This is tested by reviewing and augmenting the method employed by Repullo and Saurina (2011) to this sample group, using the World Bank database to maintain consistency with their approach on seven economies (France, Germany, Italy, Japan, Spain, UK and USA). In addition, this paper subsequently examines whether the tool was appropriately designed by counterfactually reviewing its sensitivity through both crisis episodes. In essence, the paper attempts within the limits of the counterfactual world, to answer the question posed by the President of the Bank of International Settlements regarding this macroprudential tool, “could this time have been different?”<sup>255</sup>

## **Financial and Economic Cycles in Northern Europe 1986-2013**

This section briefly discusses cyclical trends in the region using a comparative context over the period 1986-2013 to provide some general macroeconomic background before proceeding to address the countercyclical capital buffer of Basel III.

The 1980s are often referred to as an era of deregulation and privatization personified by the political philosophies of the Thatcher and Reagan administrations in the UK and USA respectively. In the UK the decade is associated with the end of financial repression in favour of prudential financial regulation.<sup>256</sup> It also witnessed a sustained deregulatory drive regarding the financial markets which commenced with the abolishment of capital controls in 1979, the removal of lending ceilings in 1980 and is often epitomized by the “Big Bang” reform of 1986. This initiated City of London institutions admitting Wall Street investment firms with risk taking bonus cultures.<sup>257</sup> The Thatcher administration provided support for The Single European Act of 1986, which led to the relaxation of capital controls at EC level, as it “offered UK style liberalization on a European scale” putting to rest “once and for all the danger that constraints of EC membership might force Britain to backtrack on liberalizing

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<sup>255</sup> Caruana, (2010)

<sup>256</sup> Turner (2014, pp. 186-196)

<sup>257</sup> Dimsdale and Hotson (2014, p. 167)

measures.”<sup>258</sup> Later during the 1990s, Irish policy makers began a similar process of deregulation, emulating the “light touch” approach to supervision adopted by the United Kingdom.<sup>259</sup>

The “common pattern” in Finland and Sweden was also characteristic of the period, as extensive deregulation in the financial and capital markets was pursued and the policy was largely pushed through without any serious public debate presented to the public as a series of “technical changes.”<sup>260</sup> As monetary policy (which was focused on defending the pegged currencies) had traditionally been aided by capital controls, the new inward flows placed upward pressure on the exchange rate which contributed to growing current account deficits and prevented interest rate rises that may have mitigated boom conditions.<sup>261</sup> Additionally, the “forceful restrictive fiscal policy” responses which may potentially have countered the lending boom were not adopted in either country.<sup>262</sup>

The subsequent EMS crisis and the political environment of the early 1990s strongly influenced the four countries’ monetary paths in this study. While the Nordic countries were undoubtedly those most acutely affected of the group with both experiencing severe financial crises (Figure 1), they emerged from the crisis choosing monetary policy regimes. Finland (driven partly by political considerations at the end of the Cold war) opted for closer European monetary integration within EMS while Sweden chose to float the krona on November 19, 1992.<sup>263</sup>

Ireland had entered the EMS in 1979 abandoning parity with the UK pound which it had held in various forms since 1826. The EMS crisis in the UK was characterized by a run on an overvalued pound and its consequent abandonment of the Exchange Rate Mechanism in 1992.<sup>264</sup> Ireland enacted a 10% currency realignment within the system opting for closer European monetary integration following this final realignment.<sup>265</sup> Despite the fact that the UK entered a recession period, neither country suffered an extensive

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<sup>258</sup> Eichengreen (2007, pp. 339-49)

<sup>259</sup> Bielenberg and Ryan (2013, p. 40)

<sup>260</sup> Jonung et al (2009, pp. 35-37)

<sup>261</sup> Jonung et al (2009, p. 36)

<sup>262</sup> Jonung et al (2009, p. 37)

<sup>263</sup> Gorodnichenko et al (2009) and Jonung et al, (2009, pp. 49-50)

<sup>264</sup> See Eichengreen (2004, pp. 214-229)

<sup>265</sup> Kelly (2003)

financial crisis, though the UK banks had engaged in a lending boom which culminated in a property crisis.<sup>266</sup>

Sweden and the UK declined the option of deeper monetary integration, moving towards inflation targeting independent central banking. Both were in a favourable position to do so as the new policy followed a period of successful disinflation which made it relatively easy to hit the new target.<sup>267</sup> In addition, during the move from pegged exchange rates to inflation targeting 1992-3, Sweden was able to pursue a policy of collective wage agreements from 1995 to 2008 as confidence in the new inflation targeting regime had developed quickly.<sup>268</sup>

In contrast as members of the European Monetary System, Finland and Ireland chose to sacrifice domestically determined independent monetary policy by moving towards monetary union and adopting the Euro. The chosen sample thus comprises two closely located geographical pairs with one country in each pair linked to one country in the other via characteristics of the monetary regime.

It is also illuminating to compare the four countries' financial and economic cycles before proceeding. One notable feature which stands out from Figure 1 is that downturns in economic cycles did not always lead to a banking crisis suggesting the potential difficulty involved in arriving at an appropriate "inter-linkage" variable to tie the financial and economic cycles together, which is a policy goal of any countercyclical instrument. All countries except Ireland experienced negative economic growth in 1992, but only Sweden and Finland experienced acute banking crises during the period.

During the global financial crisis of 2008, all countries were affected by the distress experienced by the international financial system and the subsequent fall in global demand which resulted from depressed economic conditions. Nonetheless, only Ireland and the UK were victims of severe

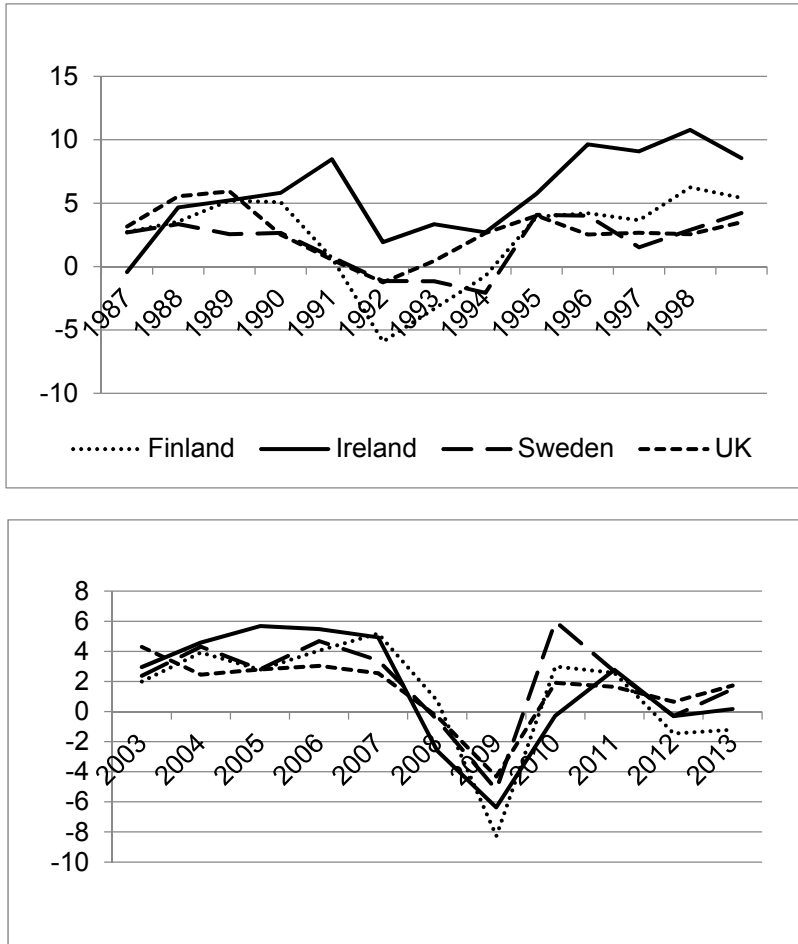
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<sup>266</sup>Reinhart and Rogoff (2009) list this as a banking crisis in the United Kingdom. However only one bank named 'The Bank of Credit and Commerce International' (BCCI) failed in 1992. It was incorporated in Luxembourg and maintained its headquarters in London. Notably, longer run studies have shown it to be an insignificant event. Turner (2014) does not mention the episode and Dimsdale and Hotson (2014, p 152) claim that this "crisis" classification is "erroneous" as it is difficult to even classify it as a commercial bank and relatively small in size.

