The Usefulness of the Debt Ratio

The Role for Measures of Financial Imbalances within the Monetary Debate and the Division within the Swedish Riksbank

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Abstract:
The aftermath of the 2008 global financial crisis has seen more and more attention within the monetary debate shifted toward the buildup of financial imbalances within the economy and the increasing levels of household debt. For years, this issue has divided the Executive Board of Governors at the Swedish Riksbank into a hawkish Majority faction and a dovish Minority faction. The measure of financial imbalances that currently dominates the monetary debate is the debt ratio—household debt as a share of total disposable income—and this thesis aspires to scrutinize this elevated position. By employing both a macro- and a micro-oriented approach, we conclude that the debt ratio has a limited value both as a descriptive measure of historic events, and as a prescriptive indicator of future development. We believe that in order to justify an approach to monetary policy that weighs financial imbalances equally against the traditional target variables of inflation and resource utilization, practically useful predictors are a necessity. Unless the debt ratio can offer tangible input into the monetary decision-making process—and we believe that it cannot— the Riksbank would be better suited to focus on achieving its traditional goals. There are more effective alternatives to tackle increasing household debt levels, than a policy rate which affects all aspects of the economy. As such, the main tool available to a central bank is a broadsword. What is needed is a scalpel.

"My preference is for the Federal Reserve to be the systemic risk regulator, because the responsibility for identifying and limiting potential problems is a natural complement to its role in monetary policy."

-Henry Paulson, US Secretary of the Treasury (2006—2009)

"Monetary policy itself cannot sensibly be directed at reducing imbalances."

-Timothy Geithner, US Secretary of the Treasury (2009—2013)

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1. Introduction

The monetary policy debate—in Sweden and abroad—has in the post-2008 era focused more and more on the potential buildup of financial imbalances caused by rising household debt levels, and to what extent central banks should play a role in tackling these potential threats (Taylor 2009; Bernanke 2012). In recent years, the Executive Board of Governors at the Swedish Riksbank has been split into a Majority faction, advocating a hawkish monetary policy to counter the buildup of household debt, and a Minority faction, advocating a dovish policy in order to better meet the central bank's inflation and resource utilization targets (Sveriges Riksbank 2014c).

Central to this debate are various measures used to evaluate household debt, and most significantly the frequently utilized debt ratio (Sveriges Riksbank 2013c; 2014b). This thesis examines the practical usefulness of the debt ratio as a measure of financial imbalances, by considering macro level data illustratively and anecdotally, as well as econometrically. These macro studies are then nuanced further by exploring the debt dynamics from a micro level perspective.

By employing an anecdotal approach to macro data, we highlight some of the difficulties with using the debt ratio as a practical tool for decision-making. We proceed to econometrically establish the extent to which the debt ratio correlates with adverse economic development. By using an ex ante approach, rather than the common practice of an ex post approach (Flodén 2014a; Svensson 2014a), we estimate the usefulness of the debt ratio as a prescriptive indicator for future economic development. In other words, we seek significant patterns in a data sample that includes years of stability as well as years of stress, rather than identifying a set of historical financial crises in order to offer a descriptive explanation to the chain of events. Finally, we wrap up our macro approach by examining the merits of one of the more feasible alternatives to the debt ratio—the debt-to-real assets ratio—in order to investigate whether a completely balance sheet-based measure might be better served to explain the resilience of households.

By reframing into a micro level approach, we use data to examine current Swedish debt trends across income segments, and draw conclusions on how these apply to the overall dynamic of the nationally aggregated debt ratio. We consider the extent to which increases in the national debt ratio has translated into increased overall vulnerability for households and the economy.

We conclude that the debt ratio is a limited predictor—although superior to many of its alternatives—when employed at the macro level, putting its usefulness as a practical tool for

policy decisions into question. As such, we find it hard to justify the Riksbank Majority's approach to monetary policy, since the predictors available of financial imbalances seem unable to offer sufficiently concrete input to the process. The debt ratio's central role in the monetary policy debate is therefor also dubious. Further, we find at the micro level that persistent increases in the national debt ratio have not been matched by widespread increases in vulnerability among most segments of Swedish households. We have, however, identified a dangerous trend where high-income earners—who represent a large fraction of the total debt volume—are becoming increasingly vulnerable, but in absolute terms these households are still resilient.

The interest rate is a blunt instrument, affecting all aspects of the economy. To the extent that increasing household debt—measured by the debt ratio or otherwise—threatens financial stability, a micro-oriented approach with targeted interventions seems more likely to offer a suitable alternative. This would enable the Riksbank to focus more effectively on meeting its traditional targets variables of inflation and resource utilization.

2. Background

2.1 Debt Measures of Financial Imbalances

"What gets measured gets done"

-William Thomson, Lord Kelvin

Within the debate on household indebtedness there is a general problem with a lack of uniformity and consistency in definitions and indicators, especially when it comes to analyzing the problem of over-indebtedness (Hedborg 2013, p. 56). Some efforts have been made, most notably by Davydoff et al. (2008), to create a common operational definition of over-indebtedness to be used for policy decisions, but the debate is still fragmented. In general, there are three ways to measure debt: administratively, subjectively, and quantitatively. Examples of administrative measures are statistics on arrears and debt settlements. Subjective measures mainly include asking individuals and households to what extent they themselves feel over-indebted (Davydoff et al. 2008; Hedborg 2013). However, this thesis focuses predominantly on the quantitative approach, considering aggregated ratios on households' cash flows and balance sheets.

There is a multitude of measures[1] used when assessing financial imbalances caused by household debt, in addition to significant disparities in how these indicators are determined and calculated (Davydoff 2008; Hedlund 2013). We believe that there is a tendency among participants in the academic debate to use diverging premises in a way that creates confusion and a lack of cohesiveness in the discourse, a problem which we highlight in section 3.3.

However, the overwhelming tendency of the Riksbank Majority is to use a quantitative indicator called *the debt ratio* when discussing household debt (Jansson, 2013; Sveriges Riksbank 2014b). This thesis aims to examine the usefulness of the debt ratio as an indicator of future contracted growth or financial crises, and to scrutinize the extent to which it deserves its central role in the monetary debate.

2.1.1 The Need for Financial Indicators to Be Practically Useful

We believe that the central role of indicators of financial imbalances is to offer input to the decision-making process. The assumption being, that if a measure cannot deliver accessible input that can be used in a practical manner to influence policy decisions, then it should not be taken into consideration at all in this particular context. Impressive attempts have been made to develop

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[1] Davydoff et al. (2008: pp. 39) mention thirteen frequently employed indicators.

indicators of imminent financial crises to be utilized in this manner (Kaminsky and Reinhart 1999; Borio and Lowe 2002; Schularick and Taylor 2012), but the main problem with using predictors in policymaking has been neatly summarized by Bank of England Deputy Governor, Charles Bean (2003, p. 22):

> A key issue is, of course, the identification of threatening imbalances before they grow too large. But without the wisdom of hindsight, it is often hard to identify those that pose a real threat, as rapid debt accumulation or large asset price movements may be a rational and justified response to changes in the economic environment

The debt ratio is a central part of the Swedish monetary debate, and its practical usefulness for policy decisions must be established in order to justify its dominant role.

2.1.2 Definitions of Used Debt Measures

The main quantitative indicator for household financial imbalances used in this thesis, and in the Swedish monetary debate in general (section 3.3), is the debt ratio, which is defined as:

$$Debt\ ratio = \frac{Household\ debt}{Disposable\ income}$$

Two other quantitative measures of financial imbalances are used or referred to in this thesis: namely, the debt-to-real assets ratio and the debt service ratio.

$$Debt\ to\ real\ assets = \frac{Household\ debt}{Real\ assets}$$

$$Debt\ service\ ratio = \frac{Service\ cost\ of\ debt}{Disposable\ income}$$

Household debt is defined as the aggregated total debt of all households in a country. In Sweden, approximately 81 percent of total household debt is made up by mortgages, making housing prices central to the debt debate. (Winstrand and Ölcer, 2014). Real assets are defined as the aggregate of all households' non-financial assets, such as dwellings and land. Disposable income is the aggregate of all households' income after taxes. The service cost of debt is traditionally defined either as interest payments and amortizations or as only interest payments.

2.1.3 Current Debt Levels within Swedish Households

Since the mid-90s, the Swedish debt ratio has increased steadily, from around 90 to 170 percent, and the Swedish Riksbank projects a continued increase of another couple percentage points in the upcoming years (Sveriges Riksbank 2013b). However, Swedish household wealth has increased significantly during the same time period. In the same time span, household wealth, in total assets as a share of disposable income, has risen from below 300 to above 600 percent (Hedborg 2013). The leverage ratio of Swedish households is high as well, and when compared to major Swedish corporations only H&M has a more solid leverage ratio (Svensson 2013a). In addition, household savings have been high for several years, enabling them to increase their buffers against financial stress (Hedborg 2013).

Figure 2.1 – The Swedish Debt Ratio   Figure 2.2–Debt Ratio Compared Across Countries
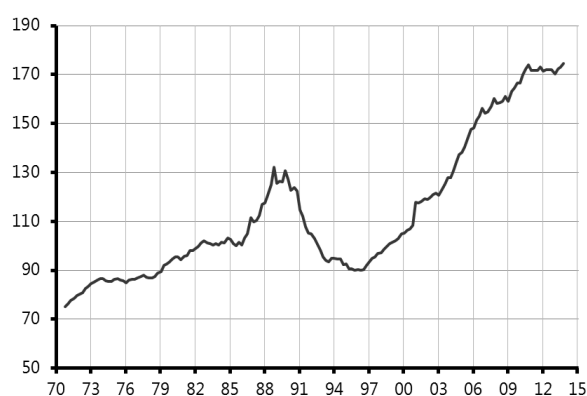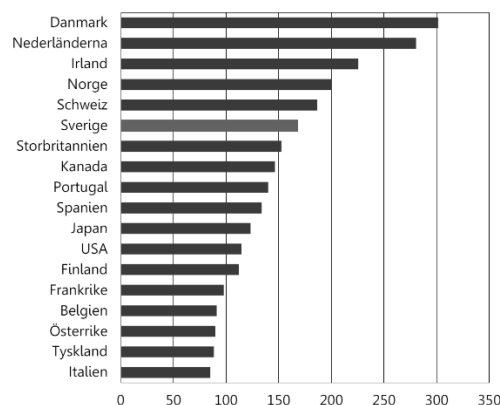
Source: reproduced from Winstrand and Ölcer (2014) (left) and Sveriges Riksbank (2013d) (right)

These trends in the national aggregate give a mixed report on Swedish household finances. To make a clear cut assessment of their future resilience might be difficult, but aggregate asset- and debt levels seem solid (Hedborg 2013, p. 68–70). The European Union's cross-country evaluation on households' ability to make ends meet lists that only 2.9 percent of Swedish households have significant problems, compared to the member state average of 11 percent (Eurostat 2012).

Further, there has been a steady rise on the ratio of debt-to-real assets during the last decades, as demonstrated in Figure 2.3.

Figure 2.3 – The Swedish Debt-to-Real Assets Ratio
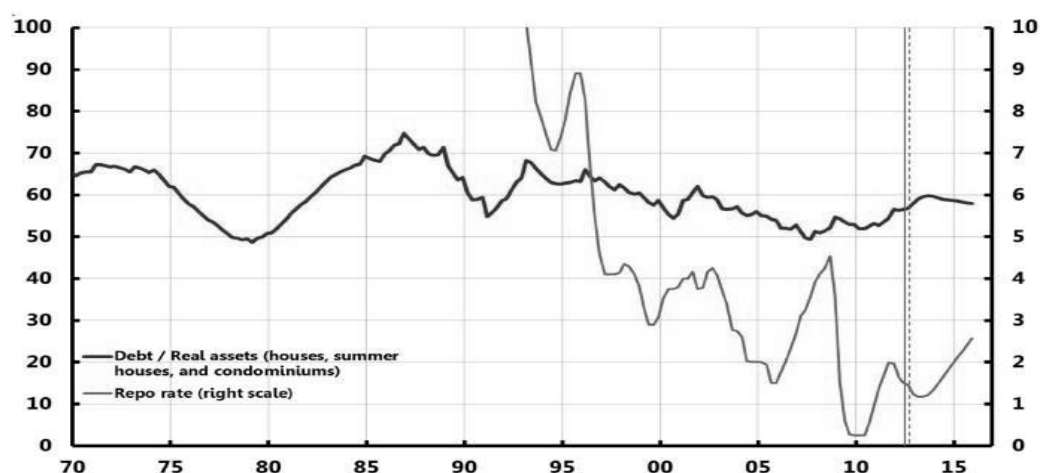
Source: reproduced from Svensson (2013d)

2.1.4 The Extent to Which Debt Matters at All

As a starting point it is important to establish whether high levels of household debt constitute a significant financial imbalance at all. If domestic debt did not matter, then the many nuances surrounding the opposing views within the Riksbank on the importance of financial imbalances in monetary decisions would become irrelevant. The interest rate path's effect on debt accumulation, the fundamentals of the Swedish real-estate market and the most suitable role for the central bank in addressing these issues would all seize to be important, since increasing household debt would not be related to economy-wide hazards.

However, there is wide-ranging support in existing literature for the view that household debt has a role to play in the creation and aggravation of financial crises (Fisher 1933; Minsky 1986; Jonung et al. 2009; IMF 2012; Schularick and Taylor 2012; Jorda et al. 2013; Alsterlind et al. 2013). However, the academic consensus is not absolute: former Riksbank Deputy Governor, Lars E. O. Svensson, has questioned whether high levels of household debt actually resulted in contracted consumption and increased unemployment in the 2008 global financial crisis (Svensson 2014a; 2014b). This critique has in turn been met by his successor at the Riksbank, Martin Flodén, (2014a, 2014b), who concludes that—despite being generally sympathetic to Svensson's more dovish monetary position[2]—household debt does indeed seem to be relevant .

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[2] See section 2.2.2 for a discussion on the policy positions of the voting members of the Swedish Riksbank.

As a result of this overwhelming body of research, it is a general premise of this thesis that household debt can indeed serve as a financial imbalance leading to reduced consumption or financial crises.

However, not all financial crises seem to have an equally strong correlation to household indebtedness (Niemira 2004). As we show in figure 2.3 below, the Swedish real-estate bubble of the early 90s was preceded by a very strong buildup in household debt. GDP then shrank significantly when the bubble burst, after which the debt ratio stabilized at a much lower level. The global financial crisis of 2008 also saw a steady increase in the debt ratio, from around 110 to 150 percent in a 5-year period, followed by a significant GDP contraction. The major difference between these two real-estate driven recessions seems to be that the former real-estate bubble burst locally in Sweden, while the 2008 crisis originated in the US (Crotty 2009; Claessens et al. 2010). In contrast, the IT-bubble of the early 2000s constituted mainly of a crash on the stock market. The pre-crisis buildup in household debt was much more limited in this case.

