

Credit and Growth: A Functional Differentiation

Dirk Bezemer* Maria Grydaki** Lu Zhang*

*University of Groningen**

*University of Stirling ***

ABSTRACT

We use newly collected data to re-examine the credit-growth nexus over 1990-2010 in 50 economies. We make two contributions. We distinguish between stock and flow effects of credit on growth and between the uses of credit into ‘nonfinancial business and consumption’ and ‘financial and real estate’ credit. Our new data show that over 1990-2010, there was strong growth of credit stocks relative to GDP while the share of nonfinancial credit in total credit decreased substantially. In the analysis, we find positive growth effects of credit flows, which suggests a positive ‘liquidity effect’. This diminishes at higher level of development, as a negative interaction effect between credit stocks and credit flows suggests. The growth effect of nonfinancial credit flows is several times larger than the growth effect of mortgage and financial credit flows. We find insignificant or negative growth effects of credit stocks, suggesting that many of the economies in our sample suffer from ‘too much finance’ (Arcand et al 2012). Third, there is evidence of nonlinearities in the credit-growth relation; not hump-shaped, but U-shaped (Shen and Lee 2006). The results are robust to using the Rajan and Zingales’ (1998) methodology and GMM specifications. We discuss implications.

1. Introduction

A large empirical literature has established the positive effects on output growth of the growth in bank credit, following King and Levine’s (1993) seminal *Finance and Growth: Schumpeter Might Be Right*.¹ Recent research however shows that above a threshold level, high credit-to-GDP growth may slow down growth (Arcand et al., 2011; Cecchetti and Karroubi, 2012) or even that “banking development has an unfavorable, if not negative, effect on growth” (Shen and Lee, 2006:1907). It is also clear that high credit-to-GDP growth precipitates crisis, as Reinhart and Rogoff (2009), Schularick and Taylor (2012) and Jorda et al. (2011) show, among others. This may be part of a changing relation between credit and growth over the financial cycle (Borio 2012). Cecchetti and Kharroubi (2012:15) conclude that “there is a pressing need to reassess the

¹ This literature goes back to Schumpeter (1934), Goldsmith (1969), McKinnon (1973) and Shaw (1973). Levine (2005) and Ang (2008) provide overviews. For recent empirical results, see Beck et al (2009).

relationship of finance and real growth in modern economic systems. More finance is definitely not always better.”

We use newly collected data to re-examine the credit-growth nexus over 1990-2010 in 50 economies. We make two contributions. First, we distinguish between stock and flow effects of credit on growth (Biggs et al, 2010). Credit flows increase agents’ ability to finance expenditures and they have an immediate positive effect on output. We call this the ‘liquidity effect’ of credit. Credit stocks increase agents’ ability to reallocate production factors and may so support growth. This is the traditional focus of the credit-growth literature. We call this the ‘financial development effect’ of credit. But credit stocks are also debt stocks, which may depress growth through the burden of debt servicing or through financial instability and debt crisis. Thus, the effect of credit stocks on growth is a priori ambiguous and may be negative, in line with recent studies.

Our second contribution is to distinguish between the uses of credit into ‘nonfinancial business and consumption’ and ‘financial and real estate’ credit, also in line with recent studies (Büyükkarabacak et al (2009); Beck et al. (2010); Büyükkarabacak and Valev (2010); Werner, 1997). Bank credit to nonfinancial business and consumption loans to households both finance transactions in goods and services, which implies a direct link to growth. Mortgage credit to households and credit to nonbank financial business finance transactions in assets (including real estate), which has an indirect impact on output growth through balance sheet effects. These two differentiations of credit (into stocks and flow, and into ‘nonfinancial’ and ‘financial and real estate’ credit) suggest a two-by-two matrix of credit-growth effects, with different channels relevant to each quarter.