<sup>267</sup> Eichengreen (2004, p 247)

<sup>268</sup> Jonung et al. (2009, p. 50)

banking crises, the worst either had experienced in almost 200 years.<sup>269</sup> Sweden and Finland made initially strong recoveries before slower growth temporarily resumed, while Finland actually experienced negative growth in 2012 and 2013.



**Figure 1: EMS Crisis, 2008 Crisis**

Real GDP % Change per country during EMS (above) and Great Financial Crisis (2008) Notes: Percentage Change in real GDP. Source: World Bank

<sup>269</sup> Turner (2014) shows that 1825 in Britain is the worst on record using a number of variables. Ireland experienced a severe banking crisis in 1820/21 in which more than half of its entire banking system failed.

One leading feature of both major financial crises experienced across the sample group was the historically high levels of private sector debt during the boom phases which preceded them. It would therefore appear quite reasonable that the Basel Committee chose to focus on private sector credit to GDP as a variable which might serve as a useful predictive indicator of financial crises as established by Drehmann et al (2010) and Schularick and Taylor (2012) amongst others. In addition, the variable has also been shown to best capture the extent to which financial liberalization has progressed.<sup>270</sup> Other research suggests that problems are more likely to develop where a large share of credit goes to the private sector.<sup>271</sup>

In Figure 2 it is apparent that not only are the private debt levels significantly higher in scale during the second crisis episode, but that the credit cycles of the four countries differ in terms of local geographical pairs as borne out by their experience of similarly timed financial crises. While Sweden and Finland's financial cycle initially peaked at the onset of the crisis in the early 1990s, Ireland's began moving in step with credit expansion in the UK as the former deregulated its banking system through the 1990s.<sup>272</sup> A footnote to the Commission of the Banking Report in 2011 even admonished Irish public institutions and banks for their short "professional memories" of the role that deregulation had played in the recent economic history of the Scandinavian crises of the early 1990s.<sup>273</sup>

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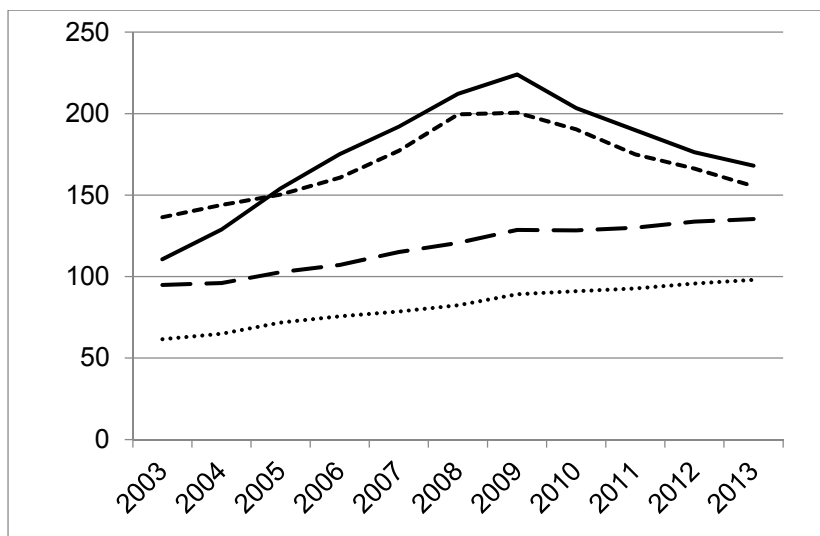
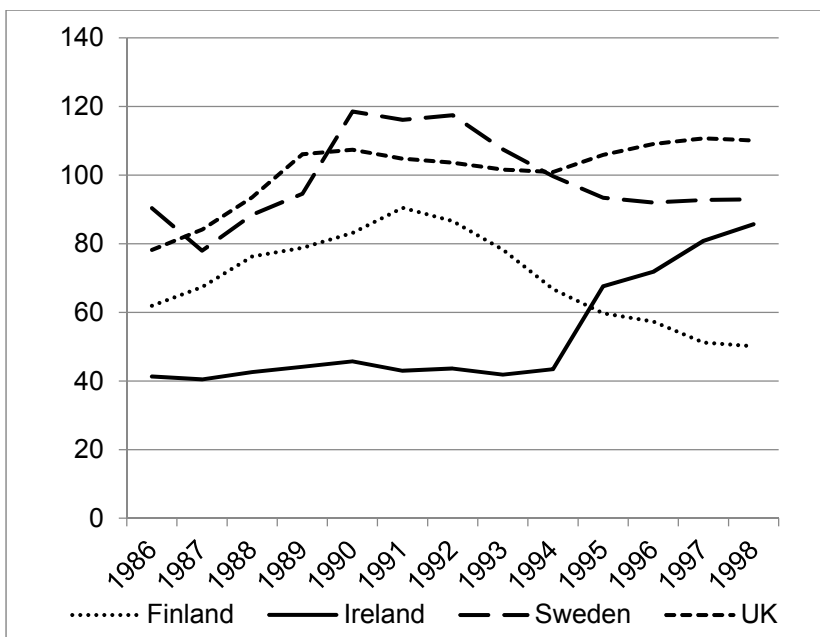
<sup>270</sup> Pill and Pradhan (1995)

<sup>271</sup> Demirgüç-Kunt and Detragiache (1997)

<sup>272</sup> 'Misjudging Risk...' Report p 20.

<sup>273</sup> 'Misjudging Risk,' p. 5





**Figure 2: Private Sector Credit to GDP in Finland, Ireland, Sweden and UK (1992 and 2008 Crises)**  
 Notes: Percent of GDP. Source: World Bank

The report highlighted that membership of the Euro area brought about the disappearance of exchange risk and “virtually unfettered access to funding from European and other capital markets,”<sup>274</sup> implying that financial institutions would consequently be able to provide access to mortgage finance at historically low rates.<sup>275</sup>

During the second half of the period following the adoption of the euro and the build up to the global financial crisis (2003-2008), private sector credit expanded in all sample countries, though the growth rates in Ireland and the UK are considerably higher. While the international climate in general was one of declining interest rates and freer movements of capital it is worth mentioning that Finland and Ireland’s financial cycles went from being negatively (pre Euro) to strongly positively correlated following 2000.<sup>276</sup>

In addition to local economic idiosyncrasies, others have referred to a “global credit cycle” driven primarily by the monetary policies of centre countries which evolved during this period.<sup>277</sup> Indeed recent research has shown that the credit cycles of Ireland and Sweden credit are the most strongly correlated with the global credit cycle in a sample of 20 advanced economies.<sup>278</sup>

Taking these general characteristics of the economic and financial cycles of the focus countries into consideration for the period 1986-2013, the paper now proceeds to discuss the motivation behind and the design of the Countercyclical Capital Buffer of Basel III.