Figure 2.4 – The Swedish Debt Ratio in Relation to Changes in GDP
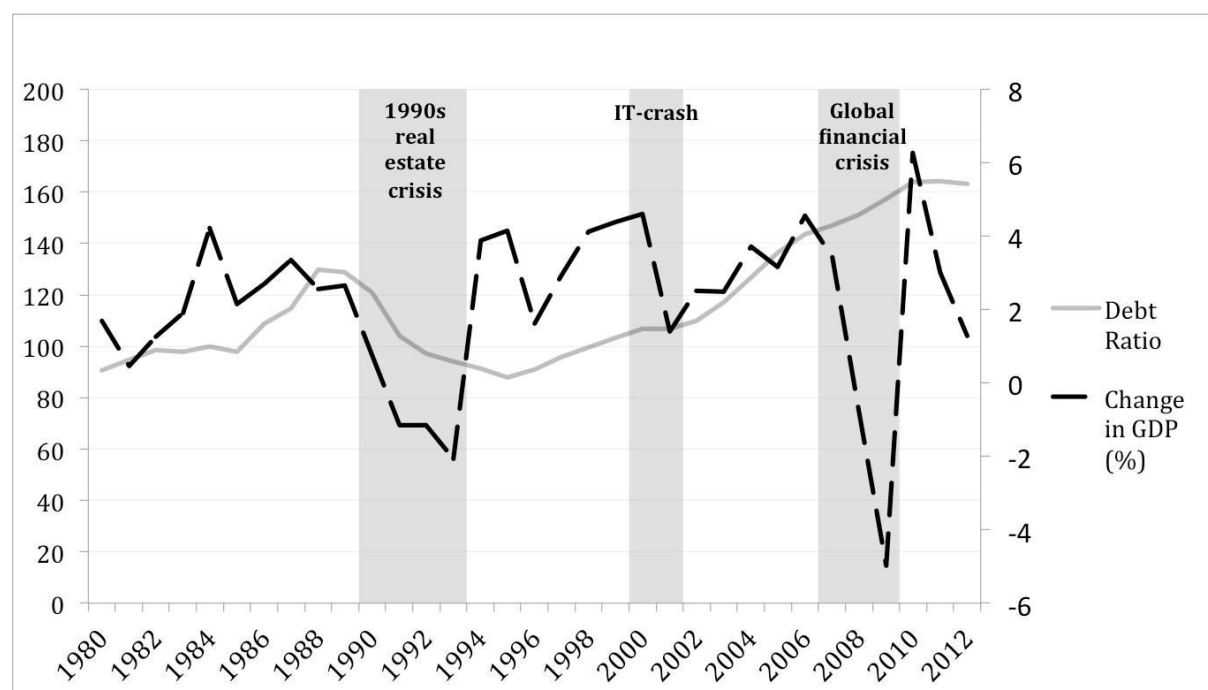
Data source: OECD and Sveriges Riksbank

In conclusion, our starting point is that household debt does matter in the creation and aggravation of financial crises, but not for all types of crises equally. Some crises are not driven by household debt. As a whole, this merits further studies of the topic of household debt, and its most frequently used measure: the debt ratio.

2.1.5 The Debt Ratio

The dominant measure for evaluating financial imbalances perceivably caused by household indebtedness is the so called debt ratio, as we establish in section 3.3. The intuition for the debt ratio is that high levels should imply that households are vulnerable to financial stress—since they have large loans in relation to their incomes—which would both increase the risk that a crisis occurs and aggravate the crisis when it finally does (Sveriges Riksbank 2014b).

In sections 5–8 we use an econometric approach to investigate the extent to which the debt ratio correlates with various measures of crisis in order to determine its statistical usefulness. In this subsection, however, we expand upon the problems connected to using the debt ratio as a practical tool, by using a more anecdotal approach to the evidence derived from our data.

2.1.5.1 Anecdotal Observations on the Debt Ratio's Predictory Abilities

Figure 2.5 – Pre-2008 Crisis Debt Ratios in Relation to Average Changes in GDP
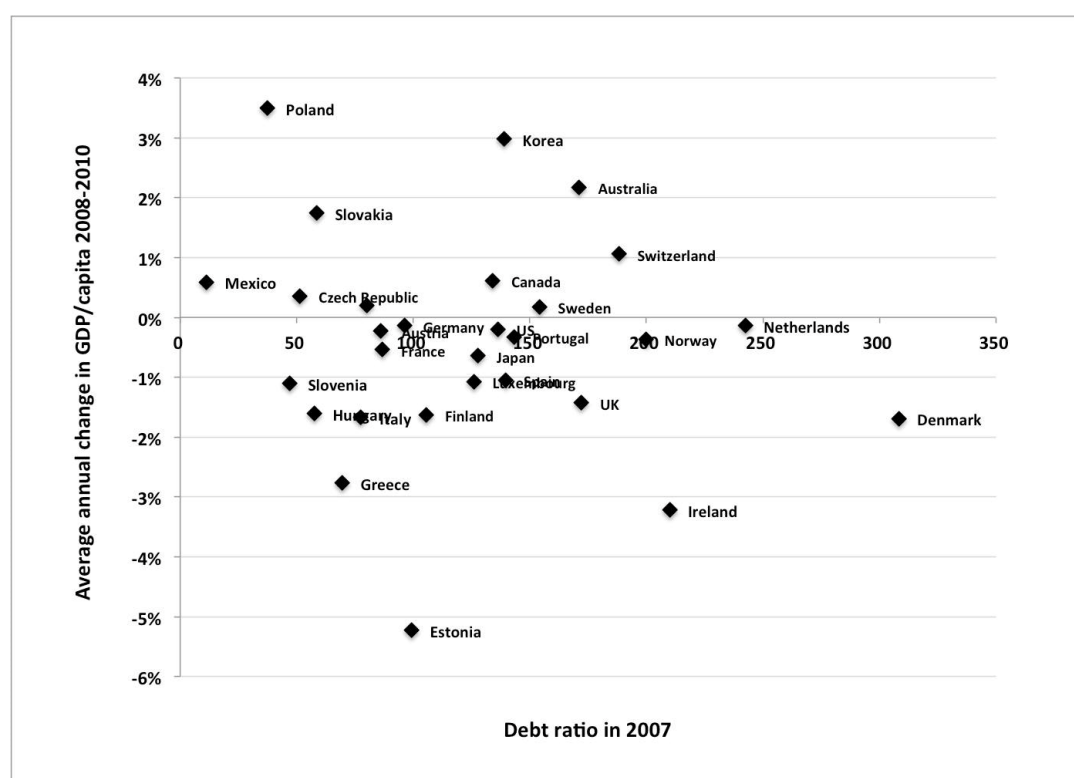
Data source: OECD

As we show in figure 2.5, a country's pre-crisis level of debt ratio seems unable to, even in an approximate manner, predict the coming GDP contraction of a looming crisis. Countries like Poland and Slovakia did indeed show both low pre-crisis debt ratios and solid post-crisis growth

rates. Conversely, Ireland and Denmark have had very high pre-crisis debt ratios and sluggish recoveries. But this relationship is by no means a clear-cut one. Many countries with relatively low pre-crisis debt ratios, such as Greece, Slovenia and Hungary, have had outdrawn recessions. Australia and Switzerland had relatively high pre-crisis debt ratios and rebounded quickly, whilst the Netherlands' very high debt ratio led to a comparatively mild recession and a stable recovery. Given this rudimentary approach, data seems unable to show an ironclad correlation between the debt ratio and crisis magnitude. Even if we recognize the debt ratio as a reasonable measure of financial imbalances, these empirics alone give us little information on how different countries could have expected their situation to develop during the global financial crisis. As mentioned in section 2.1.1, it is imperative to establish the practical usefulness of an indicator. For the debt ratio to be justified as input in monetary policy decisions, it must help us to identify reasonably clear guidelines.

When Svensson (2014a) puts forth a similar conclusion, by using other measures for crises and financial imbalances, Flodén (2014a; 2014b) answers the claim that the debt ratio lacks explanatory power by showing that the relationship between the debt ratio and his measures for crises improves significantly when cleared for additional omitted variables[3].

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[3] Namely, debt ratio growth pre-2007, current account pre-2007 and consumption growth pre-2007.

Figure 2.6 – Changes in Pre-2008 Crisis Debt Ratios in Relation to Average Changes in GDP
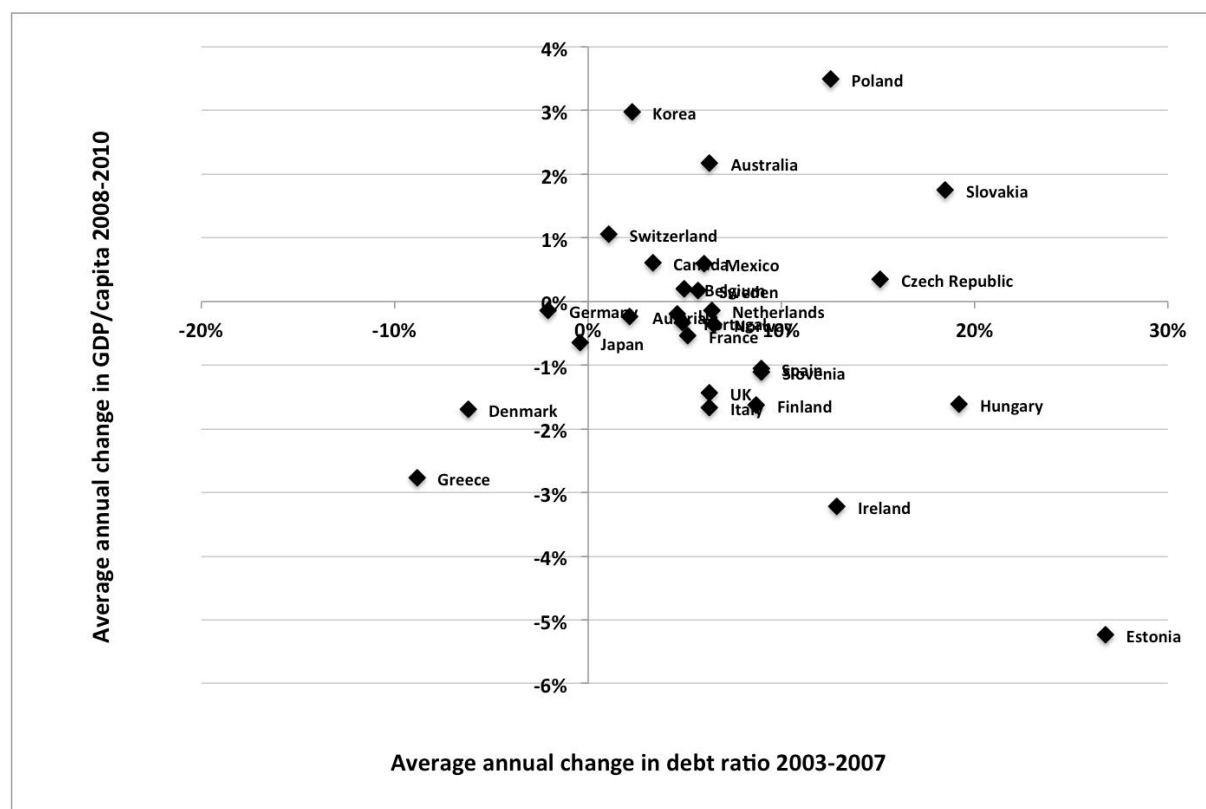
Data source: OECD

In figure 2.6, we observe the same problem when considering *fluctuations* in the debt ratio, as we did in figure 2.5 with absolute debt ratio levels. Although Flodén (2014a; 2014b) has suggested that such buildup effects could be relevant, substantial hikes in the debt ratio immediately before a crisis also seem unable to clearly predict the severity of a recession. Greece was reducing its household debt ratio—from already low levels—and was still hit among the hardest in the global financial crisis. This makes it obvious that household debt held little explanatory value for Greece's deep recession. Only three countries—Estonia, Hungary and Ireland—had both swiftly increasing debt levels and severe economic contraction. However, countries with both rapid pre-crisis increases in household debt and fast recoveries tended to have very low pre-crisis debt, as was the case for the Czech Republic, Poland and Slovakia.

Most countries were a part of the pre-2008 trend of steadily increasing debt ratios, but this trend in itself seems to have been without clear post-crisis ramifications. These observations would imply that rapid changes in the debt ratio have limited ability in themselves to forecast the magnitude of an imminent recession. Regardless of this, changes in the debt ratio will be considered in our more rigorous econometric work in sections 5–8, since it is possible for this variable to increase the explanatory power of the debt ratio as a whole.

The usefulness of the debt ratio does, however, based on this anecdotal approach, in its simplest form, seem to be limited as an indicator for imminent economic crises.

2.1.5.2 Potential Reasons for the Debt Ratio's Inability to Predict Crises

Assuming, as established in section 2.1.4, that household debt is an important force in the creation and aggravation of financial distress. Then why does the debt ratio seem unable to act as a decent predictor for the occurrence or magnitude of household driven financial crises? There can of course be several different explanations to this:

The debt ratio in its raw form could be too unsophisticated to be used as a predictor, and would need to be complemented by additional variables in order to offer useful practical input to the policy discussion (Flodén 2014a; Flodén 2014b). Using more complex econometric regressions to detect omitted variables and improve the explanatory value of the debt ratio is part of what this thesis aspires to in its econometric work in sections 5–8.

Another factor limiting the debt ratios ability to descriptively explain historic crises could be that of spillover effects (Masson 1998; Cheung et al. 2010). A financial crisis in one country could originate in another, making the pre-crisis debt situation in the first country less important as a risk predictor. In 2007, Estonia had a debt ratio of 99 percent and a government debt to GDP of 4 percent. Similarly, Spain's 139 percent debt ratio was slightly lower than Sweden's, and its national debt was only at 36 percent. Both countries suffered deep recessions, despite their low-to-moderate debt levels. The 2008 financial crisis originated in the US and had significant spillover effects on other nations, regardless of the already prevalent debt problems in these countries (Crotty 2009; Claessens et al. 2010). This severe risk of spillover effects would imply that maintaining conservative debt levels could have only limited effect in preventing the occurrence of a crisis.

Country-specific structural factors could also limit the debt ratio's usefulness as a predictor. The debt ratio's inability in cross-country analysis to indicate the relative magnitude of a coming crisis, as illustrated in figures 2.5–6, implies that the same level of debt ratio could provide diverging information on financial imbalances when present in different countries. For example, Australia performed significantly better than the United Kingdom in the post-crisis period, despite having an equivalent pre-crisis debt ratio. This could be explained by omitted variables, as per Flodén's (2014a; 2014b) approach above. But it could also be due to significant country-specific

institutional and structural differences—composition of the labor force, legal system, cultural factors etcetera—which affects a country's innate ability to address household debt (Wilkinson 1996; La Porta et al. 2008; Crotty 2009). An example of a structural difference which could make cross-country debt ratio comparison more difficult is the micro composition of debt holders in different countries. As we discuss further in section 9.2, the debt burden could be carried by differently resilient segments of the society and by varying shares of the population. The actual composition of the national aggregate of the debt ratio casts further doubt on the viability of the national aggregate debt ratio.