Our new data show that over 1990-2010, there was strong growth of credit stocks relative to GDP, in line with the literature. We also find that the share of nonfinancial credit in total credit decreased substantially, with a strong rise in the share of especially mortgage credit. We observe strong positive correlation of growth in nonfinancial credit with output growth, and substantial negative correlation of credit stocks with output growth.

In the empirical analysis, we explore the credit-growth relation in three specifications: fixed-effect panel data regressions, Rajan and Zingales’ (1998) methodology where we interact credit stocks with measures for industry-level external dependence on finance, and dynamic panel estimations (GMM models), instrumenting credit variables with their lags. We find positive correlations of credit flows with output growth, with the growth effect of nonfinancial credit flows several times larger than the growth effect of mortgage and financial credit flows. Correlations of credit stocks (of either type) with output growth are insignificant. There is nonlinearity in the credit-growth relation, which we trace specifically to a nonlinear relation of mortgage and financial credit stocks with growth. Interaction effects between credit stocks and credit flows are negative. Each of these findings is robust across the panel, Rajan-Zingales and GMM specifications.

The results suggest that many of the economies in our sample suffer from ‘too much finance’ (Arcand et al 2012). Negative debt effects of credit stocks seem to balance, or even more than outweigh, the positive reallocation effects. With higher levels of financial development, the liquidity effect on growth of credit flows diminishes. Second, it appears that the type of financial development (higher credit stocks in either the ‘nonfinancial’ or the ‘financial and real estate’ sectors) is an important factor in understanding whether there are diminishing returns to financial development. These occur especially in credit to the nonfinancial sectors.

In the next section we discuss credit’s different effect on output growth and make links to the literature. In section 3 we present the new data. In section 4 we discuss the methodology and analysis. Section 5 concludes with a discussion of the results and suggestions for future research.

2. Re-examining the credit-growth nexus: stocks and flows

A novel element in our analysis is that we distinguish between stock and flow effects of credit on growth. Both stocks and flows of credit relate to GDP growth, but in different ways (Biggs et al, 2009). Credit flows increase agents’ ability to finance expenditures. This is a direct short-term ‘liquidity effect’ on output (Borio and Lowe 2004). As Caporale and Howells (2001:555) put in in their casual analysis of credit and transactions, “[I]oans cause deposits and those deposits cause an expansion of transactions”.

Credit stocks, on the other hand, reflect agents’ ability to use the outstanding stock of loans to reallocate factors of production to more productive uses, which may support growth. This is the traditional focus of the credit-growth literature. But since all credit is debt, credit stocks are also debt stocks, which may depress growth through the burden of debt servicing, or through financial instability and debt crisis. A larger credit-to-GDP ratio implies a higher debt level in the economy. Possible ways in which high debt levels hamper growth include more financial fragility and larger uncertainty, larger debt servicing out of income (which diminishes effective demand), and a negative wealth effect on consumption. At low levels of credit-to-GDP ratios these may be minor side effects, outweighed by the benefits of more credit available to re-allocate resources to more productive uses. But if the debt burden grows and the re-allocation process runs into diminishing returns at increasing levels of credit-to-GDP, then the debt effect may come to dominate, resulting in a net negative effect on growth. Thus, the effect of credit stocks on growth is a priori ambiguous. Given the existence of these separate stock and flow effects, controlling for flow effects is important in assessing the (traditionally studied) stock effects. Since the stock of credit is commonly used as a measure for financial development, we call its effect on growth the ‘financial development’ effect.

In the recent literature there is some evidence of negative or absent financial development effects alongside positive liquidity effects. Beck et al (2012) distinguish between the financial sector’s ‘intermediation

activities' akin to the liquidity effect (which they find to increase growth) and its size (which has no effect on growth). Several papers find negative financial development without controlling for credit's positive liquidity effects. In their paper 'Too Much Finance?', Arcand et al (2011) use different empirical approaches to show that there can indeed be too much finance – finance starts having a negative effect on output growth when credit to the private sector reaches 110 % of GDP. Their measure includes all credit, not just bank credit. And in their paper on 'The Real Effects of Debt', Cecchetti et al (2011) also observe that 'beyond a certain level, debt is a drag on growth'. They assess that for government and household debt, the threshold is around 85% of GDP while for corporate debt, it is around 90% of GDP.). They