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<sup>274</sup> ‘Misjudging Risk,’ p. 3

<sup>275</sup> Whelan (2014)

<sup>276</sup> Correlation of the changes in credit between Finland and Ireland (Private sector credit to GDP) move from -0.34 for the period 1986-1999 to 0.56 for the 2000-2013 period.

<sup>277</sup> Rey (2013, 2014) and N.G. Andersson and Jonung (2015)

<sup>278</sup> Andersson and Jonung (2015) The other countries in the study are Spain, Denmark, Portugal, Greece, Italy, Norway, Canada, Finland, Belgium, France, the UK, Australia, Switzerland, Austria, Japan, the USA, Netherlands and Germany.

## Basel III-A Remedy for Basel II?

The Basel Framework (or Capital Adequacy Accord) currently in its third phase since 2010 is the principal international body of rules which guide banks on their risk management, focusing in particular on ratios of capital held against risk-weighted assets. The Basel II Accord which had been largely adopted by 2004 had been accused by many of being pro-cyclical in its design, amplifying both positive and negative shocks to the real economy.<sup>279</sup> For instance, during a downswing banks would be required to put aside more capital implying that they could reduce the denominator (primarily lending) to arrive at the target capital to asset ratio. Features such as mark-to-market real time accounting tend to exaggerate the profits (losses) and capital strength (weakness) in a boom (bust).<sup>280</sup>

Among other things, the magnitude of the pro-cyclicality would depend upon the composition of the banks' asset portfolios, their internal methods of calculating risk (and thus the level of capital requirement), the excess of their capital buffers over the regulatory minimum and the quality of both internal and external supervision.<sup>281</sup> Another relevant feature of Basel II was its empowerment of rating agencies to grade the quality of assets held on banks' books which in turn would require varying levels of capital to be set aside based upon their risk assessment of a given asset. The assets with least risk (AAA) acquire a zero weight and are thus exempt from any capital charge.<sup>282</sup> A simplified version of the calculation of the ratio is shown below. The weighting system itself implies that the ratios are not a true reflection of the percentage of capital to *total* assets as had historically been the case, as in the context of modern day regulation they are significantly

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<sup>279</sup> Goodhart (2009, 2009b, 2010), Dewatripont et al (2010), Tarullo (2009), Rajan (2010), Repullo and Saurez (2008), Repullo and Saurina (2011), Brunnermeier et al (2009)

<sup>280</sup> Goodhart (2010)

<sup>281</sup> Drumond (2009, p. 823)

<sup>282</sup> An oft cited example of the weakness of weighting assets by risk is the approval by the Financial Services Authority in 2007 of Northern Rock's holding of £2.2 billion against assets of £113.4 billion (see Dewatripont et al (2010, pp. 87-88). Of the bank's total assets of £113.4 billion, only £19 billion of these received a risk weighting of more than 0%. Basel II's 8% capital charge was £1.52 billion (£19 billion x 8%). The CEO of Northern Rock justified a large dividend just before the crisis due to his "shrewd" management of the bank as the level of equity was more than sufficient according to Basel II rules.

lower due to the charge being multiplied by the assigned (fractional) *weight* of the asset.<sup>283</sup>

$$\text{Basel Capital Ratio \%} = \frac{\text{Capital}}{\text{Risk Weighted Assets}}$$

The agencies traditionally provide ratings of assets which determine the risk weight using a point-in-time approach giving favourable ratings to assets in normal economic conditions and more negative ratings during downturns which accelerated the procyclical tendencies.<sup>284</sup> In summary, not only would this additional mechanism amplify the tendencies of a boom as the reverse would occur but it would equally exacerbate a contraction of lending in recession.

At the aggregate level, it was agreed that there existed “urgent need for better metrics of financial stability” where national supervisors could play a stronger role.<sup>285</sup> This indicated a move away from solely microprudential regulations concerning individual banks towards macroprudential regulation which would take a macroeconomic view of system wide risk. Goodhart (2009, p. 31) stressed that “the BIS and the IMF can warn until they are blue in the face, with the benefit of more and more information, but it will not do much good. What we need are countercyclical instruments.”

Portes (2014) emphasizes that macroprudential policy should “protect the banking sector from the financial cycle” and additionally moderate the financial sector and “protect the economy from the banks.”<sup>286</sup> This is the essence of the justification of the countercyclical capital buffer. Macroprudential regulation itself is a somewhat novel addition to the debate,<sup>287</sup> the objective of which is to limit the risk of widespread disruptions to the provision of financial services and thereby minimize the impact of such disruptions to the wider economy - the crucial link for a

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<sup>283</sup> Turner (2014, p. 133) shows that over the period 1885-2007, the total capital resource as a percentage of assets has fallen from over 45% to less than 5%.

<sup>284</sup> Though the agencies claim to use a through-the cycle analysis this has generally not been the case according to King and Sinclair (2003)

<sup>285</sup> Tarullo (2009, p. 289)

<sup>286</sup> In ed. Schoenmaker (2014)

<sup>287</sup> See Brunnermeyer et al (2009) and ed. Schoenmaker (2014)

successful approach therefore lies in the link between the business and financial (credit) cycle.<sup>288</sup>

## **The Design of the Countercyclical Capital Buffer**

In the aftermath of the financial crisis, the Basel Committee on Banking Supervision published three policy documents which resulted in the countercyclical capital buffer becoming a part of the global regulatory standard under the Basel III framework.<sup>289</sup> As considerable private credit growth in banks had preceded the 2008 crisis in all of the worst affected countries, it is not surprising that it received particular focus as a predictor variable. Indeed, the literature has persistently stressed its link to financial crises.<sup>290</sup> Emphasis was placed on the “inter-linkages” between the losses incurred by the hitherto imprudent and (consequently) distressed banking sector which would tend to “exacerbate a downturn in the real economy which can further destabilize the banking sector.”<sup>291</sup>

The instrument itself was designed to function as an “automatic stabilizer” which as it was originally intended, should not be adjusted through the credit cycle and triggered in a pre-determined manner when passing through pre-approved thresholds.<sup>292</sup> This rule based approach provides the advantages of transparency (with lower scope for inaction) and regulatory certainty, but suffers the disadvantage of being susceptible to circumvention and rigidity which would not suit potentially desirable changes to calibration.<sup>293</sup>

The Basel committee targeted the broad measure of private sector credit to GDP relative to its long term trend as the variable which would determine the behavior of the buffer “on a jurisdiction by jurisdiction basis...to ensure that the resulting buffer guide will take account of local market conditions.”<sup>294</sup> The consideration is thereby sensitive to “financial systems

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<sup>288</sup> Paragraph summarizes Lim et al (2011)

<sup>289</sup> BCBS (2009, 2010a, 2010b), see also Drehmann et al (2010)

<sup>290</sup> Schularick and Taylor (2012) , Demirgüç-Kunt and Detragiache (1997) and Kindleberger (1979)

<sup>291</sup> BCBS (2009, p17)

<sup>292</sup> Lim et al (2011)

<sup>293</sup> Lim et al (2011)

<sup>294</sup> BCBS (2010b, p. 10)

at different stages of development.”<sup>295</sup> The larger umbrella of private sector credit to GDP was chosen as broader measures of credit perform better as predictors of banking sector distress and the variable captures diversion of the supply of credit to other parts of the economy such as the non-bank financial sector.<sup>296</sup>

The trend from which private credit to GDP deviates is to be calculated using a Hodrick-Prescott (HP) filter with a lambda ( $\lambda$ ) value of 400,000 in the smoothing parameter, effectively producing a straight line “to capture the long term trend in the behavior of the credit/GDP ratio in each jurisdiction.”<sup>297</sup> The trend requires a minimum of ten years of data and the lambda value of 400,000 was chosen as it was found to perform well in picking up the trend in private sector indebtedness.<sup>298</sup> The difference between the calculated trend and private sector credit to GDP is known as the credit to GDP gap.