Figure 2.7 – Swedish Pre-Crisis Debt Levels and Post-Crisis Increases in Unemployment
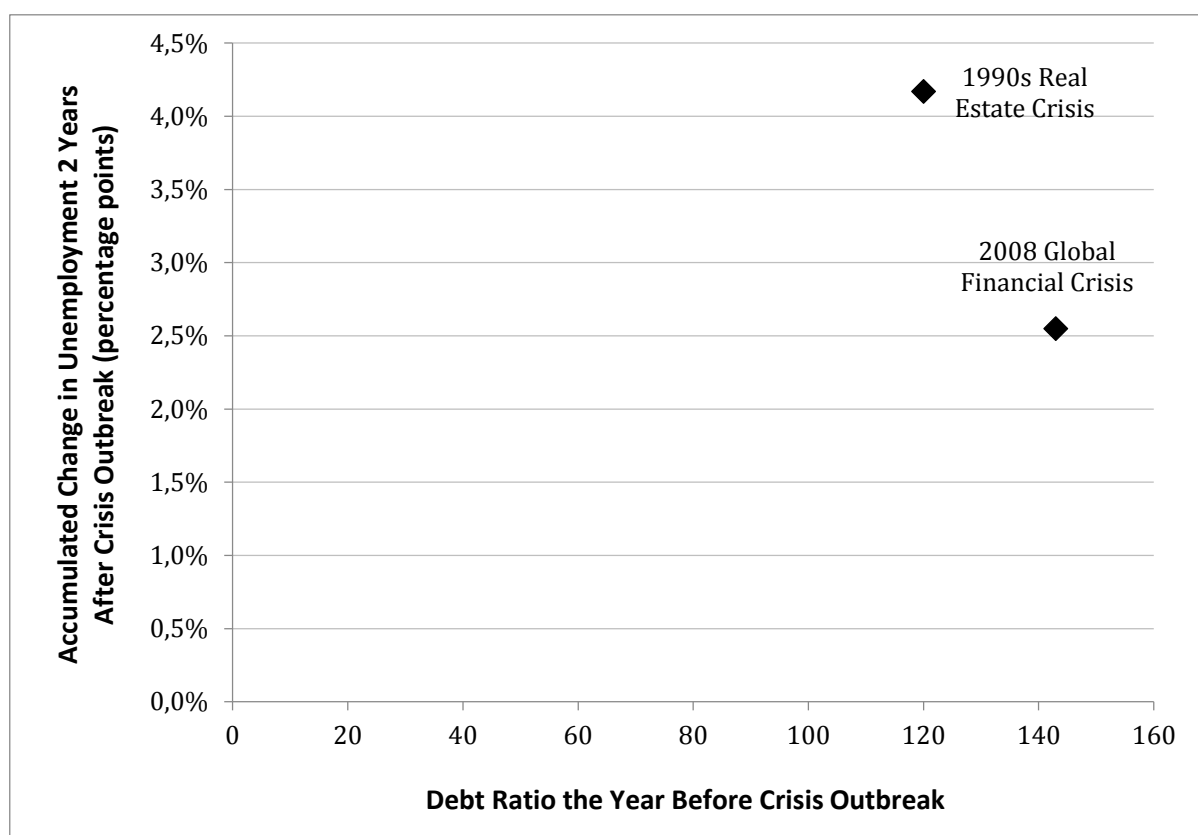
Data source: Statistics Sweden

The structural country-specific factors could vary significantly over time, making it difficult to use historical debt ratio data as a predictor for future development. Considering the same country, but before different real-estate crises and in different time periods, we see that the debt ratio differs significantly in relation to the seriousness of the following crisis. As we see in figure 2.7, did a certain level of Swedish debt ratio in 1993 lead to vastly higher unemployment than a similar ratio in 2007. If we accept that the variation in explanatory power of the debt ratio—across countries and over time—is affected by both structural factors and omitted variables, we also need to recognize that both of these can evolve over time. Institutions and the structural

composition of the economy change over time (Caballero and Kingston 2009), and unless we are able to anticipate these changes in country-specific factors, we might be unable to adapt our predictions with the debt ratio in order to anticipate future consequences. This reasoning of continuously evolving structural factors goes roughly with the conclusion of Assenmacher-Wesche and Gerlach (2010), when they state that historical empirics on household debt levels may have very limited ability to explain future events.

Problems with omitted variables, spillover effects, and country-specific structural factors that evolve over time all contribute to make it more difficult to use historical debt data as an indicator of future debt driven crises. Many of these problems need to be accounted for.

This all comes back to the usefulness of the debt ratio as a practical tool. Even if household debt is an important factor in the buildup of financial crises, the debt ratio needs to deliver relevant interpretable input on future developments in order to be considered in monetary policy decisions. Schularick and Taylor (2012) reached the conclusion that debt measures, for all their flaws, still are valuable predictors of future crises. Bean (2003) and Svensson (2014b) has argued the opposite. Regardless, decent measurability is a minimum requirement to justify their use, as captured by frequently used statement from Svensson (2013d):

What gets measured gets done.

2.2 The Monetary Policy Debate

2.2.1 The Swedish Riksbank

The Swedish central bank, the Riksbank, has maintained political independence since 1999, has presided over the nation's current main funds rate—the Repo rate—since it was created in 1994, and is ranked among the world's most transparent central banks (Eijffinger and Geraats 2005). The bank's deciding body—the Executive Board—is made up by the governor and his five deputies, with each board member having a single vote for policy rate decisions. The Riksbank is charged with two main responsibilities, which henceforth will be referred to as the bank's *primary goal* and *secondary goal*. No formal prioritization is provided between these goals in the bank's charter and steering documents[4]. The primary goal of the Swedish Riksbank is to maintain stable price levels while maximizing the sustainable level of resource utilization and economic output. In practice, this translates into maintaining a two percent inflation target, while keeping high, stable levels of employment and economic growth. The secondary goal of the Riksbank is to maintain financial stability, a responsibility it shares with the Ministry of Finance, the Financial Supervisory Authority and the National Debt Office. Systemic financial imbalances caused by household indebtedness, and measured primarily by the debt ratio, are a key example of something that could arguably be covered by this secondary goal. As we will observe in section 2.2, it is possible for the Riksbank's two responsibilities to be at odds with each other.

The Executive Board of the Riksbank has, in the aftermath of the financial crisis, been split into a more hawkish majority faction and a more dovish minority faction—henceforth referred to as *the Majority* and *the Minority*—with the former advocating a judgment-based policy framework that weighs both of the bank's goals more equally, and the latter a simpler approach more focused on the primary goal.

2.2.2 The Division within the Riksbank Executive Board of Governors

The underlying cause for the division within the Executive Board has been a difference of opinion on how monetary policy should be conducted in order to best fulfill the bank's macroeconomic objectives (Flodén 2013; Jansson 2013; Svensson 2013a; Jansson and Skingsley 2014), and in time the debt ratio would come to seize a very central role in this debate. According to the Board's voting history (Sveriges Riksbank 2014c), the first signs of a more permanent split appeared in early 2009. From that point, former Deputy Governor Lars E. O. Svensson forms the Minority by

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[4] The central banks responsibilities are formulated in Riksbankslagen chapter 1 §2 and Regeringens proposition 1997/98:40

consistently voting for a lower interest rate path than the remaining board members, and reserving himself against the Majority opinion.

The Minority would continue to vote and advocate for looser monetary policy, and it still does as of April 2014 (Sveriges Riksbank 2014d). As a reaction to gradual rate increases being enacted throughout 2010, Karolina Ekholm chose to join the Minority in June 2010, causing the Executive Board to become more or less permanently split along faction lines. Throughout 2011 the Minority opposed all Majority-proposed rate increases in periodic 2-to-4-votes decisions. Similarly, the Minority continued to oppose the Majority when they reversed their position in the end of 2011, on grounds that their proposed rate reductions were not radical enough. This pattern continued in 2012 and early 2013, with the Majority pushing through modest reductions or keeping the policy rate unaltered, and the Minority consistently advocating a more dovish position. Typically, Svensson advocated an even lower interest rate path than his co-Minority member, Ekholm. In mid-2013, Lars E. O. Svensson and Barbro Wickman-Parak were both replaced in the Executive Board by Martin Flodén and Cecilia Skingsley. However, Flodén seems to have joined the Minority position, and Skingsley the Majority position (Sveriges Riksbank 2014c), leaving the voting patterns of the Board intact.

Figure 2.8 – Post-Crisis Levels of the Swedish Repo Rate
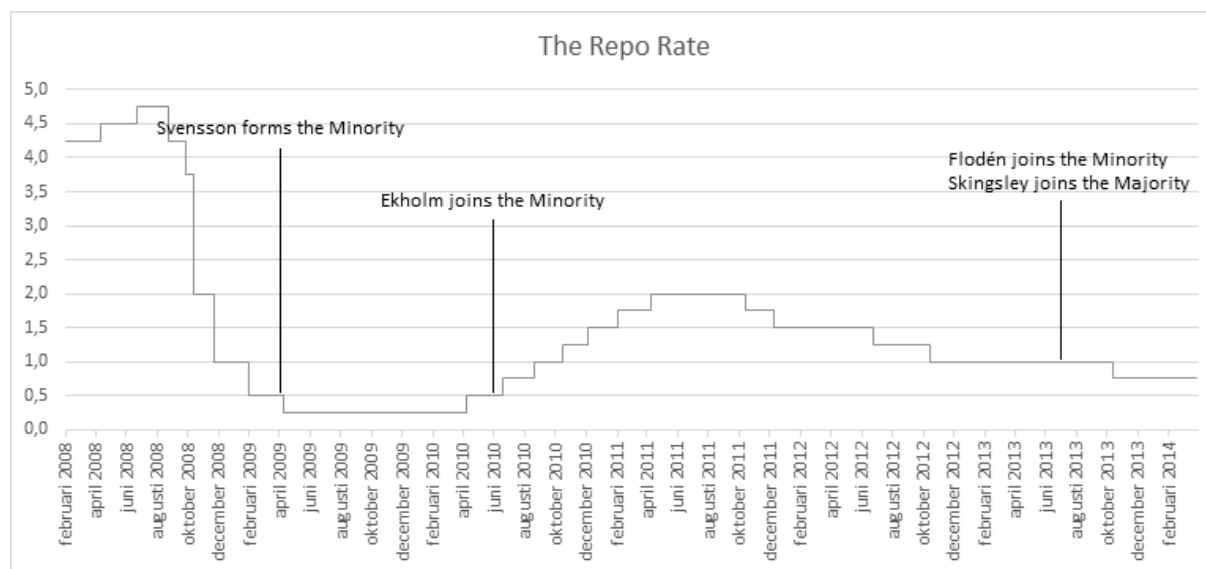
Data source: Sveriges Riksbank

The division within the Riksbank has been highly publicized by media, both in Sweden and abroad. Sweden's leading business newspaper, Dagens Industri, wrote about the opposing positions within the Executive Board more than a hundred times between June 2009 and April 2014 (Dagens Industri 2014). Other leading Swedish newspapers, such as Dagens Nyheter, Svenska

Dagbladet, Expressen and Aftonbladet have in the same period of time written about the Board's division more than 80, 200, 40 and 30 times respectively (Dagens Nyheter 2014; Svenska Dagbladet 2014; Expressen 2014; Aftonbladet 2014). The issue has even received international traction. Most notably, Nobel laureate Paul Krugman (2013, 2014) has written two blog posts at the New York Time's webpage, criticizing the hawkishness of the Swedish Riksbank, as well as giving a presentation on the subject at the Skagen Funds Conference in Stockholm, January 2014. As time has passed, the issue financial imbalances caused by household indebtedness, as measured by the debt ratio, has taken an increasingly central role in this public debate.

It would take some time for an organized and consistent position to materialize within the Majority. According to Svensson (2013d; 2014a) himself, the Minority went through significant efforts from the start to present a consistent and logical reasoning, meanwhile it has been much more difficult to follow the line of thought of the Majority. Svensson mentions two occasions—a press conference in November 28, 2013 and a parliamentary hearing in March 6, 2014—where the Riksbank Governor, Stefan Ingves, in Svensson's opinion, refuses to present a clear theoretical justification for the Majority view (Svensson 2014d; Svensson 2014e; Svensson 2014f). In both cases, Ingves deflects direct questions regarding his position on the Minority's main argument: that monetary policy does not affect household indebtedness in real terms in a significant manner. Instead he answers in a very general, and arguably out-of-the-point, manner. After initially offering a more fragmented opposition to looser monetary policy, the Majority would eventually center upon the issue of looming household debt as their main counter-argument. The debt ratio has since become a central premise to this argument through its role as the measure of choice when considering financial imbalances, as we show in section 3.3.

The disagreement within the Swedish monetary debate, as it relates to household debt, can be summarized into three separate issues: firstly, whether the fundamentals of the Swedish real-estate market are sound; secondly, whether monetary policy can affect real debt levels in the long run; and thirdly, whether the Riksbank is the governmental agency most suited in addressing these problems effectively and efficiently (Svensson 2013d). None of these issues are settled with finality.

This thesis, however, focuses on a fourth, smaller but related, issue: the practical usefulness of the debt ratio as an indicator of economic development, and its role within the monetary debate.

3. Existing Research - An Opposing Theory Perspective

"My bottom line is that monetary policy should react to rising prices for houses or other assets only insofar as they affect the central bank's goal variables - output, employment, and inflation."
– Janet Yellen, Chairwoman of the US Federal Reserve[5]

There exists a vast amount of previous research within this field, so we have chosen to focus primarily on the theory which is currently most frequently employed by the opposing sides of the monetary debate, in order to create an opposing theory-survey of relevant existing research. In this section we begin by mapping out the diverging decision models for monetary policy used by the Majority and Minority, since these guide and determine what research and theory they afterwards have chosen to lean upon. Thereafter, sections 3.1 and 3.2 give account of the theoretical foundations of the Majority and Minority view respectively. Section 3.3 serves to show the extent to which the debt ratio dominates the academic debate.

The two factions within the Executive Board represent two largely opposing theoretical viewpoints on monetary policy, the current fiscal situation and the most effective role of the Swedish central bank. Central to this brisk debate is that the Minority and the Majority, even according to their own admissions (Svensson 2014d; Sveriges Riksbank 2014b), utilize diverging thought processes when gathering theoretical and empirical support for their respective positions on monetary policy decisions.

The Minority's reasoning leans heavily upon prediction models focusing primarily on the central bank's three target variables: inflation, unemployment, and output (Ekholm 2014; Svensson 2014d). By largely refuting the comprehensive, judgment-based process employed by the Majority, they present a much clearer thought process. The baseline of the Minority' decision framework can be summarized by this section's opening quote by Janet Yellen, and it has been the predominant global approach within pre-crisis monetary policy theory (Sveriges Riksbank 2014b). We will therefore refer to it as *the traditional monetary policy decision-making process*, where predictions regarding the central bank's target variables remain completely central.

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[5] 9-27-2005, Conference on US Monetary Policy at the European Economic and Financial Centre.

Figure 3.1

Traditional monetary policy decision-making
process without consideration for financial imbalances

| Interest rate path | → | • Inflation
• Resource utilization | → | Target achievement throughout the prognosis period |
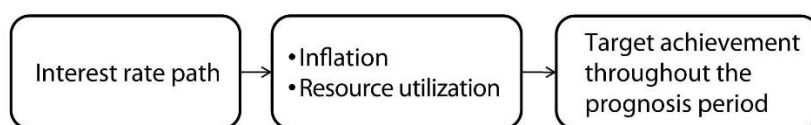
Source: Sveriges Riksbank (2014b)

The Majority, however, has in the post-crisis era elaborated on this framework and moved toward what they refer to as a *comprehensive judgment-based decision-making process*. The idea is to, in addition to the official target variables, also consider the buildup of financial imbalances in the household sector when making monetary decisions. In the current debate, these imbalances are predominantly considered through the lens of the debt ratio by both advocates and detractors of this newer view (section 3.3). The result of this new framework is a weighted approach, where conflicting interests—such as when achieving the secondary goal require the enactment of policies which hurt the primary goal—might have to be weighed against each other when determining the interest rate path.