Different explanations have been given. Arcand et al. (2011) develop a model in which the expectation of a bailout may lead to a financial sector which is too large with respect to the social optimum. Cecchetti and Karroubi (2012) note that the financial industry competes for resources with the rest of the economy, particularly with skill-intensive parts. They present evidence that more skill and R&D intensive suffer more productivity growth during a financial boom. Earlier Stockhammer (2004) analysed a causal relation for selected OECD economies between expanding asset markets and a slowdown in the accumulation of fixed capital and of income growth. Easterly et al (2000) point to a volatility channel. They show that the volatility of growth tends to decrease and then increase with increasing financial depth. Mapping the credit-to-GDP ratio on a horizontal axis against the volatility of growth on the vertical axis, they find that the bottom of the U is around value 1 (or 100%) for the credit-to-GDP ratio.

Research on credit flows (rather than stocks) and their growth effects is rare. One exception is Biggs et al (2009, 2010). In the context of simple macroeconomic model they show that GDP is a function of both the stock and the flow of credit. But "for reasonable values of depreciation and interest rates, the coefficient on the flow of credit is substantially larger than the coefficient on the stock of credit (Biggs et al 2009: 3) - even without considering any negative debt effects from credit stocks outlined above. This motivates our distinction between stocks and flows. While the literature so far point to possibly negative stock effects, this is not to say that 'credit is bad for growth' since there are also positive flows effects. Also, stocks effects (negative or otherwise) will be better measured in models accounting for flow effects.

3. Re-examining the credit-growth nexus: the uses of credit

A second and related contribution in probing the credit-growth nexus is to "distinguish between different categories of credit, which perform different economic functions", as the LSE *The Future of Finance* report (Turner et al, 2010:16) urges. Cecchetti et al (2011) distinguish credit by sector, as government, household and corporate debt. Büyükkarabacak and Valev (2010) distinguish between (nonfinancial) enterprise and household

credit, as Beck, et al (2011). We distinguish debt by its function. In particular, we recognize that the economy is composed of a real sector where goods and services are produced and traded, and a financial and real estate sector whose primary function is to originate and trade assets, including real estate².

Consequently, two broad functions of bank credit can be distinguished as: financing production and consumption, and financing asset transactions (with existing real estate being the most important asset category in most economies). These uses of credit can be (imperfectly) mapped onto the credit categories of: credit to nonfinancial business plus household consumption loans on one hand, and mortgages plus credit to financial business on the other hand. Because bank credit to nonfinancial business and consumption loans to households both finance transactions in goods and services, there is a direct link to growth in GDP, which is the total value of final transaction in goods and services³. This direct link does not exist for mortgages and credit to financial business, which finance asset transaction. Asset transactions are not included in GDP, but may have indirect effects on GDP.

One would therefore expect different effect of credit flowing to the financial sector and real estate, from credit flows to the nonfinancial sectors. For instance, if the share of credit to real estate and other asset markets is growing, this will tend to diminish the immediate growth effect of total credit since less of it directly finances transactions spending on goods and services, either as investment or consumption. This helps understand the findings by Cecchetti and Karroubi (2012) and Stockhammer (2004) quoted above about productivity losses with expanding asset markets. The point here is that credit facilitating investment in financial capital may provide income through capital gains, interest and dividends to individuals, but not necessarily national income growth through investment and output growth⁴. Whereas the depth of financial markets is usually taken as “a measure of economies' absorption capacity” (Brezigar Master et al 2007), here we recognize that asset markets can outpace the economy's capacity to productively invest financial resources. The theoretical mechanism is traced in Boissard et al (2013), who focus on “how large a credit boom [is] relative to the possibilities of productive uses for loans” (p 4) (also Lorenzino 2007). There can be credit growth without GDP growth.