The mechanism through which the buffer operates can be described with the aid of the following formulae

$$z_t = x_t - \bar{x}_t$$

where  $z_t$  = the credit to GDP gap. This is the difference between private sector credit (as a percentage of GDP)  $x_t$  and its long term trend,  $\bar{x}_t$ . The gap is “penalized” by its magnitude when it exceeds a lower bound of 2 (or L) in a linear fashion until it exceeds the higher bound of 10 (or H) where the maximum capital charge of 2.5% of risk weighted assets is applied as the formula below outlines.

0% charge	If $z_t < L$
$b_t = b(z_t) = \frac{z_t - L}{H - L} \times 2.5 \%$	If $L \leq z_t \leq H$
2.5% charge	If $z_t > H$

In other words, the buffer  $b_t$  will vary linearly from 0% to 2.5% as a function of the size of the gap, implying a higher cost to the national

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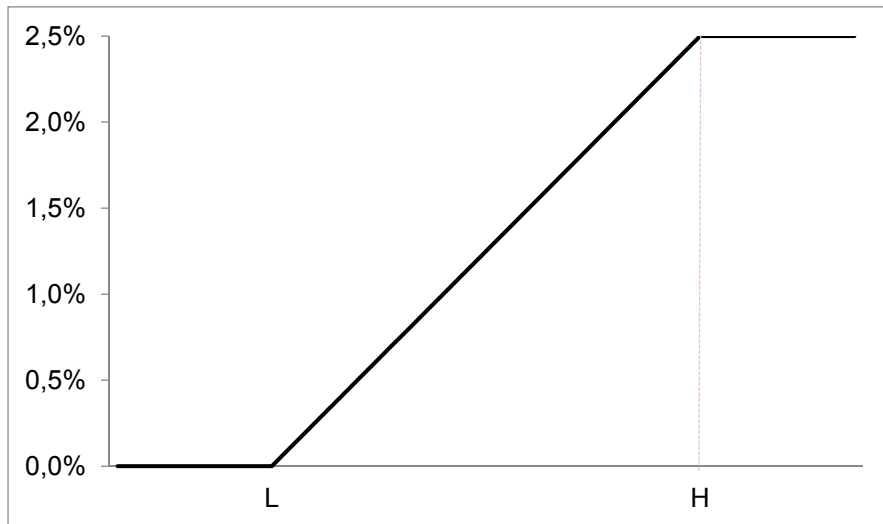
<sup>295</sup> BCBS (2010b, p. 10)

<sup>296</sup> BCBS (2010, pp.10-11)

<sup>297</sup> BCBS (2010a) Annex 2

<sup>298</sup> BCBS (2015), Drehmann and Tsatsaronis (2014), Drehmann et al (2010)

banking system the greater the extent of private credit in the system (Figure 3). In contrast, falling levels of credit would trigger capital release and banks would be in a position to increase lending. This is the vision behind the operation of the countercyclical capital buffer.



**Figure 3: Relationship between Countercyclical Capital Buffer and Credit to GDP Gap**

Notes: Gap on Horizontal Axis, Buffer Percentage Charge on Vertical Axis, Notation from Repullo and Saurina (2011),  $b_t$  = buffer,  $z_t$  = credit to GDP gap, L=lower threshold of 2% > than long run trend, H= higher threshold of 10% > than long run trend. Charged on Risk Weighted Assets

### *Counterfactual Analysis- Countercyclical or Procyclical?*

In a speech shortly after the two Basel consultative documents (which outlined the nature of the counter-cyclical instrument) were released to the public,<sup>299</sup> the Manager for the Bank of International Settlements attempted to persuade attendees that Basel III provided a solid, internationally agreed foundation for macroprudential policy. By theoretically exploring a counterfactual pre-crisis world, he claimed that the financial system would have been considerably more resilient and that “the procyclicality of the system would have been mitigated” had the countercyclical capital buffer (which was newly designed) been in operation.

<sup>299</sup> BCBS (2010a, 2010b)

One potential difficulty with this conclusion is that the timing of financial/credit and economic cycles may not be synchronized with some research suggesting that the former are on average about four times longer than the latter.<sup>300</sup> While it may be quite reasonable to estimate that credit expansion may have been materially reduced in the pre-crisis era if the countercyclical buffer had been deployed as some studies have shown,<sup>301</sup> this does not imply that the timing of such a reduction would have been suited to underlying conditions in the real economy over a longer timeframe. Repullo and Saurina's (2011) have claimed that not only is the credit to GDP gap an unsuitable indicator which should be "abandoned" as a common reference point, but that the CCB itself would "exacerbate" the pro-cyclicality of the existing regime.

The first method they used was a simple measure of correlation between GDP growth and the credit to GDP gap. The gap, as outlined above, is the difference between the level at time  $t$  with respect to its long run trend. According to Repullo and Saurina (2011), the test should accordingly show a positive sign if the gap was a useful common reference point from which to deploy the buffer. If this is the case, the buffer would be deployed from a trigger point that exhibited countercyclical properties as it would co-move with the business cycle. If the resulting sign is negative, the buffer would tend to amplify the business cycle in either direction in a pro-cyclical manner. For example, if economic growth was negative and the gap was positive (which would prompt a rise in capital ratios), lending (the denominator) would be reduced in an effort to achieve the higher capital ratio at the least desirable time.

However, some treatment must be given to the data due to the nature of the HP filter which Repullo and Saurina (2011) have overlooked. The credit-to-GDP gaps in their contribution were not the gaps as they transpired in each  $t$  to counterfactual policy makers, but rather they were gaps imposed recursively by the end point of the filter in 2009 in an *ex ante* manner. The gap of each year which is calculated by using the long term trend can only be known at the end of that year. In other words, the gap of any given year should be calculated with data applying only up to that year, before a truly valid correlation could be conducted, even if the calculations are conducted from the distant future.

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<sup>300</sup> Drehmann and Tsatsaronis (2014)

<sup>301</sup> Benes and Kumhof (2015); Drehmann and Gambacorta (2012)



At least ten years of data is required before the process can be considered reliable.<sup>302</sup> As counterfactual policy makers in 1986 would have required ten years of data, the period 1976-1985 would have provided them with a sufficient trend from which to calculate the gap for 1985, which would have been used to trigger the buffer at the beginning of 1986. This improves on Repullo and Saurina's (2011) method which produced gaps for 1986-2008 from a trend with a base point of 1986 and a terminal point of 2009. This end point could not have been known in any year prior to 2009 by counterfactual policy makers, thereby making the resulting gaps for 1986 until 2008 largely redundant in their work. The correlation between growth and the credit to GDP gap is shown in Table 1 below.