Figure 3.2

Comprehensive judgment-based monetary
policy decision-making process with
financial imbalances taken into account
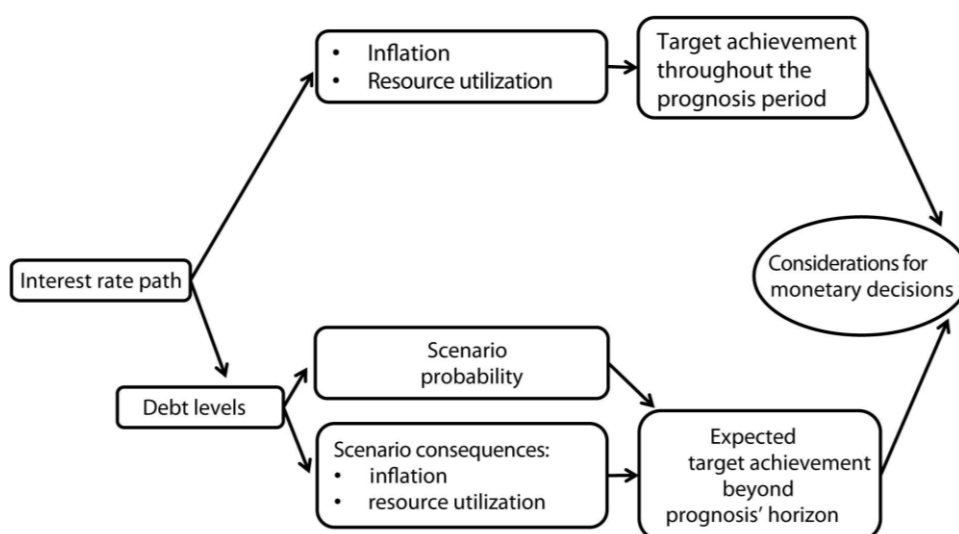
Source: Sveriges Riksbank (2014b)

A result of the diverging thought processes is that the Majority's theoretical foundation has become more fragmented than the Minority's (Sveriges Riksbank 2014b, p. 12). The comprehensive decision-making framework rests upon a wider variety of theoretical arguments and lines of thought than only the pure target variable prognoses which are central to the traditional approach. Some of the extended inputs are not as easily quantifiable as traditional prediction models for inflation and unemployment, which has led to criticisms that their reasoning has become too fragmented and that their new input variables are too irrelevant or unspecific (Svensson 2012b; Krugman 2013). The Majority's counter-claim is that the dominant pre-financial crisis doctrine of strict adherence to target variable modeling obviously served us poorly, and that a more balanced approach will be more effective in preventing or alleviating future crises (Sveriges Riksbank 2013b). The debt ratio becomes central here, since it is the main tool used when considering imbalances in this comprehensive framework.

In this thesis we adhere to the popular assumption, maintained by all sides of the debate, that there exists a strong, direct link between household debt and real-estate prices. Since a vast majority of the domestic debt burden is in the form of mortgages, increases in household debt directly reflects increases in house prices and vice versa. In order to limit our scope, we have only indirectly surveyed research focusing primarily on house prices, in order to look more closely on studies on debt. However, we recognize that these issues are intimately interlinked.

The rest of this section constitutes an effort to survey the academic theories used to support the Majority (3.1) and Minority (3.2) positions respectively within the monetary policy debate. The final section maps out the extent to which different debt measures are being used in the debate (3.3).

3.1 The Theoretical Foundation of the Majority View

> "When interest rates are low people borrow more money"
> – Stefan Ingves, Governor of the Swedish Riksbank[6]

As mentioned above in section 3, the Majority's comprehensive decision-making framework is destined to result in a more fragmented theoretical base than would a strict adherence to traditional target variable modeling. In short, however, the Majority position can be summarized by a sentiment frequently expressed by Stefan Ingves, and which is quoted above. The central

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[6] 11-28-2013, press conference on the release of the report Finansiell stabilitet 2013:2.

intuition is that low interest rates will inevitably incentivize households to borrow more money, increasing household debt levels, which in turn constitutes a risk for long-term financial stability (Jansson 2013).

The theoretical foundations for the Majority view is primarily available in the form of the central bank's bimonthly monetary report, *Penningpolitisk rapport*, and its annual summary, *Redogörelse för penningpolitiken*. The Riksbank conducts the majority of its modeling and empirical studies with its DSGE model Ramses, and these predictions make up the core of what is presented in the Riksbank's extensive publications. In addition, several point studies made by the Riksbank have touched, directly or indirectly, upon the subject of household debt and the central bank's role in handling financial imbalances. Further, some theoretical support for their view can be derived from the Majority members' statements in the Executive Board's meeting protocols, as well as the excerpts of their public speeches.

A recent Riksbank study on monetary policy effects on household debt (Sveriges Riksbank 2014b; p. 42–6) gives the most extensive survey of the Majority's theoretical view on the central issues of the monetary debate. The study works through several main points. It concludes that it is not only the real interest rate that affects household debt levels, but also households' expectations on future rates. Further, monetary policy can only affect real rates in the short term, and if households believe rate changes to be temporary they will have little effect on household debt. The study also gives an account of the additional theory the Majority leans on for supporting its view. In order to do predictions on interest rates' effect on household debt levels, the Riksbank employs—as a complement to the Ramses model—the equilibrium model developed by Walentin (2013) as well as the VAR-model for small, open economies created by Laséen and Strid (2013). Further, a notable sentiment of the study is a recurring statement that empirical predictions made on historical data in general tend to be very uncertain,[7] and as such have limited usefulness. The piece goes on to briefly answer Svensson's (2013b) critique of the Riksbank's "leaning against the wind"-policy. They claim that the relationship Svensson shows—that raising the repo rate actually increases, rather than decreases, household debt levels—lacks support in empirical data. In their conclusion they empathize that the Riksbank is but one tool available to tackle rising household debt levels, but that other agencies are needed as well in order to be effective. This last sentiment has been expressed by members of the Majority on several other occasions (Jansson 2013; af Jochnick 2014).

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[7] In his speech 06–07–2013, Deputy Governor Per Jansson (2013) elaborates on the uncertainty of prediction models even further.

Important additional contributions to the Majority framework are made by two Riksbank studies on household debt, one published in the monetary policy report from July 2013 (Sveriges Riksbank 2013b, p.42–8) and the other in the 2013 annual policy summation (Sveriges Riksbank 2014b, p.11–3). These studies present the Majority's reasoning behind their more comprehensive, judgment-based approach to monetary policy. In short, they believe that to only take the target variables—unemployment, inflation and output— into account in their prognosis would be an oversimplification of reality, since monetary policy today threatens to create financial imbalances beyond the bank's three-year prediction scope. Inflated household debt caused by today's monetary policy could in the future lead to a financial crisis or severely reduced consumption, if house prices were to fall. There are two different issues here: firstly, high debt levels might increase the risk for a financial crisis to actually occur, and secondly, high debt levels could act as a damage multiplier once problems start. Some theoretical justification exists for both. According to Schularick and Taylor (2012), consistent increases in borrowing slightly increases the probability of a financial crisis. Likewise, Mian et al. (2011) and Dynan (2012) show that high levels of household debt multiplies the consumption reduction caused once housing prices start to fall. As a result of these studies, the Majority believes that a more comprehensive approach to monetary policy, taking into account additional factors such as long-term interest rates expectations from households and banks, needs to be employed.

The Majority's opinion is further strengthened by a study conducted by White (2009) of the Federal Reserve Bank of Dallas, which states that monetary policy should be more focused on preventing the buildup of financial imbalances than reacting to them in retrospect. The argument made is that simply reacting to changes in the economy ex post is a short-term approach that is inferior to the proactive approach of restraining the buildup in the first place.

The Riksbank's exhaustive Memorandum no. 6 to the Stability Council (Alsterlind et al. 2014) summarizes another central piece of the Majority's reasoning: the risks connected to Swedish households' faulty long-term expectations on interest rates. Consistently, households tend to believe in a lower interest rate path than the central bank, which could lead to forceful downward corrections of real-estate prices in the future that would then harm the macro economy. A caveat presented here is that Sweden suffers from a low degree of construction as well as high levels of domestic savings, two factors which both lower these risks. The memorandum leans heavily on the works of Englund (2011) and Claussen et al. (2011) in pushing this line of thought.

This is but a brief survey of the extensive material available in support of the Majority perspective. We now turn to the Minority viewpoint.

3.2 The Theoretical Foundation of the Minority View

An important thing to consider is that the Minority view has been argued much more frequently in recent times in academic publications, especially within Sweden itself. However, having their views more aggressively published than the opposition does not in itself give the Minority right—since absence of evidence is not evidence of absence—but we believe that it increases the burden of proof on the Majority even further. Since the Majority currently presides over policy decisions, and their opposition makes their case so forcefully, it is up to them to justify their judgment-based approach.

Former Riksbank Deputy Governor, Lars E O Svensson, has written extensively for the Minority position regarding the subjects that go to the core of the current Swedish monetary debate. Svensson (2013b) shows mathematically that the recent Riksbank policy of "leaning against the wind"[8]—a central piece of the Majority's more hawkish position—actually has increased, rather that decreased, real household debt levels by reducing nominal price levels and GDP more than nominal debt levels. He concludes that the Riksbank's slightly tighter monetary policies therefore have not only reduced output, increased unemployment and kept inflation below the inflation target, but they have also increased financial instability by inflating the debt ratio. He states that ". . . the Riksbank has not presented any analysis of debt dynamics that supports its case" (p. 3) and by achieving the opposite of what was intended the bank has failed to deliver on both its primary goal of price stability and resource utilization *and* its secondary goal of stability in the financial markets. In doing so, he believes that "it is difficult to find any justification for the Riksbank policy."(p. 4) Svensson uses the Riksbank's own DSGE model, Ramses, in this paper for his predictions on inflation and GDP.

Further, Svensson (2013e) has written on the dangers of consistently undermining the two percent inflation target. If inflation expectations remain at the pronounced target, but actual inflation significantly deviates from that target, the Philips curve becomes non-vertical. This creates a large unemployment cost with undershooting the target, and by doing so consistently since 1997 unemployment in Sweden has been 0.8 percentage points higher than necessary for a long time. Svensson uses 1997 as his starting year since this is the point from which he considers the targeting policy of the Riksbank to be credible and normalized (2013e, p. 26).

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[8] The leaning against the wind principle describes a tendency to cautiously raise interest rates, even beyond the level necessary to maintain price stability over the short to medium term, when a potentially detrimental asset price boom is identified (Financial Times Lexicon, 2014)

Svensson (2012b) has also written on the importance for the central bank to solely focus upon its measurable target variables, much in the spirit of the Janet Yellen-quote at the start of section 3. Household debt, housing prices or the policy rate itself should not be considered independent variables. The gradual shift of the Riksbank to include other resource utilization measurements than the unemployment gap is troubling, since most of measures have large measurement errors and are less relevant. He highlights the conceptual and practical confusion between monetary policy and financial stability-policy, calling an integration of the two "inappropriate" (p. 1). A main takeaway is that inconsistency in employed measures hurts the bank's transparency and credibility.

Riksbank Deputy Governor, Martin Flodén (2014a, 2014b), has written on whether the level of household debt mattered in the great recession. Although Flodén belongs to the Minority and advocates a looser monetary policy, he still concludes that high and increasing levels of household debt indeed are contributing risk factors to financial crises when prevalent in an economy. As such, it is justified for the central bank, the Financial Supervisory Authority and the government to study these developments in order to try and determine whether the debt levels are sustainable. Flodén makes no judgment on the current Swedish situation, but is satisfied with determining that debt levels need to be studied further.

In its 2014 report on the Swedish mortgage market, the Financial Supervisory Authority (Finansinspektionen 2014) addressed many of the issues surrounding the fundamentals of the Swedish real-estate market, highlighted by both Flodén (2014a) and by members of the Majority (af Jochnick 2014). Their conclusion is that the recommended 85 percent loan-to-value requirement for new mortgages is enforced by all major banks and that amortization is up over the past two years. Households have good margins, and for the second year in a row (Financial Supervisory Authority 2013) their stress tests show that they are, in general, well prepared for interest rates hikes and income losses. The total amount of new mortgages supersede that of the total amortizations, leading to a net increase in debt, but the bulk of the new debt is carried by a small section of the households that previously had much lower LTV-levels to begin with. This will be discussed further in the micro analysis in section 9.

On the subject of interest rates' effect on the household debt levels over time, Sten Hansen (2013) writes that the increases in the Swedish debt-to-disposable income ratio over the past two decades can be largely explained by structural factors, such as increased ownership, later entry into the labor force and abolished or reduced inheritance, wealth, and real-estate taxes. Low

interest rates seems to explain only a small fraction of the increases in the debt ratio, and he concludes that these increases would most likely have occurred even under a tighter monetary regime.

Further, in a study on the extent to which central banks have the responsibility to work against the buildup of financial imbalances, Charles Bean (2003) of the Bank of England concludes that focus should not be diverted from the inflation target, even if there is a plausible threat of financial imbalances due to increasing household debt.

Assenmacher-Wesche and Gerlach (2010) gives a similar critique as Svensson (2013b) against the "leaning-against-the-wind"-approach, when they argue that tighter monetary policy in response to financial imbalances only threatens to substantially depress real growth. They also conclude that "standard measures of financial imbalances contain little information useful for future economic conditions, and reacting to them is likely to result in large output losses."(p. 473) In other words, they believe household debt levels to be poor predictors of future financial crises.

3.3 The Debt Ratio's Dominance and The Use of Different Measures in the Debate

The debt ratio is the by far most frequently used measure of financial imbalances in the Swedish monetary policy debate, as well as in academia. The members of the Riksbank Majority (Jansson 2013; af Jochnick 2014) as well as the central bank's own publications (Sveriges Riksbank 2013a; 2013b; 2013c; 2013d; 2014a; 2014b) are predominantly focusing on household debt in relation to disposable income. A limited amount of the Riksbank publications, such as their extensive Memorandum no. 6 (Alsterlind et al 2013) and their recent micro study (Winstrand and Ölcer 2014), do maintain a slightly wider focus in terms of what financial predictors they consider, but the dominant trend to lean upon the debt ratio is very clear. Another measure that does carry significant weight with the Majority opinion, however, is real housing prices (Jansson and Skingsley 2014). Even Minority members Martin Flodén (2014a; 2014b) and Lars E. O. Svensson (2014a; 2014b) have occasionally considered the context of household driven financial crises from the perspective of the debt ratio.

When other measures than the debt ratio are utilized to examine household debt, they are most frequently found within the Minority viewpoint. For example, Lars E. O. Svensson has repeatedly used other measures in order to present his arguments. Svensson has focused on measures such as real debt, debt-to-GDP, loan-to-value ratio (Svensson 2013b), debt-to-real assets (Svensson 2012a) and debt-to-total assets (Svensson 2012a) in order to nuance the debate.

Departing from the Swedish context, we note that the US Federal Reserve System frequently employs the debt service ratio when debating the topic of household debt (Bricker et al. 2012). Similarly, the merits of pure cash flow measures such as the debt service ratio—as opposed to the mixed debt ratio—have been argued by reports like the one by Davydoff et al. (2008). Other academic work employs the use of housing prices as a measure of indebtedness (Kuttner 2012), while some turn to the debt-to-GDP ratio (Assenmacher-Wesche and Gerlach 2010).

In sum, the debt ratio is by far the single most frequently used measure of household debt, both in the academic debate and the policy debate. We believe that this heavy bias towards one measure requires further scrutiny in order to justify its appropriateness and usefulness as a predictor of economically adverse development.