**Table 1: Coefficient of Correlation between the Credit to GDP Gap and Real GDP Growth in Finland, Ireland, Sweden and the United Kingdom.**

	<b>Finland</b>	<b>Ireland</b>	<b>Sweden</b>	<b>UK</b>
1986-2007	-0.34	0.30	-0.46**	0.14
1986-2013	-0.47 ***	-0.16	-0.47***	-0.13

Notes: Significance levels are indicated as follows: \*\*\*p<0.01 \*\*p<0.05 \*p<0.1 Source: World Bank

Even having adjusted for the issues in Repullo and Saurina's (2011) treatment, in the Scandinavian countries the sign remains negative and thereby supports the former's findings for other countries that the credit to GDP gap is negatively correlated with economic growth. This is not the case for the other pair which suggests some idiosyncrasies with respect to local cycles. The UK is the only common country between both papers for which Repullo and Saurina (2011) find negative correlation, yet by adjusting their method with the above considerations the coefficient sign turns positive as seen in Table 1 during the pre-crisis period.<sup>303</sup>

However, the above adjustments still do not reflect the practical reality that policy makers are unlikely to maintain an invariant base year indefinitely into the distant future. This invites further experimentation of rolling forward a variety of base years for each terminal year covering the period 1986-2013. To this end, I calculate 12 alternative gaps per year for the period 1986-2013 based upon a rolling window of 12 alternative base years per each terminal year.<sup>304</sup> This means that for the period 1986-2013,

<sup>302</sup> BCBS (2015), Drehmann and Tsatsaronis (2014)

<sup>303</sup> For the same test, the single negative coefficient of correlation Repullo and Saurina (2011) provide for the UK is -0.58 (1986-2009).

<sup>304</sup> For example, as 10 years of data are required to calculate any given gap, the latest possible starting point for the 1986 gap is 1977. Therefore the period 1966-1977 provides

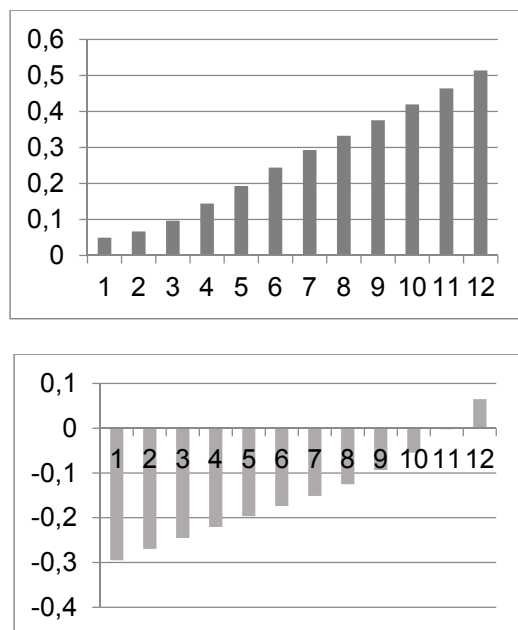
336 gaps (12 bases x 28 years) were calculated for each country coming to a total of 1,344 across the sample of four countries.

12 gap series were produced for the 1986-2013 per country, each calibrated upon the base year which produced them. For example, the last available rolling base year for each gap year 1986-2013 produced the last series (12) and the earliest available rolling base year for each gap year produced the first series (1). Each of the individual time series spanning the period 1986-2013 was then correlated with real GDP growth. Having conducted this analysis, it is clear that the correlation coefficients in Table 1 mask a distinctive shift in the direction of increasingly positive correlation with every later base year chosen in each country.

Figure 4 plots the 12 coefficients of correlation in the *pre*-crisis period 1986-2007 as pertaining to each base year with 1 representing the earliest and 12 the latest possible base year for the two most linear cases of the UK and Finland.

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a 12 year window of alternative bases for 1986. The first trend from the earliest base year (1966) contains data for 21 years while the final possible trend (with 1977 base year) contains data for the specified minimum of 10 years. For each subsequent year, the 12 year array of alternate bases was rolled forward by one year maintaining the consistent amount of 12 alternative bases for every subsequent terminal year. To illustrate, the window of base years 1966-77, 1967-78, 1968-79 are used to calculate the 12 alternative trends relating to the years 1986, 1987 and 1988 respectively.



**Figure 4: Coefficient of Correlation between Real GDP Growth and the Credit to GDP Gap (1986-2007) in the United Kingdom and Finland by base years 1-12**

Notes: United Kingdom (Above) And Finland (Below) per base years (1 = earliest, 12=latest). Source: World Bank

While this tendency may at first glance suggest that there may be scope for policy makers to continue to roll forward to the latest available base year in order to increase counter-cyclicality, it should be apparent that typically the later the base year (and thus the fewer observations comprising the trend) the lower the levels of statistical significance. Furthermore (as we shall see in the next section), this approach would not only lead to additional problems due to the diversity of the 12 slopes produced by the 12 alternative filters, but the positive correlation is associated with persistently smaller gaps which would be insufficient in size to trigger the buffer, irrespective of whether the credit to GDP ratio is at levels which could be classified as risky.

The literature which stresses that gaps are not an appropriate measure for financial regulation focuses on issues such as sizeable revisions to the data by national statistical agencies occurring *ex post* on the same order of magnitude as the gap itself, low correlations between the gap as estimated in real time and the gaps estimated on all available data and the unreliability of

end of sample estimates of the ratio's trend.<sup>305</sup> According to the Basel Committee however, the available evidence “suggests that statistical revisions do not impair the signaling quality of the credit-to-GDP gap.”<sup>306</sup> The most obvious potential side effect of such an occurrence is a buffer being deployed in time  $t$  which (because of data revisions at time  $t+1$ ) later transpires as unnecessary through the subsequently minimized gap relating to  $t$  recalculated at  $t+1$ .

While it could be expected that the buffer (which is itself a function of the gap) would act in a similar manner, it is instructive nonetheless to pursue the correlation test with economic growth similarly to Repullo and Saurina (2011). Their buffer however suffers from the same retrospectively imposed problem as outlined above with regard to the credit to GDP gap which I treat by using an identical method to that pursued in Table 1. The only difference with the buffer is that it is triggered by the previous period's credit to GDP gap. Namely, I treat the terminal year of the reference point as the year that calculates the buffer for the policy makers in the subsequent year so that (for example) the data which produces the credit to GDP gap of 1985 produces the buffer relating to 1986.

**Table 2: Coefficient of Correlation between Real GDP Growth and the Countercyclical Capital Buffer in Finland, Ireland, Sweden and the United Kingdom.**

	Finland	Ireland	Sweden	UK
1986-2007	-0.30	0.38*	-0.80***	0.05
1986-2013	-0.49***	0.02	-0.59***	-0.30

*Notes: Significance levels are indicated as follows: \*\*\* $p < 0.01$  \*\* $p < 0.05$  \* $p < 0.1$  Source: World Bank*

As one might expect, the buffer tests yield similar results to those concerning the credit-to-GDP gap with some variation (Table 2). During the pre-crisis period, a counterfactually triggered buffer was largely neutral in the UK, though when the post crisis era is included the buffer behaves in a pro-cyclical manner over the whole sample. In Ireland by contrast, the buffer tended to act in a countercyclical manner in the pre-crisis period. Likewise, the most pronounced negative decline in correlation of the four countries occurs for Ireland when the crisis years are included. In Sweden's case, largely because of the fact that during the period 1993-2004 the credit to GDP gap was negative while growth was positive the negative sign was produced. However with specific reference to the buffer, during the entire

<sup>305</sup> Orphanides and Van Norden (2002), Edge and Meisenzahl (2011)

<sup>306</sup> BCBS (2015)

period 2007-2013 in which Sweden experienced a relatively low average growth rate of 1% including three negative years, the full buffer charge of 2.5% was applied in the post crisis era thereby significantly increasing the procyclicality of the buffer by this definition.

## **Credit Growth?**

The question then arises as to what might constitute a more suitable reference variable for economic growth whilst simultaneously having predictive power or relevance regarding financial crisis? Schularick and Taylor (2012) have recently suggested the importance of real credit growth which “clearly helps predict financial crises.” Ibáñez-Hernández et al (2015) and Repullo and Saurina (2011) both review the alternative of credit growth to the credit to GDP ratio.