4. Contribution of Thesis and Limitations of Scope

4.1 Contribution of Thesis

A general assumption of this thesis is that the Swedish monetary debate, as it relates to financial imbalances, would benefit from being more coherent, in order for participators and decision makers to be able to define and pursue the most effective monetary policy. We want to contribute to the streamlining of this debate by econometrically examining the merits of the most frequently employed debt-based predictor for adverse economic development—the debt ratio—, as well as one of its main alternatives—the debt-to-real-assets ratio. By examining how the increases in the debt ratio on the national aggregate have translated into actual changes in the micro level debt dynamics, we further nuance the way in which measures of financial imbalances can be practically employed in decision-making.

As a result, we are able to draw conclusions regarding the role of the debt ratio, provide input on how to further streamline the premises of the debate and bring some clarity to the role of financial imbalances in monetary policy decisions.

4.2 Limitations of Scope

In general, three major questions constitute the Swedish monetary debate (Svensson 2013d): the fundamentals of the Swedish real-estate market; the ability of interest rates to affect real long-term debt levels; and what agents are most suited in addressing potential imbalances.

We have chosen to only approach these issues indirectly, and limit ourselves to a fourth aspect: the quality and the usefulness of the tools employed in the debate itself. The merit of this approach is that it allows us to contribute to the discussion, without presuming to pass judgment on some of the more complex core-issues.

The findings presented in this thesis are mainly limited to the domestic context. That is, we estimate the usefulness of domestic levels of the debt and debt-to-real assets ratios in relation to domestic financial crises. A national central bank has limited ability to control international economic development and will always be a victim of spillover effects from global economic conditions. Thus, our empirical testing attempts to single out the effects from international economic conditions on the domestic economy in order to accurately estimate the effect of domestic household debt on domestic adverse economic development. By doing so we try to

estimate the usefulness of these measures in an accurate manner, without the risk of obtaining results that are significantly biased due to international noise.

There exist a multitude of quantitative measures for financial imbalances, as well as several administrative and subjective indicators. We have, however, limited ourselves to the study of the debt ratio and the debt-to-real assets ratio. The debt ratio is the dominant predictor used in this context (section 3.3), and is therefore easily justified. We have elaborated conceptually (section 5.2.2) on our choice of the debt-to-real assets ratio for our comparison, but there are certainly several other measures that could arguably have been chosen instead. On the micro level we have focused primarily on the debt ratio due to availability of data.

5. Model Specification

The following section provides a model for empirical testing of the usefulness of the domestic debt ratio and the domestic debt-to-real assets ratio as predictors for adverse domestic economic development. In constructing the model we draw from previous research conducted by Minority member Martin Flodén (2014b), by applying some of the variables included in his main regression function.

5.1 Measures of Financial Crises

In order to estimate the usefulness of our two employed debt measures as predictors for adverse economic development, we first need to clearly define what we mean with such developments. We do this by looking to Flodén (2014b), who includes four separate economic indicators for financial distress in his model. We have chosen to employ three of these as our measures of adverse development: percentage change in real GDP/capita; percentage change in the unemployment rate; and percentage change in household consumption. We have omitted the fourth measure used in Flodén's model: changes in property prices. In doing so we would argue that our scope becomes broader than that of Flodén's study, which focuses primarily on the Great Recession of 2008. It is possible that any type of crisis or recession could affect property prices, but our judgment is that such a measure would more often only be influenced by more severe financial crises. Omitting property prices makes our model more inclined to measure general adverse development instead, rather than full-blown crises. For the debt ratio to be a practical tool for analysis of future events, we believe this property to be important.

5.2 Measures of Household Debt

5.2.1 The Debt Ratio

We have chosen to test the predictory ability of the debt ratio, since it is the most frequently use predictor for financial imbalance. We will compare it against a feasible alternative predictor, as justified in the following subsection.

5.2.2 A Justification for the Use of the Debt-to-Real Assets Measure

In order to test the usefulness of the debt ratio we need to contrast it against the most feasible alternative measure available. Thus, we offer a conceptual approach—Figure 5.1—on the manner in which we believe household debt affects economic stability.

Figure 5.1

Theory for two-staged process of household driven financial crisis

Stage 1   Stage 2

Household cash flows start to collapse

(debt service-to-disposable income ratio deteriorates)

Forced to sell assets to clear debt; real estate prices start to go down

Household balance sheets begin to collapse

(debt-to-real assets ratio deteriorates)

Result 1 – Mass-defaults on mortgages; banks start to fail

Recession or full-blown financial Crisis

Result 2 - Consumption reduction

In Stage 1 of our framework, household cash flows collapse, due to various factors reflected in the debt service ratio, limiting their ability to service their outstanding debt. This would force households, which could not meet their debt obligations, to sell their homes in order to clear their debt, causing housing prices to deteriorate. In Stage 2 of the process, national aggregated household balance sheets would start to deteriorate, as reflected by the debt-to-real assets ratio, as a result of collapsing real-estate prices but static debt levels.

The first potential result would be an extreme case, where sufficient deterioration in household balance sheets would trigger a financial crisis, as mass-defaults on mortgages would threaten the stability of the financial markets.

A second, potentially harmful result of this process—less dire but considered more likely (Alsterlind et al. 2014)—, would be a significant reduction in household consumption. In Stage 1, lower disparities between disposable income and debt service costs would give households smaller financial margins to consume (Davydoff et al. 2008; Svensson 2014d), which in aggregate would reduce demand and slow down the economy.

Consumption theory also explains how this consumption contraction would be aggravated even further in Stage 2 as a result of shrinking asset values (Hofmann 2003): many borrowing-constrained households require their homes as collateral in order to consume using credit, causing them to moderate their consumption patterns when asset prices start to fall; changes in property prices may affect households perceived life-time wealth, causing them to change their

spending plans in order to smooth consumption over their life-cycle; and property prices affect the value of bank capital, directly and indirectly, influencing their willingness to extend loans to consumers.

The debt ratio is a mixed measure, which borrows from both cash flow and balance sheet elements. However, we want to examine the extent to which pure cash flow and pure balance sheet measures hold a better predictory ability of household driven financial crises than the debt ratio. Limited availability of data has excluded the possibility to test the debt service ratio's ability to predict crisis, and thus we have chosen not to perform any econometric tests related to Stage 1 and the collapse of households' cash flows. We will, however, test Stage 2 and the collapse of household balance sheets, by exploring the ability of the debt-to-real assets ratio to predict future economic development. By comparing the debt ratio—a mixed cash flow and balance sheet measure—with the debt-to-real assets ratio—a pure balance sheet measure—we can evaluate the merits of separating or mixing different elements.

As such, we believe the debt-to-real assets ratio to be the most feasible alternative to the debt ratio.

5.3 The Ex Ante Approach

As opposed to most previous research conducted on the area of financial crises (Flodén 2014b, Mendoza et al. 2008) our model applies an ex ante approach. That is, we do not attempt to identify a set of financial crises and then formulate an explanation as to why they occurred. Rather, we include a set of observations collected from a time period where both years of crisis and economically stable years are included. Consequently, the results will be more applicable in terms of evaluating the usefulness of the debt ratio and the ratio of debt-to-real assets as *predictors* for financial crises.

5.4 The Nature of the Dependent Variable

The crises measures used in the model are in the form of the change in the respective variables, rather than the absolute level of it, e.g. "Δ Real GDP/capita" is used instead of "Real GDP/capita". The intuition behind this decision is that we aim to investigate the propensity of the dependent variable to behave adversely given a certain level of household debt, rather than the expected level of the dependent variable given a certain level of household debt. Returning to the example of applying real GDP/capita, the β-coefficient obtained from such a regression would be interpreted

as the second order derivative of real GDP/capita with respect to household debt and time –
defined by the debt ratio in this example – i.e. as follows below:

$$\hat{\beta} = \frac{\partial^2 \ (real\ GDP\ per\ capita)}{\partial(debt\ ratio)\partial t}$$

An additional aspect justifying this choice is that we have observed a general trend towards
positive growth in real GDP/capita among our sample countries during the specified time period.
This approach allows us to clear for the long-run trend in GDP growth, since the dependent
variable will represent the yearly deviations from the long-run change.

5.5 Controlling for Other Factors

In order for the results obtained from our main model to be as accurate as possible we need to
control for other factors that also might be able to explain the occurrence of financial crises. We
categorize these factors into the following three groups: buildup effects, country-specific factors
and time-specific factors. The following subsections will run through these at greater detail.

5.5.1 Buildup Effects

The factors that we have decided to name buildup effects are controlled for by the introduction of
the following three variables: average change in household debt over the five years preceding the
year of observation; average current account balance over the five years preceding the year of
observation, and average net savings rate over the five years preceding the year of observation.
The two former of these three variables are directly borrowed from Flodén's (2014b) study on
financial crises, whilst the latter one is our own addition. The reasoning behind the inclusion of
these variables is that economies tend to expand heavily in terms of leverage, capital inflow and
consumption patterns prior to a financial crisis (Borio and Disyatat 2011). Hence, it is not the
absolute level of household debt alone that is important in predicting crises, but also the rate of
increase and the general level of expansion of the economy as a whole. For example, an economy
with a high household debt is likely to be faced with a lower risk of financial crises if the debt
levels are decreasing and the economy in general displays contractive tendencies, compared to if
the opposite tendencies are prevalent. In other words, the buildup tendencies of an economy call
for consideration as well.

5.5.2 Country-specific Factors

Since our sample of observations is derived from a set of 26 different countries there will most likely be country-specific factors at work that need to be accounted for. Some economies might be more vulnerable to financial imbalances than others due to a poorly functioning financial system for example. Thus, we cannot simply pool all our observations into one vast set of observations without accounting for national differences. However, since the specifics and details of these of national differences are difficult to identify we chose not to introduce control variables based on them, e.g. we do not introduce a variable that controls for how well functioning the financial system of each country is. Rather, we simply control for the fact that our observations are derived from different countries with different levels of propensity towards financial crises. In doing so, we chose between two alternatives: to introduce 25 country specific dummy variables that would account for these factors, or to use a fixed effects regression model – rather than a random effects model – to account for the same factors. In order to keep the main regression function as simple and clear as possible we decided on the latter alternative.

5.5.3 Time-specific Factors

Apart from country-specific factors there might also be intra-national time-specific factors at work, e.g. the fact that the global economic climate differs from year to year. Such differences certainly affects our dependent variable in a manner that might incur a confounding relationship between domestic household debt and national financial crises unless accounted for. In order to disentangle these global, time-specific factors, from the domestic level of household debt we introduce a dummy variable for each year in the time-span, apart from the baseline, year 2005. Year 2005 is chosen as the baseline due to the fact that the economic climate that year was more stable than was the case in 2008 or 2009. By introducing these dummy variables we control for the effects in our crisis measure that might for example result from a global financial crisis, such as the one experienced in 2008. It might seem counterintuitive to "control for financial crises" when financial crises actually are the one thing our model attempts to explain. However, if we revisit the main limitations of this paper, controlling for global economic conditions does not seem particularly odd: our model is formulated in order to test the effect of the different measures of *domestic* household debt on *domestic* financial crises. Thus, controlling for intra-national time-specific factors is a natural action.

5.6 Regressions

5.6.1 Main Regression

The above specifications of the model are now summarized in our main regression:

$$(1)\ Adverse\ Economic\ Devlopment = \alpha + \beta_1 Household\ Debt + \beta_2 \Delta Household\ Debt$$
$$+ \beta_3 CA + \beta_4 Net\ Savings + \delta_1 2004 + \cdots + \delta_5 2009 + v + e$$

5.6.2 Subordinate Regressions

Since we use three different measures of adverse development – ΔReal GDP/capita, ΔUnemployment and ΔHousehold Consumption – in the testing of two different measures of household debt – the debt ratio and the ratio of debt to real assets – we formulate six subordinate regression functions based on the main model. In order for the comparative testing of the debt ratio and the debt-to-real assets ratio to be as independent from external noise as possible we use a static approach when formulating their respective regression functions. That is, the only difference between the debt ratio regressions and the debt-to-real assets regressions is that we substitute the debt measure we seek to examine into the specific regression for the measure that we are not interested in testing in that specific regression. Naturally, the adhering buildup control variable – e.g. Δ Debt Ratio – is also substituted in depending on which debt measure we aim to test.

5.6.2.1 Debt Ratio Regressions

The subordinate regressions formulated for testing the debt ratio are as follows:

$$(2.1)\ \Delta Real\ GDP/Capita_{i,t,t+2} = \alpha + \beta_1 Debt\ Ratio_{i,t} + \beta_2 \Delta Debt\ Ratio_{i,t-1,t-5}$$
$$+ \beta_3 CA_{i,t-1,t-5} + \beta_4 Net\ Savings_{i,t-1,t-5} + \delta_1 2004 + \cdots + \delta_5 2009 + u_i + e_{i,t}$$

$$(2.2)\ \Delta Unemployment_{i,t,t+2} = \alpha + \beta_1 Debt\ Ratio_{i,t} + \beta_2 \Delta Debt\ Ratio_{i,t-1,t-5}$$
$$+ \beta_3 CA_{i,t-1,t-5} + \beta_4 Net\ Savings_{i,t-1,t-5} + \delta_1 2004 + \cdots + \delta_5 2009 + u_i + e_{i,t}$$

$$(2.3)\ \Delta Household\ Consumption_{i,t,t+2} = \alpha + \beta_1 Debt\ Ratio_{i,t} + $$
$$\beta_2 \Delta Debt\ Ratio_{i,t-1,t-5} + \beta_3 CA_{i,t-1,t-5} + \beta_4 Net\ Savings_{i,t-1,t-5}$$
$$+ \delta_1 2004 + \cdots + \delta_5 2009 + u_i + e_{i,t}$$

A further explanation to the chosen time-spans will follow in the next section.

5.6.2.2 Debt-to-Real Assets Regressions

The subordinate regressions formulated for testing the debt-to-real assets ratio are as follows:

$(3.1)\ \Delta Real\ GDP\ per\ Capita_{i,t,t+2} = \alpha + \beta_1 Debt\ to\ Real\ Assets_{i,t}$
$+ \beta_2 \Delta Debt\ to\ Real\ Assets_{i,t-1,t-5} + \beta_3 CA_{i,t-1,t-5} + \beta_4 Net\ Savings_{i,t-1,t-5}$
$+ \delta_1 2004 + \cdots + \delta_5 2009 + u_i + e_{i,t}$

$(3.2)\ \Delta Unemployment_{i,t,t+2} = \alpha + \beta_1 Debt\ to\ Real\ Assets_{i,t}$
$+ \beta_2 \Delta Debt\ to\ Real\ Assets_{i,t-1,t-5} + \beta_3 CA_{i,t-1,t-5} + \beta_4 Net\ Savings_{i,t-1,t-5}$
$+ \delta_1 2004 + \cdots + \delta_5 2009 + u_i + e_{i,t}$

$(3.3)\ \Delta Household\ Consumption_{i,t,t+2} = \alpha + \beta_1 Debt\ to\ Real\ Assets_{i,t}$
$+ \beta_2 \Delta Debt\ to\ Real\ Assets_{i,t-1,t-5} + \beta_3 CA_{i,t-1,t-5} + \beta_4 Net\ Savings_{i,t-1,t-5}$
$+ \delta_1 2004 + \cdots + \delta_5 2009 + u_i + e_{i,t}$

6. Data

In section 5, we outlined an econometric model for empirical testing of the debt ratio and the debt-to-real assets ratio. In this section we describe the data that has been used for the testing, and highlight important issues regarding its nature.

6.1 The Dataset

The data used in this study is a set of panel data from a sample of 26 OECD countries over a period of 13 years, from 1999 to 2012. Eight countries were dropped from the dataset due to a lack of records on their respective debt ratios: Chile, Denmark, Greece, Iceland, Israel, Luxembourg, New Zealand, and Turkey. Although it was possible to obtain a few years of data for some of these countries—e.g. Denmark—, this was not enough to result in a sufficiently sophisticated observation due to a certain aspect of our test: the inclusion of a variable representing the average change in the debt ratio over the five year period prior to the year of observation.

Further, when testing for the debt-to-real assets ratio, there was a need to drop additional countries from the set due to difficulties in obtaining data. Thus, the dataset for the testing of the debt-to-real assets ratio contains observations derived from only 12 unique countries. The reduced number of observations is understandably a source of measurement error when comparing the two measures. The problem is however somewhat overcome by the use of the fixed effects model, where country-specific factors are accounted for.

6.2 Sources and Data Issues

The single source used for obtaining the data is the statistical databases provided online by OECD. Since we only use one source for obtaining our data, we are vulnerable in terms of the legitimacy of that source. However, our judgment is that OECD is a sufficiently trustworthy to legitimize this approach. Further, the fact that all data is derived from one source reduces the risk of unnecessary errors due to different measuring conventions being applied by different organizations.

7. Methodology

In order to conduct our empirical tests we apply an econometric approach using the regression's functions specified in section 5. In this section we go into further detail on the econometric method used for these tests and the choices made during the process.

7.1 Endogeneity Problem

An ever-present problem when conducting empirical studies in the field of economics is that of endogeneity, or two-way causality. In order to avoid this, we attempt to be very cautious in the construction of our variables. The dependent variable is formulated as the accumulated change in the given crisis measure two years after year t, i.e. the year of observation. The independent test variable—the debt measure we aim to test—is constructed as the absolute level of debt one year prior to year t. The control variables making up the buildup category are all formulated as the average change in the given variable during the five years prior to year t. By using this approach we can, at the very least, achieve weak exogeneity in the form of sequential exogeneity. The intuition behind this is that a two-way causality is unlikely to be prevalent since the value of the dependent variable—observed two years after year t—is highly unlikely to be able to affect the value of the independent variables, since those values are observed in the years prior to year t.

7.2 Choice of Time-spans

The length of the time-spans assigned to the variables might at a first glance seem arbitrary since the buildup variables take into account the development during the five years prior to year t, whilst that five-year period is not replicated for the dependent variable which only observes the development two years after year t. However, this is not the case. Commencing with the five-year time-span assigned to the buildup variables, our judgment is that at least five years are required in order to fully observe the buildup tendencies of an economy. Including only two years might result in arbitrary values that do not account for the actual development. Further, it might be argued that only including two years in the time-span assigned to the dependent variable is not enough, based on similar reasoning. Our conclusion, from logic reasoning and from scrutinizing the empirical data in our set, is that a time-span of five years would smooth out the annual effects to such a high degree that statistical inferences would be both biased and incorrect if attempted. We thus chose to use the shorter time-span of two years in order to avoid this smoothing effect. Testing these two different time-spans for the dependent variable econometrically also gives us support in the decision.

7.3 Unbalanced Dataset

When avoiding the problem of endogeneity, by creating non-overlapping time-spans, we lose a set of observations that would otherwise have been usable. Since we have data beginning from year 1999, and we use five-year time-spans, the first year of observation is year 2004. Further, since we use a two-year time-span for the dependent variable—and the last year in our dataset is 2012—the last year of observation is 2010. This of course implies that our panel dataset is unbalanced, i.e. it does not contain observations for every variable, for every country, every year. However, since the reason that the set is unbalanced is not correlated with the idiosyncratic error term, but is rather an effect of our methodological approach, this is not a problem that needs to be adjusted. Had the missing data points instead been due to some hypothetical situation like some of the sample countries stopping to keep records on GDP, unemployment and household consumption, due to political turmoil or financial default, the unbalanced dataset would have been a problem, since the estimators would have been biased.

7.4 Testing for Autocorrelation

Using panel data with annual observations naturally implies a risk for autocorrelation between the observations. Refraining from testing for autocorrelation would result in the estimators for our test variables to seem more significant than is the case in reality. In order for our results to be more correct we clear for the disturbance caused by the possible autocorrelation. However, results from running our regressions both with and without clearing for autocorrelation are included in this thesis, the latter being attached to Appendix 1.

8. Empirical Results
8.1 Tables

Table I: The Debt Ratio when Controlling for Autocorrelation

	Δ Real GDP/Capita (2.1)	ΔUnemployment (2.2)	Δ Household Consumption (2.3)
Debt Ratio	-0.0007277 (0.0008858)	0.009621* (0.0057526)	-0.0021223* (0.0011047)
Δ Debt Ratio	0.1499276 (0.2632648)	0.0050749 (1.703213)	0.3139069 (0.3141196)
Current Account	0.0074754 (0.0068249)	-0.077748* (0.0442592)	0.0212251** (0.008256)
Net Savings	0.0116016 (0.0069983)	-0.1395952*** (0.0452599)	0.0133981 (0.0083369)
Year 2004	-0.1249055*** (0.0460598)	0.2759732 (0.2792021)	-0.0482437* (0.0281494)
Year 2006	0.0098131 (0.0176795)	-0.1050078 (0.1112844)	0.0140161 (0.0155479)
Year 2007	-0.0537395** (0.0225623)	0.2473065* (0.1431706)	-0.0316206 (0.0214329)
Year 2008	-0.0595075** (0.0238277)	0.3170948** (0.152028)	-0.026426 (0.0240806)
Year 2009	0.0205567 (0.022903)	-0.0821032 (0.1464784)	0.031456 (0.0240334)
Constant	0.079882 (0.0721828)	-0.3631661 (0.4543998)	0.2084002*** (0.0606665)
R-squared (within)	0.7190	0.6581	0.5802
Number of countries	25	25	25
Total number of observations	111	111	111

Standard errors in parenthesis

* $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table II: The Debt-to-Real Assets Ratio when Controlling for Autocorrelation

	Δ Real GDP/Capita (3.1)	Δ Unemployment (3.2)	Δ Household Consumption (3.3)
Debt-to-Real Assets	-0.0008595 (0.0017589)	0.0009205 (0.0115822)	-0.0027178** (0.0013212)
Δ Debt-to-Real Assets	0.8807912** (0.2894667)	-2.813597 (1.891741)	0.7766191*** (0.2210243)
Current Account	-0.0002015 (0.0068142)	-0.0260298 (0.0448377)	0.0107516** (0.005124)
Net Savings	0.0154841* (0.008136)	-0.0407176 (0.0534392)	-0.0035931 (0.0061443)
Year 2004	-0.2107058*** (0.0556034)	0.4675589 (0.3440994)	-0.1135744** (0.0481153)
Year 2006	0.0328008 (0.021141)	-0.0927227 (0.135546)	0.0182354 (0.0168359)
Year 2007	-0.0182466 (0.0282938)	0.2583993 (0.1827978)	-0.01797 (0.0221423)
Year 2008	-0.022217 (0.0296795)	0.3112222 (0.1925173)	-0.0088946 (0.0230254)
Year 2009	0.0454583 (0.029224)	-0.0550061 (0.1898314)	0.0293235 (0.0226097)
Constant	-0.0642615 (0.0519193)	0.359049 (0.3344578)	0.1124807*** (0.0408875)
R-squared (within)	0.8445	0.7446	0.7512
Number of countries	12	12	12
Total number of observations	54	54	54

Standard errors in parenthesis

* p<0.1, ** p<0.05, ***p<0.01

8.2 Analysis of the Results

We initially consider the debt ratio. In Table I we see that the debt ratio is significant on a 10 percent level when ΔUnemployment and ΔHousehold Consumption are applied as measures of financial crisis. However, the debt ratio is not found to be statistically significant in our model when ΔReal GDP/capita is employed as an alternative measure of crisis. Even if the debt ratio displays significance in two out of three cases, it is only at a 10 percent level. Intuitively this implies that making monetary policy decisions based on this measure of household debt might not be an ideal approach.

Secondly, we scrutinize the debt-to-real assets ratio presented in Table II. Running the regression with ΔHousehold Consumption as the dependent variable indicates—with 95 percent significance—that the debt-to-real assets ratio can be used as an indicator for financial crisis. However, if we consider the remaining two measures—ΔUnemployment and ΔReal GDP/capital—no statistical significance is found. Thus, making policy decisions based on the debt-to-real assets ratio is not desirable since household consumption is not the sole relevant measure of financial crisis.

Intriguingly, the R^2-values within the model are generally higher when the debt-to-real assets ratio is employed, compared to the level they reach when the debt ratio is used. This implies that our specified model—in its current state—is more applicable when including the debt-to-real assets ratio rather than the debt ratio. However, it should be noted that this could just be a coincidental occurrence derived from the fact that the number of observations and countries used in the debt-to-real assets regressions are reduced.

To summarize, neither the debt ratio nor the debt-to-real assets ratio seem to be able to perfectly and significantly explain the occurrence of domestic, economically adverse, development. Nonetheless, the debt ratio seems to be a slightly superior indicator compared to the debt-to-real assets ratio, since it was statistically significant when modeling two out of three crises measures, whereas the debt-to-real assets ratio only was significant in one of the three cases. In the following section we proceed to investigate the debt ratio further by applying a micro data approach pertaining to the Swedish case. The micro approach is taken in order to comprehend how the increase in national debt ratio—which has been considered a severely negative domestic trend in Sweden—has divided itself within different segments in the Swedish society. In doing so we will receive a clearer picture of the extent to which increased national debt ratios necessarily translate into a more destabilized economy.

9. Micro Data Approach to Debt Dynamics

We outlined and conducted econometric tests in sections 5–8 in order to evaluate the usefulness of the aggregated versions of the debt ratio and the debt-to-real assets ratio. However, an alternative approach to measures on the national aggregate is to examine individual and household data on the micro level. There are many potential gains with this approach, since it allows for a more detailed breakdown of the distribution of debt and wealth that can result in more accurate stress testing (Hedborg 2013; Finansinspektionen 2014; Winstrand and Öcel 2014). The current downside is that the availability of data is limited. To collect detailed micro data can be expensive and there are significant confidentiality issues involved with its release.

In recent times, three micro data studies on Swedish households, and parts of their data sets, have been released to the public. In May 2014, the Swedish Riksbank released a micro data analysis including debt data collected from Sweden's eight biggest banks. The report was released with a selection of its data presented in aggregates. In April 2014, the Financial Supervisory Authority released its fourth annual survey of the mortgage market, where the data sample covers newly acquired Swedish loans. The report also includes financial stress tests, although very limited amounts of actual micro data were made public. In November 2013, a large Swedish Government Official Report[9] on household indebtedness authored by Anna Hedborg (2013) with extensive micro data from the Enforcement Authority and Sweden's largest credit institute, UC.

The debt ratio, as well as an administrative measure of arrears with the Enforcement Authority, will be considered in this section. The debt-to-real assets ratio will, however, not be discussed due to a lack of relevant data.

The following sub-sections aim to demonstrate how a micro level analysis of household debt and the debt ratio can contribute to the debate and give nuance to the picture provided by the national aggregates. In sub-section 9.1 we present our own findings from the micro data, which is followed in 9.2 by a review and evaluation of some of the more important takeaways found in the existing research.

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[9] Statens Offentliga Utredningar, SOU

9.1 Authors' Findings Regarding Swedish Micro Level Debt Trends

Between 2010 and 2013 the debt ratio shrank for individuals with mortgages in the lowest two deciles of disposable income, but rose for everybody else. Most strongly the ratio grew in the 8th decile.

Figure 9.1
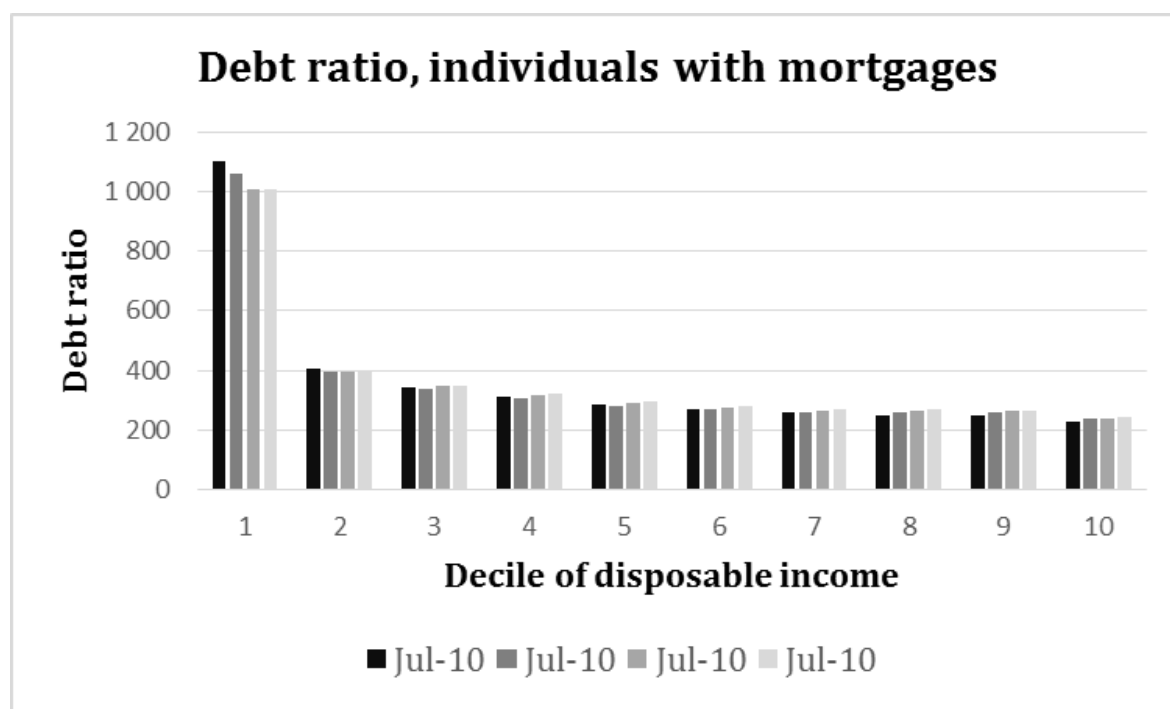
Source: reproduced from Winstrand and Ölcer (2014)

Examining debt ratio fluctuations from year to year, as shown in table 9.1, we have found that the fall in debt ratio for bottom-income individuals and the increase in debt ratio for top-income individuals seem to have begun to slow down and stabilize. Naturally the limited time-span of the data set makes definitive conclusions hard to draw.

Table 9.1

Change in debt ratio for individuals with mortgages, per deciles of disposable income									
1	2	3	4	5	6	7	8	9	10
2010-2011	-3.68%	-3.29%	-1.37%	-0.34%	-0.39%	-0.05%	1.44%	3.17%	4.41%	5.74%
2011-2012	-5.21%	0.90%	2.84%	2.47%	2.62%	1.71%	1.87%	2.15%	1.11%	0.83%
2012-2013	0.27%	0.88%	1.03%	1.78%	1.75%	2.22%	1.80%	2.27%	1.04%	1.07%
2010-2013	-8.45%	-1.57%	2.47%	3.95%	4.02%	3.93%	5.2%	7.77%	6.67%	7.76%

Data source: Winstrand and Ölcer (2014)

The general trend we have found, however, is that the debt ratio still increases for high-income individuals and decreases for low-income individuals.