Like the latter, I employ the GDP deflator to get from nominal to real values for each country and similarly find that growth in real credit is more positively correlated with real GDP growth (Table 3), implying that it may be a more appropriate common reference point for the deployment of a countercyclical capital buffer. Nonetheless, Sweden remains mildly negative though the results are not statistically significant for either it or Finland.

Thus from this point of departure, attention to real credit growth would tie the financial and economic cycles together while protecting the real economy in a countercyclical manner as it is consistently more positively correlated with the business cycle. Importantly, when the crisis years are included, the correlation becomes slightly more positive in contrast to the credit to GDP gap which is a desirable characteristic of the reference variable responsible for issuing the buffer. Some regional variation is however apparent and latter day Swedish credit growth may as suggested elsewhere be influenced by the wider global credit cycle as opposed to underlying economic growth.<sup>307</sup> Finally, the rate of change in credit growth is less subject to interpretation and manipulation than a credit to GDP gap produced by a trend which can vary considerably by the choice of base year.

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<sup>307</sup> Andersson and Jonung (2015)

**Table 3: Correlation between Real GDP Growth and Real Credit Growth in Finland, Ireland, Sweden and the United Kingdom.**

	<b>Finland</b>	<b>Ireland</b>	<b>Sweden</b>	<b>UK</b>
1986-2007	0.27	0.61***	-0.14	0.27
1986-2013	0.30	0.64***	-0.06	0.32*

Notes: Significance levels are indicated as follows: \*\*\* $p < 0.01$  \*\* $p < 0.05$  \* $p < 0.1$  Source: World Bank

While the above results lend some support to the findings of Repullo and Saurina (2011) and Ibáñez-Hernández et al (2015), there are notable characteristics of the sub periodization I adopt. The fact that the credit to GDP gap was negatively correlated with economic growth in the Nordic pair both before and after the financial crisis implies by this definition that it would tend to operate in a consistently procyclical manner, while potentially functioning well in the Irish case and moderately well in the UK business cycles.

More reliability should arguably be placed upon the pre-crisis sample results, as if the buffer had been deployed the subsequent variables may have been altered in a counterfactual scenario from 2008 though the degree to which this may have occurred is impossible to measure as the Lucas critique famously recognized regarding counterfactually testing macroeconomic variables in a policy system.<sup>308</sup>

However, it is apparent from the results in Tables 1 and 2 that stronger negative correlation emerges in all countries when the full period is employed which includes the Great Financial Crisis of 2008. Furthermore, within the pre-crisis sub period (1986-2007) the Nordic pair which shows negative correlation coefficients experienced a severe crisis during the early 1990s as outlined in the first section. Other research has demonstrated that the private sector credit to GDP ratio can actually rise during downturns due to the tendency of GDP to fall faster than credit.<sup>309</sup> This suggests that further investigation is required around crisis events on the operation of the filter and resulting buffer.

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<sup>308</sup> Lucas (1976, p. 41)

<sup>309</sup> Edge and Meisenzahl (2011), Repullo and Saurina (2011)

## The Counterfactual Performance of the Buffer in Crisis

Focusing on the buffers which were calculated for the years surrounding the crises may shed some light on the increase in negative correlation between growth and the buffer/gap which transpires when crises are included in the time interval. I take three years prior to each event which are usually associated with sustained “capital flow bonanzas” and current account deficits before each banking crisis,<sup>310</sup> the crisis year itself (1992 and 2008), and the three years following the crisis. Furthermore, the Basel Committee state that “the indicator should breach the minimum (threshold) at least 2-3 years prior to a crisis.”<sup>311</sup>

The results are presented in Table 4 below in the binary context of whether or not the buffer was triggered in each country with “12” representing the total number of possible scenarios for each year implied by the 12 various base years used for each year. As all crisis afflicted countries engaged in extensive lending in the three years leading into both financial crises (with the exception of Ireland during the 1992 event which is consequently excluded in those calculations), the buffer should be “on” showing a *true positive*, in accordance with the Basel Committee’s stated objective.<sup>312</sup> I include the crisis year as one in which the buffer should remain “on,” but during all subsequent years it should disappear to become a *true negative* value of “off” if operating in a countercyclical manner. *False negatives* (the buffer should be “on” but is in fact “off”) and *false positives* (the buffer should be “off” but is in fact “on”) are underlined in bold typeset.

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<sup>310</sup> As Reinhart and Reinhart (2008) suggest

<sup>311</sup> BCBS (2010b)

<sup>312</sup> BCBS (2010b)

**Table 4: The Countercyclical Capital Buffer in Finland, Ireland, Sweden and the United Kingdom during the EMS Crisis (1992) and Great Financial Crisis (2008)**

Year	Finland		Ireland		Sweden		United Kingdom	
	On	Off	On	Off	On	Off	On	Off
The EMS Crisis 1992								
1989	12		n/a		9	<u>3</u>	12	
1990	12				12		12	
1991	10	<u>2</u>			12		9	<u>3</u>
1992	12				12		5	<u>7</u>
1993	<u>3</u>	9			<u>11</u>	1	2	10
1994	0	12			0	12		12
1995	0	12				12		12
The Great Financial Crisis 2008								
2005	12		11	<u>1</u>	12		12	
2006	12		12		12		12	
2007	12		12		12		12	
2008	12		12		12		12	
2009	<u>10</u>	2	<u>12</u>		<u>12</u>		<u>12</u>	
2010	<u>11</u>		<u>12</u>		<u>11</u>	1	<u>12</u>	
2011	8		0	12	8	4	2	10

Notes: Number of times (out of a possible 12) the buffer was activated (on) or inactive (off) during each year per country during the EMS crisis and the Great Financial Crisis. "False positives" and "false negatives" are underlined in bold typeset. Author's calculations. Source: World Bank.

Upon first inspection, the buffer does remarkably well on the three years leading into each crisis episode achieving a 95% rate of "true positives" as summarized in Table 5 below.

**Table 5: Performance of Counterfactual CCB in Finland, Ireland, Sweden and the United Kingdom.**

	True Positives	True Negatives	False Positives	False Negatives
Pre-Crisis	95%	N/A	N/A	5%
Post Crisis	N/A	50%	50%	N/A

Source: World Bank. Author's Calculations

However, while the buffer predicts each of the seven cases with remarkable accuracy, it performs poorly during the downturn yielding false triggers 50% of the post crisis period, particularly following the most recent crisis where it yielded false positives 76% in comparison to 14% in the aftermath of the EMS crisis. Less weight might be placed upon the post crisis results as the potential effect of an employed CCB (pre-crisis) must remain



unknown though it has been suggested as having a near zero effect on GDP.<sup>313</sup>

By this measure, the credit to GDP gap exhibits the unattractive properties which others have emphasized in time of crisis; it tends to increase due to the relatively faster decline of the denominator of GDP, triggering the buffer during distress periods.<sup>314</sup> Figure 1 which shows the comparatively sharper contraction of the 2008 crisis and the results in Table 4 support this analogy, as the first implies (and the second displays) the poorer post crisis performance of the buffer following the more recent crisis. These results additionally yield the conclusion that the procyclical properties which the tool exhibits in post crisis environments are positively related to the magnitude of the collapse in output which preceded it.