According to the Financial Supervisory Authority (Finansinspektionen 2013; Finansinspektionen 2014) and Hedborg (2013), wealthy individuals are typically more resilient when tackling financial stress. Conversely, low-income households and individuals are statistically more likely to have financial problems and to default on their debt (Davydoff et al., 2008). The lowest quintile in both gross and disposable income are much more likely of being in arrears, with the second lowest quintile being less than half as likely to have financial troubles. The exception seems to be pensioner households, whom Kempson (2002) found to be less likely to be in debt regardless of having low incomes. Atkinson and Kempson (2006) found that the two segments that struggle the most are people with low incomes, and people with median incomes and large debt.

Figure 9.2

Different Income Groups' Percentage Share of Total Loans, by Size of Loan

Income Group	Without Loan	Small Loans	Medium Sized Loans	Large Loans
Decile 1	17	11	6	3
Decile 2	16	12	7	2
Decile 3	14	12	8	3
Decile 4	11	12	10	6
Decile 5	9	11	12	9
Decile 6	7	10	12	11
Decile 7	7	9	12	13
Decile 8	6	9	12	14
Decile 9	6	8	12	17
Decile 10	6	8	9	22

Source: reproduced from Hedborg (2013)

As shown in figure 9.2, the Swedish situation shows a clear trend with high-income households carrying the bulk of large loans, mid-income households the bulk of medium-sized loans and low-income households being lightly indebted or debt-free (Hedborg, 2013: pp. 72). This results in upper-income households carrying a much larger share of the total outstanding debt, and as a result it is of greater importance for overall financial stability that these households meet their financial obligations (Finansinspektionen 2013).

In order to determine default trends within income groups, we can use the arrears registry of the Swedish Enforcement Authority[10]—KFM—as an administrative measure for over-indebtedness. KFM has 368 443 unique individuals in its registry, with approximately a quarter of these being added before 1993. The data set available lists people entered into the register by 5-year intervals, as given in table 9.2. I addition, these registrees are broken down into a multitude of categories such as loan size, type of loan, age, gender etcetera.

Table 9.2

	-1992	1993-1997	1998-2002	2003-2007	2008-2012	2013	Total
Total amount of unique registrees in KFM registry	95200	45340	47619	58567	106327	15390	368443
Average amount of new registrees per year	n/a	9068	9524	11713	21265	15390	

Data source: Hedborg (2013)

As shown in table 9.2, the KFM had a steady increase in unique arrear holders entered into its registry between 1993 and 2007, with a significant hike of new entrants during the financial crisis period 2008 to 2012. The inflow has fallen slightly from its peak, but the 15 390 new registrees in 2013 were still significantly more than the pre-crisis levels. This implies a general trend of Swedish individuals defaulting on financial obligations.

For each time period approximately 40 to 50 percent of the registrees are being listed as currently debt free, although the trend implies that this share is declining. We have examined trends in arrears over the past 20 years in regards to KFM registrees over the age of 18. Assuming that the Enforcement Authority has maintained similar efficiency, priorities and rules of enforcement over the past two decades, these trends could be assumed to represent national trends.

Table 9.3

Amount of KFM registrees entered yearly (on average)	1993-1997	1998-2002	2003-2007	2008-2012	2013
By size of total loans					
Debt free registrees	3695	3719	4556	7291	6010
Small loans -P25 (1 - 80 000 SEK)	2946	3271	4207	6087	2900
Medium sized loans P25 - P75 (80 001 - 708 894 SEK)	2112	2196	2518	6516	4526
Large loans P75 - (708 895 SEK <)	315	337	433	1371	1954
By size of mortgages					
Registrees without mortgage	8210	8579	10663	18396	11818
Small mortgage - P25 (1 - 242 060 SEK)	279	307	316	670	649
Medium sized mortgage P25-P75 (242 061 - 900 000 SEK)	402	438	517	1542	1786
Large mortgage P75 - (900 001 SEK <)	177	200	218	658	1137

Data source: Hedborg (2013)

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[10] Kronofogdemyndigheten/KFM – the principal government agency for debt collection, distraint and evictions

We can, from the data presented in table 9.3, see that the amount of new individuals with small loans in financial trouble peaked during the global financial crisis, and that they are now down to the same levels as they were in the mid-90s. Individuals with medium-sized loans peaked during the crisis as well, but this category has not stabilized to pre-crisis levels to the same extent as minor debtors. And most interestingly, the category of large debt holders saw a tripling during the financial crisis, but rather than stabilizing to pre-crisis levels, the amount of large debtors in financial trouble has continued to rise drastically.

In regards to debtors with mortgages, the trends are similar. Small- and mid-sized mortgage owners saw a doubling and tripling respectively in individuals being processed by the Enforcement Authority in the financial crisis, and these levels have persisted to date. Interestingly, 2008 to 2012 saw a drastic increase in large mortgage holders in financial trouble, and this trend seems to have continued to explode even further.

If we—as shown in table 9.4—consider KFM registrees as shares, rather than absolute amounts per year, broken down in to the same categories, we see a similar trend of large debt holders increasingly suffering from financial troubles. Large, but also medium-sized, debt holders with financial troubles are up significantly in comparison to the total average. KFM cases considering large loans are at an all-time high in 2013, at almost three times the average.

Table 9.4

Share of debtors in KFM registry per loan size			-1992	1993-1997	1998-2002	2003-2007	2008-2012	2013	Total
Total loans									
Debt free registrees			49.9%	40.7%	39.0%	38.9%	34.3%	39.1%	40.7%
Small loans -P25 (1 - 80 000 SEK)			31.0%	32.5%	34.3%	35.9%	28.6%	18.8%	31.2%
Medium sized loans P25 - P75 (80 001 - 708 894 SEK)			16.9%	23.3%	23.1%	21.5%	30.6%	29.4%	23.7%
Large loans P75 - (708 895 SEK <)			2.3%	3.5%	3.5%	3.7%	6.4%	12.7%	4.4%
Out of which are mortgages									
Registrees without mortgage			93.2%	90.5%	90.1%	91.0%	86.5%	76.8%	89.5%
Small mortgage - P25 (1 - 242 060 SEK)			2.6%	3.1%	3.2%	2.7%	3.2%	4.2%	3.0%
Medium sized mortgage P25-P75 (242 061 - 900 000 SEK)			2.9%	4.4%	4.6%	4.4%	7.3%	11.6%	5.2%
Large mortgage P75 - (900 001 SEK <)			1.3%	2.0%	2.1%	1.9%	3.1%	7.4%	2.3%

Data source: Hedborg (2013)

The share of mortgage holders experiencing financial trouble has gone up as well. If this arrears measure represents the national trend in aggregate, it has the potential to be problematic, since 81 percent of the total amount of outstanding domestic debt consists of mortgages.

The trend for both holders of total debt, and holders of mortgages, seem to imply that large debtors are increasingly in financial trouble, whereas small and mid-sized debtors have stabilized

to slightly-higher-than-historic levels. This administrative measure seems to show that large debtors are increasingly under stress.

Large debtors are increasingly under stress, but they are also reliably wealthier and have higher incomes. The trend of increasing financial stress coincides with an increased debt ratio for only high-income earners. All these factors taken together could serve to show that the increase in the debt ratio of wealthier individuals' coincides with an increasing difficulty for them to meet their financial obligations. Since wealthier individuals and households carry a very large share of the total domestic debt burden, having them under financial strain could be dangerous. These data points, however, only demonstrate a trend of increasing strain on high-income individuals. The Financial Supervisory Authority's (Finansinspektionen 2013; Finansinspektionen 2014) stress tests have shown that Swedish households—and especially wealthier ones—are in good shape in absolute terms. As such, this aggravation seems to have occurred in the segment most able to carry it.

9.2 The Frequent Dilution of the Debt Ratio Measure in the National Aggregate

When calculating the national debt ratio, total aggregated debt volume is divided by the total aggregate of disposable incomes. This is problematic, since it includes debt-free individuals with incomes, making the debt ratio lower than it should be. Only people with debt are directly vulnerable to interest rate increases and only people with mortgages are directly vulnerable to falling housing prices. By excluding debt-free individuals, the debt ratio can be made more accurate. By only including individuals with mortgages, the measure can be made more relevant from an asset-perspective. Winstrand and Ölcer (2014: pp. 2–4) have calculated more precise debt ratios by using only the 52 percent of the grown up population that are in debt. Further, they use the mean of the debt ratios of unique individuals' and households', rather than the aggregate volumes of their debt and income. In their final breakdown, Winstrand and Ölcer (2014) have studied individuals and households with mortgages, and not only loans in general.

Figure 9.3

Debt ratio by all grown income earners, indebted individuals and mortgage holders
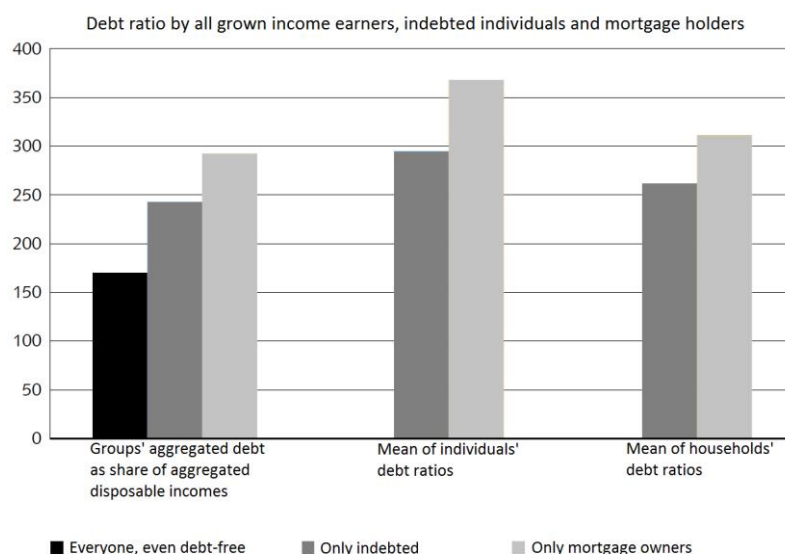
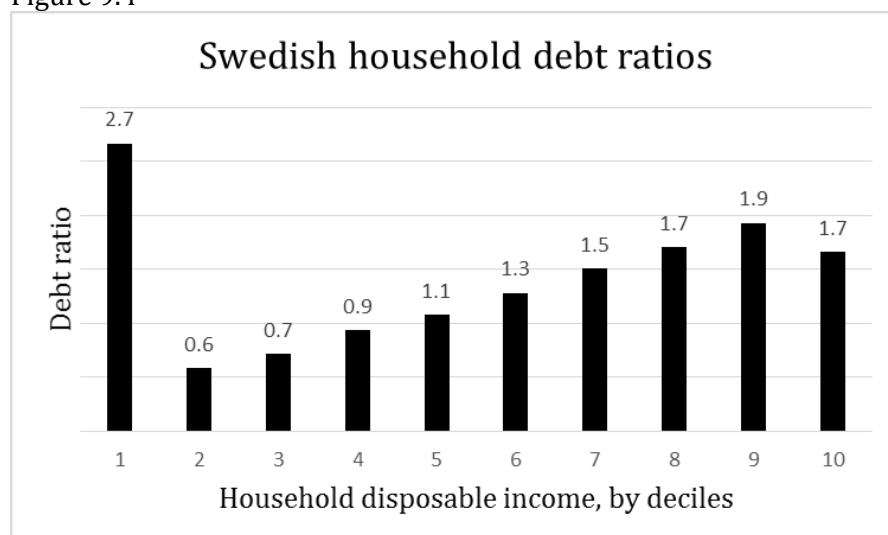Source: reproduced from Winstrand and Öcel (2014)

These significantly higher debt ratios are more representative of the actual state of affairs, but the main implication of this is that the frequently used national aggregate debt ratio is a relatively imprecise and unwieldy tool by comparison. When doing cross-country or time-series analyses, the diluted debt ratio—including debt-free income earners—could be a great source of error. Two countries with similar aggregated debt ratios, but vastly different shares of indebted population, could in reality be very differently vulnerable to financial stress. Structural factors, such as major borrowing constraints on the national level or underdeveloped financial markets, could serve to undermine the predictory value of the debt ratio. The dilution of the debt ratio makes a particular debt level harder to interpret.

This re-calculation of the national debt ratio does not change any economic fundamentals, but it helps to better describe them for future analytical work. It is reasonable that only individuals affected by credit dynamics should be incorporated in a country's debt ratio. Historically, however, the national aggregate has been prevalent in discussion and analytics, as shown in section 3.3.

9.3 Main Takeaways from Recent Micro Studies on Swedish Debt Levels

The Swedish Government Official Report on over-indebtedness by Anna Hedborg (2013) included extensive analysis and discussion, as well as substantial micro data on loans from the credit institute UC and arrears information from the Enforcement Authority. Hedborg (2013, p. 72) solidifies the view of a strong connection for households between high incomes and large total debt burden. A caveat here, as seen in Figure 9.4, is the lowest income decile. But this group is assumed to be in need of special examination since it also includes wealthy individuals with negative incomes due to capital losses etcetera. Further findings of Hedborg (2013) are that highly educated individuals are more indebted, but at the same time generally more resilient to financial stress (pp. 78). Men are more indebted than women (pp. 76). Married couples and couples living together have larger loans, but singles with children are also slightly overrepresented (pp. 77).

Figure 9.4

Source: reproduced from Hedborg (2013)

Hedborg (2014: pp. 78–79), the Riksbank (Winstrand and Ölcer 2014) and the Financial Supervisory Authority (Finansinspektionen 2013) all found that larger cities, and especially Stockholm, have significantly higher debt ratios as well as a larger share of the total debt burden, mainly as a result of higher housing prices. Big city households are at the same time substantially wealthier. Concerning age, people between 30 and 54 are heavily overrepresented as debtors in general, and in having larger loans in particular. However, these individuals should also be more able to maintain such debt levels.

Table 9.5

Different Age Groups' Share of Total Loans, by Size of Loan

Age	Share of Total Population, 18 Years or older	Without Loan	Small Loans	Medium Sized Loans	Large Loans
18-19	3	10	1	0	0
20-24	9	13	12	6	1
25-29	8	6	9	10	6
30-34	8	5	6	9	14
35-39	8	4	6	9	18
40-44	9	4	6	10	17
45-49	9	4	8	11	14
50-54	8	4	8	10	10
55-59	8	5	8	10	8
60-64	8	6	10	10	6
65-69	8	8	10	8	4
70-74	5	7	7	4	1
75-	11	23	9	4	1

Source: reproduced from Hedborg (2013)

In conclusion, Hedborg (2013) finds that the people who tend to have higher debt ratios are those who are wealthier, have better work prospects and are statistically healthier, and as such, are much more resilient to financial stress. The biggest question marks can be found within the lowest income decile and single parents.

The Financial Supervisory Authority (Finansinspektionen 2013; Finansinspektionen 2014) releases an annual mortgage market report with a micro perspective, "left-to-live-on"-calculations and stress tests. Their sample data come from newly acquired loans for that year. They found that major cities should be able to carry their inflated debt ratios due to more developed labor markets leading to lower unemployment, making households more able to service their debt. In addition, the loan-to-value ratios are healthier in Stockholm and Gothenburg than the national average. Big city households buy more expensive homes in relation to their incomes – inflating their debt ratio – but as a percentage of the house price they use less debt to finance the purchase. Younger people have a higher loan-to-value ratio, making them more vulnerable. At average, the LTV-ratio is 70 percent, with an almost complete compliance with the 85 percent LTV-threshold what was introduced in 2010. On average, those with the largest loans also maintain the largest buffers in case of value reductions.