To consider the effect of such a “false positive” in a post crisis scenario, one can reflect on the Swedish banking system which with sustained support from the authorities avoided widespread failure during the financial crisis of 2008.<sup>315</sup> The results in Table 4 show that it would have been bound to raise capital buffers (or shrink the denominator of lending) in direct contradiction to the aggressive and initially successful “array” of crisis response actions taken by Swedish authorities to prevent precisely that mechanism from occurring.<sup>316</sup> Therefore, in Sweden where extensive liquidity was readily provided which assisted in averting the worst of the financial crisis,<sup>317</sup> if applied rigidly such a buffer may have acted as a regulatory “brake” at the same time the monetary authorities were pressing the “accelerator.”<sup>318</sup>

## Experiments with the HP Filter Trend

Despite the instrument’s apparent success in recognizing the crucial three year period leading into financial crises, a closer inspection of the magnitude of the buffer and how it varies in each calculation reveals how

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<sup>313</sup> Drehmann and Tsatsaronis (2014)

<sup>314</sup> Edge and Meisenzahl (2011), Repullo and Saurina (2011),

<sup>315</sup> Though one “systemically important” bank, Swedbank, “was completely reliant upon the guarantee for its medium term funding for several months.” Bryant et al (2012, p 47)

<sup>316</sup> See Bryant et al (2012) for an extensive summary of all tools employed by all government institutions.

<sup>317</sup> See Bryant et al (2012) for an in depth analysis

<sup>318</sup> The analogy is borrowed from Schonmaker ed. (2014)

sensitive it is to the starting point of the HP trend. One is compelled to acknowledge the issue of the straight line produced by the lambda value of 400,000 in the HP filter and its varying slope based upon starting year. Additional textbook problems with end points of HP filters are well known such as imprecision at estimated end points, no objectively correct value of  $\lambda$ , the inability of the tool to capture structural breaks in the trends of economic time series and the resulting considerable uncertainty about the “true” credit gap.<sup>319</sup>

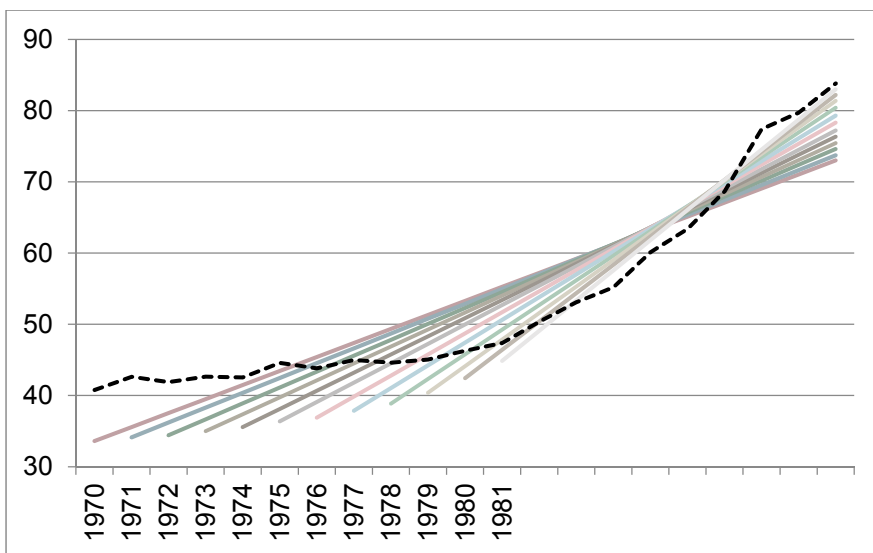
The effects of the straight trend line based upon alternative starting years can be best displayed by way of illustrative example. Due to the relatively stronger change in private credit growth rates in the years leading into crises, the trend component of the HP filter is influenced by exhibiting a steeper slope ending with a higher terminal value, the later the starting year. This is the result of the pronounced change in the trend growth rate, picked up in the second term in the HP filter formula below. The relatively high lambda value of 400,000 sacrifices the cyclical component almost entirely.

$$\sum_{t=1}^T (c_t - g_t)^2 + \lambda \sum_{t=2}^{T-1} [(g_t - g_{t-1}) - (g_{t-1} - g_{t-2})]^2$$

where  $ct$  is private sector credit to GDP and  $gt$  is the value of its trend at time  $t$ . Taking Finland as an example in the period preceding the crisis it experienced, Figure 5 plots an array of 12 alternative trends for 1990 which would form the basis of the capital buffer for 1991.

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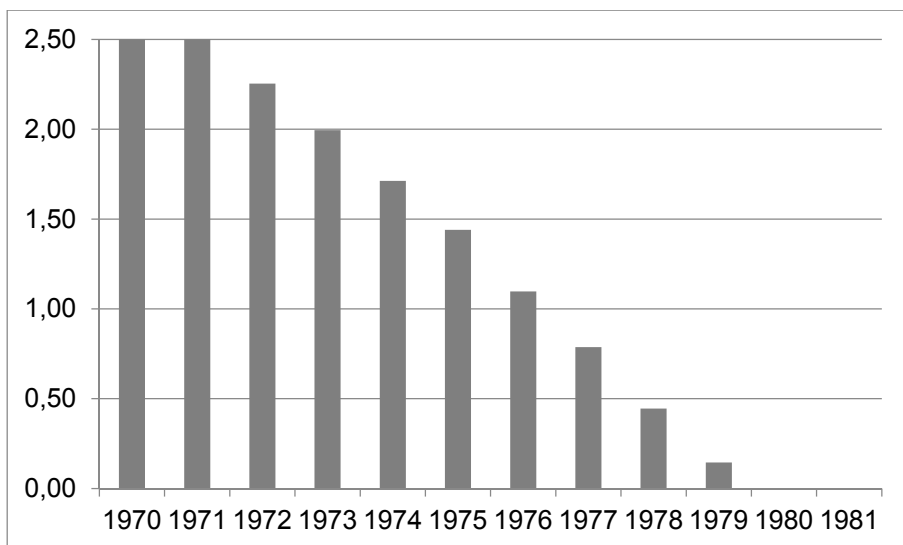
<sup>319</sup> Sørensen and Whitta-Jacobsen, (2010, p 381)



**Figure 5: Private Sector Credit to GDP and Trends of Private Sector Credit to GDP for Finland (1990)**

Notes: Percent of GDP. Dotted Line = Private Sector Credit to GDP. 12 trends using base years 1970-1981 for the year 1990. HP Filter (Lambda 400,000). Author's calculations. Source: World Bank.

The distance between private sector credit to GDP (dotted line) and each trend at the terminal point produces 12 resulting credit to GDP gaps for 1990. It demonstrates that later base year trends which are considerably more influenced by the boom (for example 1981), produce a steeper trend than earlier starting points. The higher trend value in 1990 produced by the trend with 1981 as its base year will consequently reduce the deviation from the trend (credit to GDP gap) leaving the buffer at a comparatively lower level. The potential array of counterfactual buffers each base year triggers for the year 1991 is displayed in Figure 6.



**Figure 6: The Countercyclical Capital Buffer for Finland in 1991**

Notes: Percent of Risk Weighted Assets. 12 Countercyclical Capital Buffers calculated for Finland in 1991 from twelve alternative trends with base years (1970-1981). Author's Calculations. Source: World Bank

The converse pattern holds for the earlier starting point. It will create a larger gap (due to a comparatively flatter trend as displayed in Figure 5 by base year 1970) and consequently penalize the deviation from trend in the pre-crisis era, but will tend to maintain that larger gap in the aftermath of a crisis triggering the buffer. In other words within this sample, earlier base years produce countercyclical buffers in pre-crisis years but later base years produce countercyclical buffers in post crisis years.