The Financial Supervisory Authority's (Finansinspektionen 2014) stress tests originate in a "left-to-live-on"-calculation, where they consider the means households have left after paying for their living costs, including interests, amortization and food. Households with negative means are in danger of defaulting on their interest payments. On average, 2 percent of the population has negative left-to-live-on ratios. The 2014 stress tests came to the conclusion that Swedish households are resilient, despite increasing debt ratios (pp. 14–19). In case of a 5 percentage point increase in interest rates, only an additional 5 percentage points of households would have troubles covering their interest payments, and these 7 percent of most vulnerable households maintain about 8 percent of the total debt burden. This is an improvement from 2013, despite increasing debt ratios.

If 10 percent of the new debtors represented by the sample lost their jobs—which would imply a larger unemployment rate increase in society as a whole, since new debtors are typically financially sound—the amount of households without surplus means would rise to 6 percent, representing about 5 percent of the total debt burden. Unemployment rose with 8 percent in the crisis during the 90s and 2.5 percent after 2008.

If housing prices were to fall by 20 percent and unemployment rise to 10 percent, approximately 2 percent of the sampled households would have both a means deficit and an asset value below their debt. These household debts would represent less than 2 percent of the total outstanding debt.

In actuality, it is only about 5 percent of indebted households that represent about 80 percent of the total volume increases in mortgages, and these are the households that had the lowest initial LTV-ratios and the largest abilities to pay.

The Riksbank micro analysis by Winstrand and Ölcer (2014) uses data from Sweden's eight largest banks and covers roughly 80 percent of all outstanding domestic debt. In addition to the general findings of Hedborg (2013) and the Financial Supervisory Authority (Finansinspektionen 2013; Finansinspektionen 2014), they reach some additional conclusions.

Younger individuals typically have a higher debt ratio, and especially those in their early thirties, as a result of them entering the real-estate market while still having relatively low incomes. As concluded by Hansen (2013), the main driving factor for inflated debt ratios for young people is a gradually delayed entry into the labor market.

When considering debt ratios change over time, Winstrand and Ölcer (2014) found that the debt ratio has increased the most for the highest earners, but these were the households and individuals with the lowest debt ratios to begin with.

Out of current debtors, 60 percent lowered their total debt burden between 2012 and 2013, and 24 percent increased it. However, both Winstrand and Ölcer (2014: pp. 9) and the Financial Supervisory Authority (Finansinspektionen 2014) have found that the net amortization rate has been somewhat slowing down.

The following section (10.1) will explore the implications of the results found in the macro results and analysis, after which the implications of the results found in this micro section will be discussed (section 10.2). Finally, our concluding remarks (section 11) will aim to relate the implications from both approaches and sum up the essence of our study.

10. Discussion

10.1 Implications of the Macro Approach to the Debt Ratio and Debt Dynamics

The Swedish monetary debate—as it relates to household debt and financial imbalances—focuses primarily on three separate issues: the fundamentals of the Swedish real-estate market; the ability of interest rates to affect real debt levels in the long run; and what role the central bank should play in tackling these imbalances (Svensson 2013d).

This thesis, however, focuses on a fourth, and related, issue: the practical usefulness of debt measures as indicators of imminent adverse economic development. The debt ratio, as discussed in sections 2.1–2 and 3.3, has a key role in justifying the Riksbank Majority's comprehensive judgment-based decision-making process for monetary policy, and as such it needs to be justified.

We believe, as stated in section 2.1.2, that unless employed predictors, such as the debt ratio, can offer concrete and practical input into the decision-making process, then they should not be considered at all in this context.

We have further argued that the Swedish monetary policy debate is too fragmented, with its participants using too diverging premises in their argumentation, and that a significant streamlining would be beneficial (Davydoff et al. 2008; Hedborg 2013). Using a consistent vocabulary when discussing financial imbalances is central in achieving this, and the debt ratio is currently the closest we have to a unified debating-point. By testing the explanatory power of the debt ratio as a predictor on the macro level we have attempted to justify or reject its central role within this debate.

The macro analysis of the debt ratio's explanatory value—as well as that of the debt-to-real assets ratio—was performed using a domestic, ex ante approach. Our results indicate that the debt ratio has a limited explanatory power for our crisis measures, when attempting to control for spillover effects, country-specific structural effects and buildup effects. The debt ratio is, however, still slightly more relevant than our chosen alternative measure: the debt-to-real assets ratio. Therefore, our tests do not support the overwhelming weight given to the debt ratio in the public and academic debates, and we would argue that the burden of proof lies on the Riksbank Majority to present a convincing argument for its usefulness. If unable to do so, we would further argue that the monetary debate, as it relates to financial imbalances, should evolve in a different direction.

There are several additional problems with the practical usefulness of the debt ratio, as presented in section 2.1.5. A major difficulty is that the debt ratio is a measure of relative indebtedness, and not absolute over-indebtedness (Davydoff et al. 2008, p. 45), and as such it gives very limited

concrete input as regard to risk levels. Spillover effects, structural differences and omitted variables—all of them possibly evolving over time—can limit the debt ratio's ability to give future predictions based on historic data. In order to keep the Riksbank Majority's comprehensive, judgment-based process from becoming a gut-feeling approach to monetary policy, they are obliged to justify the predictors they employ. We would argue that the traditional monetary policy approach, which focuses on clear target variables and is advocated by the Riksbank Minority (Bean 2003; Ekholm 2014; Svensson 2013e), is easier to justify. If the debt ratio does indeed turn out to be an inferior measure, then other more suited predictors must be developed in order to justify the Majority's comprehensive approach.

The shear reality is that the Riksbank has one major tool at its disposal: the repo rate. The policy rate affects all aspects of the economy. Using the repo rate to battle the buildup of financial imbalances could—even if proven possible in real terms—create a conflict between the Riksbank's primary goal of price stability and resource utilization, and its secondary of financial stability. An example being growing household debt levels and falling inflation[11], where the former would—arguably—warrant increases and the latter decreases in the policy rate path.

We have tackled the issue of the debt ratio's practical usefulness as a measure of financial imbalances and as an indicator of future adverse economic development. The ex ante approach to our econometric work has indicated that the debt ratio is a weak prescriptive indicator of future events, and its descriptive abilities to explain historical patterns are also limited.

The critique we have presented does, however, not even begin to delve into the three other major areas of critique presently laid upon the Majority: that monetary policy cannot affect real long-term household debt levels; that other agencies are better suited to tackle debt dynamics; and that the fundamentals of the Swedish real-estate market still might be sound. These criticisms need to be answered in their own right by the Majority.

If we lack practical predictors of imminent financial crises, it might be inadvisable for the Riksbank to consider them too heavily in their decision making. Tackling financial imbalances is within the Riksbank mandate, but if they lack practical and useful predictors designed to evaluate future events, and if the tools at their disposal are attached to too high costs (Svensson 2013e; Ekholm 2014), it might be better to focus solely on what they know they can control: their target variables.

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[11] Sweden suffered real-term deflation of 0.6 percent in March 2014 (Svensson 2014g)

10.2 Implications of the Micro Approach to the Debt Ratio and Debt Dynamics

The macro data tells a story of steadily increasing debt levels on the national aggregate, and a debt ratio that indicates that these financial imbalances could lead to a recession or a crisis. Altogether this would imply that proactive policies are needed, and possible through the use of monetary policy.

The micro data tells a different story. Debt ratios have increased within segments that had low debt levels to begin with and that are financially able to carry that debt. And even though richer deciles carry a vast majority of the total debt volume, poorer deciles are the ones who default more regularly on their obligations. We have, however, identified a distinct trend with more high-income earners defaulting on their loans and their mortgages than ever before, but in absolute terms they still constitute a relatively small share compared to the low-income households in trouble. This trend should, however, be kept under surveillance in order to prevent it from gaining further traction, since it would be a potential hazard to the economy if higher income households would begin to fail to a much greater extent.

Stress tests show that household resilience is improving, rather than deteriorating. Additionally, further evidence support (Hansen 2013) that the increases in the debt ratio over the past decades had structural causes unrelated to the low interest rates, and would have occurred regardless of the monetary regime. This raises further questions as of the need for major monetary intervention.

Micro studies are an effective tool in identifying and tackling financial imbalances. The 85 percent loan-to-value threshold on new mortgages introduced in 2010 has been a success (Finansinspektionen 2013; 2014), and serves as an example on how targeted policies can be used more effectively than the policy rate. Micro studies also enable us to calculate an un-diluted debt ratio for households—which assumedly must be more representative of the overall debt dynamics than the national aggregate—and they make it possible to perform more detailed stress tests.

Much of this implies that targeted measures into certain segments of society are what is needed, and that the Riksbank is ill suited to the task. The interest rate path affects the economy as a whole, and not only the segments in need of targeting. Other organizations than the central bank—such as the Financial Supervisory Authority and the Department of Finance—could be more suited to enact such targeted policies, as exemplified by the successful implementation of the 85 percent loan-to-value requirement.

Despite an increasing national debt ratio, stress tests of households show an increasing overall stability within the economy. The macro trends and micro trends point in different directions, and it is likely that the micro level has a greater accuracy. Rather than using the debt ratio on a nationally aggregated level, we could benefit from a more active micro approach to financial stability. Stress tests and measures of over-indebtedness, rather than relative indebtedness, could help us in achieving this goal.

11. Concluding Remarks

The measuring of financial imbalances and household debt has taken an increasingly prominent place in the Swedish monetary policy debate, with distinct Majority and Minority factions with opposing positions taking form in the Riksbank Executive Board. The debate has, however, been fragmented and inconsistent, and would benefit a more coherent premise.

The debt ratio has limited ability as a predicator of future financial stress in the economy, even though it is superior to many of its alternatives. It is more suited as a descriptive measure of past events, than as a prescriptive analytical tool of future threats, and as such its usefulness as a practical tool for policy decisions is limited. Household debt needs to be monitored, but without concrete and relevant input from this monitoring, the Riksbank Majority's comprehensive approach to monetary policy is put into question. It is within the central bank's mandate to consider financial imbalances, but if this cannot be done effectively and efficiently they should employ the traditional approach, advocated by the Minority, and focus on its target variables.

A strong focus on gathering and analyzing micro level data would be preferable. It would make available predictors with improved accuracy—such as an un-diluted debt ratio—by enabling us to calculate measures based on individual household data, rather than more imprecise national aggregates. Macro aggregates and micro analysis can show conflicting pictures, such as an increasing aggregate debt ratio but a more resilient actual composition of the economy. In such cases, rigorous micro level analysis and stress tests are probably more suited to identify risks to the overall financial stability. Such risks could then be countered by targeted micro-prudential policies aimed at relevant segments and enforced by suitable agencies.

Using the policy rate to tackle financial imbalances is like using a broadsword—affecting all aspects of the entire economy—when what might really be needed is a scalpel.

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Appendix 1 – Additional Tables of Empirical Results

Table A.I: The Debt Ratio without Controlling for Autocorrelation

	Δ Real GDP/Capita (2.1)	Δ Unemployment (2.2)	Δ Household Consumption (2.3)
Debt Ratio	-0.0019973*** (0.0005642)	0.0113169*** (0.0034389)	-0.0031371*** (0.0006575)
Δ Debt Ratio	-0.0179232 (0.1949773)	1.10689 (1.188415)	0.5121712** (0.2272344)
Current Account Balance	0.0035985 (0.0040787)	-0.041717 (0.0248603)	0.0151796** (0.0047535)
Net Savings	0.0064191 (0.0053179)	-0.0612966* (0.0324136)	0.0010282 (0.0061977)
Year 2004	-0.0249897* (.0126651)	0.1964579** (0.0771957)	-0.0265392* (0.0147604)
Year 2006	-0.0256849** (0.0126058)	-0.0570432 (0.0768339)	0.0037546 (0.0146913)
Year 2007	-0.1115914*** (0.01361)	0.3671145*** (0.0829552)	-0.0523582*** (0.0158617)
Year 2008	-0.1211489*** (0.0140602)	0.4312284*** (0.085699)	-0.0495638** (0.0163863)
Year 2009	-0.037728** (0.0159)	-0.0134195 (0.0969131)	0.0211817 (0.0185306)
Year 2010	-0.056402* (0.0288049)	0.0636579 (0.17557)	0.013761 (0.0335704)
Constant	-1.116786** (0.464639)	0.399179*** (0.0888427)	0.1195393** (0.0481976)
R-squared	0.7650	0.6371	0.6001
Number of countries	25	25	25
Total number of observations	136	136	136

Standard errors in parenthesis

* $p<0.1$, ** $p<0.05$, ***$p<0.01$

Table A.II: The Debt-to-Real Assets Ratio without Controlling for Autocorrelation

	Δ Real GDP/Capita (3.1)	Δ Unemployment (3.2)	Δ Household Consumption (3.3)
Debt Ratio	-0.0027761** (0.0013166)	0.0194923** (0.0078879)	-0.0037784*** (0.0009123)
Δ Debt Ratio	0.8629284*** (0.2632137)	-3.587655** (1.576985)	0.7092858*** (0.1823906)
Current Account	-0.0021866 (0.0040495)	-0.031666 (0.0242616)	0.0086007*** (0.002806)
Net Savings	0.0156115** (0.0061451)	-0.0241451 (0.0368167)	0.0017714 (0.0042581)
Year 2004	-0.0060742 (0.0110339)	0.0575626 (0.0661074)	0.0028872 (0.0076458)
Year 2006	-0.0424192*** (0.0106466)	0.0528217 (0.0637867)	-0.0162001** (0.0073774)
Year 2007	-0.1230325*** (0.0107535)	0.4563711*** (0.0644274)	-0.0637323*** (0.0074515)
Year 2008	-0.1282142*** (0.0108129)	0.4922503*** (0.0647832)	-0.0570885*** (0.0074927)
Year 2009	-0.0656411*** (0.0120792)	0.1225296* (0.07237)	-0.0228044*** (0.0083702)
Year 2010	-0.1060851*** (0.0320345)	0.2125051 (0.1919274)	-0.0656072*** (0.0221979)
Constant	0.1195393** (0.0481976)	-0.5680589* (0.2887649)	0.172832*** (0.0333979)
R-squared (within)	0.8734	0.7473	0.7930
Number of countries	12	12	12
Total number of obs	66	66	66

Standard errors in parenthesis

* p<0.1, ** p<0.05, ***p<0.01

Appendix 2 – Variable Specification

Variable – as referred to in regressions	Description
Debt Ratio$_{i,t-1}$	The level of household debt as a share of disposable income
ΔDebt Ratio$_{i,t-1,t-5}$	The average annual change in the debt ratio five years prior to the year of observation
Debt to Real Assets$_{i,t-1}$	The level of household debt as a share of real assets (e.g. dwellings, land)
ΔDebt to Real Assets$_{i,t-1,t-5}$	The average annual change in debt-to-real assets five years prior to the year of observation
ΔReal GDP/Capita$_{i,t,t+2}$	Accumulated change in real GDP/capita two years after the year of observation
ΔUnemployment$_{i,t,t+2}$	Accumulated change in unemployment two years after the year of observation
ΔHousehold Consumption$_{i,t,t+2}$	Accumulated change in household consumption two years after the year of observation
CA$_{i,t-1,t-5}$	Average current account balance during the five years prior to the year of observation
Net Savings$_{i,t-1,t-5}$	Average net savings rate during the five years prior to the year of observation, estimated by subtracting household consumption expenditure from household disposable income plus the change in net equity of households in pension funds
2004	Dummy variable for year 2004
2006	Dummy variable for year 2006
2007	Dummy variable for year 2007
2008	Dummy variable for year 2008
2009	Dummy variable for year 2009