The features concerning later starting points support the findings of Edge and Meisenzahl (2011) who focusing solely on “false positives” in recessions conclude that real time measures of the gap can yield “excessively high levels of credit that later, based on longer time series of data, do not appear so extreme.” In contrast to the scenario where banks are asked to raise capital, reductions in the buffer are allowed to take effect “immediately.”<sup>320</sup>

Nonetheless, assuming that the buffer is to be used primarily in preventing rather than curing the eventual effects of a crisis, an earlier starting point in this time period is the preferable choice despite the higher

<sup>320</sup> BCBS (2010b)

negative correlations with economic growth associated with earlier base years.

The primary reason for the increased positive correlation on later base years shown in Figure 5 is that the gaps were considerably less deviant from steeper (later base year) trends than those gaps which emerged from a flatter slope over a longer time frame where GDP was likely to fall more often than the shorter minimum ten year periods leading into each financial crisis. The only country which did not experience such crises until 2008 was Ireland and somewhat tellingly it is the only member of the group which shows a positive correlation in the pre-crisis and full sample.

### *Policy Implications*

The spectrum of alternatives presented in Figure 5 which result in the buffers shown in Figure 6 might be viewed in an extreme case, as the potential scope for political pressure during boom conditions where revisions to trend lines could potentially take place. Economic agents who benefit from increased lending may lobby for lower capital buffers (later starting points for trends) in boom conditions in the absence of strong institutional protection.

Critics of the micro-prudential elements of Basel III have previously stated that the framework “lends the regulator a great deal of discretion in the more or less strict application of prudential criteria” and that restricting such discretion was an original objective of the Basel committee which now “therefore becomes unrealizable.”<sup>321</sup>

However regarding the macro-prudential aspect, in 2010 the Basel Committee in a similar vein stated that banks are permitted up to one year to raise the additional capital and stated that authorities should “apply judgement” which allows for “discretion” in implementing the buffer.<sup>322</sup> In a more recent policy document released in 2015 which responded to a variety of questions forwarded by national supervisory authorities,<sup>323</sup> the language is arguably even more encouraging towards acting upon discretion; the committee states that the credit to GDP guide “does not need to play a dominant role in the information used by authorities to take and explain buffer decisions.” It continues to state that authorities are “not

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<sup>321</sup> Dewatripont et al (2010, p. 84)

<sup>322</sup> BCBS (2010b)

<sup>323</sup> BCBS (2015)

expected to rely on this guide [BCBS, 2010b] mechanistically” and are “free to choose the specific level and can change the buffer add-on rate by whatever amount they deem necessary.”

While it is not difficult to imagine the negative effect of domestic political considerations determining national buffer decisions within such a loosely defined context, it is worth considering an alternative view based upon the results presented above. In the same document, the committee emphasizes excess credit growth as the general target of national supervisors and recognizes that the credit to GDP gap is “influenced by the behavior of GDP as the denominator.” It continues to caution that if the “gap has risen purely from a cyclical downturn,” this may not reflect a “build-up of system wide risks.”<sup>324</sup> Viewed in a positive light, this official recognition combined with the ability to “immediately” release the buffer when national authorities deem it necessary, would presumably mitigate the procyclical nature of the buffer (if rigidly adhered to as implied by the results) in a post crisis environment. On the other hand, this recognition necessitates additional national discretion and in the worst case can be seen as an admission that the credit to GDP gap is not a consistently reliable reference guide as the committee discloses that it “is not immune to measurement problems.”<sup>325</sup>

## Conclusion

In this paper, the countercyclical capital buffer of Basel III was tested on a regional basis focusing on Finland, Ireland, Sweden and the United Kingdom for the period 1986-2013.

By initially using the (augmented) methodology of Repullo and Saurina (2011), the paper found that the credit to GDP gap (and as a result the buffer) acted in a procyclical manner in the Nordic countries in both the pre and post crisis period according to the strategies employed. However, this negative correlation increased across the entire sample when the turbulent 2008-2013 period was included, suggesting that pro-cyclicality increases during distress periods.

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<sup>324</sup> BCBS (2015)

<sup>325</sup> BCBS (2015)

The buffer was subsequently tested on the two economic crises in an attempt to discern the cause of the increasingly negative correlation. It achieved a 95% rate of success in the target three years preceding each event (as well as the year of crisis itself) as the Basel Committee stated it should.<sup>326</sup> Indeed, the reliability and importance of the results must be more significant on the pre-crisis experience as the CCB's very objective is preventive in nature- to "defend the banks against the financial cycle"- and it does not involve managing the business cycle.<sup>327</sup>

The strong pre-crisis performance contrasted with the post crisis results where the trigger rate was 50% when ideally the aim of the tool was to be "off." This number masks the relatively poorer performance in the recent crisis where it was "on" 76% in the period 2009-2011. However, real credit growth does not suffer from this inability to adapt as it produced consistently more positive correlation in time of crisis which suggests its suitability as a reference point.

This work also reviewed the choice of starting year and found that it considerably influences the magnitude of the buffer. During any given *pre* crisis year over the period 1986-2013, a lower (higher) buffer resulted from later (earlier) starting points for the HP filter. Conversely, because of the same attributes of the design, the more recent (earlier) starting point which steepens (flattens) the upward slope of the trend; the sooner (later) the buffer disappeared in a countercyclical manner in the aftermath of a crisis. This reveals the buffer as one sided in its functionality as it is not Janus like in its ability to adapt to changing circumstances.

In this sense, it is perhaps understandable that the Basel Committee has granted "discretion" and has hinted at this problem by stating that "the calculated long-term trend of the credit/GDP ratio is a purely statistical measure that does not capture turning points well. Therefore, authorities should form their own judgements about the sustainable level of credit in the economy; they should use the calculated long-term trend simply as a starting point in their analysis."<sup>328</sup>

To summarize, while issues surrounding the base year have been highlighted in this work, the paper has shown the CCB in a more positive light than Repullo and Saurina (2011) by adjusting their methodology for a number of considerations and explaining why they found such

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<sup>326</sup> BCBS (2010b)

<sup>327</sup> Drehman and Tsatsaronis (2014)

<sup>328</sup> BCBS (2010b)

procyclicality in their manner of testing over their chosen time interval-when distress periods are included, procyclicality increases due to poor performance of the buffer associated with the aftermath of crises. Due to the flexibility granted to national supervisors on releasing the buffer “immediately” however, there is an in-built mechanism for dealing with this lag.

While the introduction of such an instrument is a welcome addition to a framework which previously did not take account of procyclicality, there remain features of its design which might be partly understood due to the “great hurry”<sup>329</sup> in which they have been assembled in the wake of the crisis and that “(too) great expectations”<sup>330</sup> may have been placed upon their capabilities. However, if we grant that it is a preventive rather than a reactive measure, its performance in boom periods provide some ground for optimism if it is insulated from political pressures and complemented with monitoring other features such as real credit which, as this paper suggests, does not suffer from procyclicality during downturns.

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<sup>329</sup> Tucker in ed Schoenmaker (2014)

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# Seán Kenny

## Money and Debt

Empirical Studies in Northern Europe 1840-2015

This dissertation firstly produces new financial series on money and bank assets which are consistent with current definitions for the UK for the crisis rich period 1840-80 and new monetary aggregates for Ireland from pre famine to independence (1840-1921). By employing the new data, cyclical and seasonal analysis are conducted to shed light on the business cycles and financial crises of the period. Secondly, the dissertation explores the evolution of public debt in Ireland (1950-2015) by constructing a consistently defined fiscal series, analysing the debt ratio dynamics and reductions of the past and offering policy lessons for the present. The thesis finally contributes to the post crisis financial regulation debate by testing the use of private sector debt in macroprudential regulation (as outlined in Basel III) through conducting a regional analysis (Finland, Ireland, Sweden and the UK) covering the period 1986-2013.

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