² Most mortgage credit finances transactions of real estate already in place, rather than financing construction. In the data we distinguish between credit to the construction industry (which is part of nonfinancial business) and mortgages.

³ There is a theoretical argument that consumer credit does not lead to higher growth since it merely smooths consumption. Several studies include mortgages into an overall category of ‘household credit’ and find that it has no growth effect (e.g. Beck et al., 2010, Büyükkarabacak et al, 2009). This is compatible both with the theoretical argument about consumption credit and with our observation that mortgage credit does not finance consumption, hence has no growth effect. Note that consumption is here consumption of goods and services (included in GDP), not of assets (not included in GDP).

⁴ This is a distinction with a long pedigree in economics. As John Stuart Mill (1848, ch 4 book 1) put it, “[a]ll funds from which the possessor derives an income, .. are to him equivalent to capital. But to transfer hastily and inconsiderately to the general point of view, propositions which are true of the individual, has been a source of innumerable errors in political economy. In the present instance, that which is virtually capital to the individual, is or is not capital to the nation, according as the fund ... has or has not been dissipated by somebody else”. Tobin, in his 1984 Hirsch Memorial Lecture ‘On the Efficiency of the Financial System’, also worried about “throwing more and more of our resources ... into financial activities remote from the production of goods and services”.

This distinction also relates to the credit-instability nexus. Since credit-financed asset market expansion leads to credit growth beyond GDP growth, credit-to-GDP ratios are rising, possibly to leverage levels which lead to financial fragility and instability, or which imply large debt servicing burden or negative wealth effects. Thus, it is no coincidence to see a fall in the share of nonfinancial sector credit simultaneous with rising credit-to-GDP ratio's and a falling growth effect from credit. Borio and Lowe (2004) shows that the *combination* of credit booms and asset price booms (rather than just rapid overall credit growth) is a good predictor of financial instability. That is, specifically credit that inflates asset prices is a cause for rising debt-to-GDP ratios and financial instability.

Indeed, it is on the markets for mortgages, stocks, bonds and derivative products that financial fragility typically develops, often leading to crisis and lower growth. Much of this is linked to household credit: mortgages and its derivatives are a large part of such asset markets, and large share of asset market investment goes through pension funds. In two recent studies, Beck et al. (2010) and Büyükkarabacak and Valev (2010) find that credit to households (most of which is mortgages, in most economies) has negligible growth effects, while credit to nonfinancial business has strong growth effects. Similarly, Jappelli and Pagano (1994) argue that more household credit leads to lower private savings and so slower economic growth. Japelli and Pagano (2008) and Barba and Pivetti (2009) find positive crisis/instability effects of the expansion of household credit. It is also significant that household credit expansion resulting in real estate and asset market investments leads to rising credit-to-GDP ratio's. This links our functional differentiation to the large literature researching on high credit-to-GDP growth precipitate crisis (Lorenzoni, 2007; Barajas et al 2007; Reinhart and Rogoff, 2009, Schularick and Taylor, 2012, Jorda et al. 2011 Boissay et al 2013).

4. A New Data Set

We collected data from the consolidated balance sheet of Monetary Financial Institutions observed in central bank sources for 50 countries over 1990-2011. On the asset side of the balance sheet, loans to nonbanks are reported, where possible separately observed as mortgages to households, household consumption credit, credit to nonfinancial business, and credit to financial business (insurance, pension funds, and other nonbank financial firms)⁵. These four categories of credit were aggregated into the two larger categories of credit to nonfinancial business plus household consumption loans on one hand, and mortgages plus credit to financial business on the other. The first credit flow to asset market (including real estate) finances the creation and trading of financial and real estate assets. The second credit category of non-secured consumer credit and credit to nonfinancial business comprise loans which finance transactions in goods and services. While the delineation is useful with respect to credit's growth effects, as explained above, we emphasize that its measurement is necessarily

⁵ A fifth category is bank lending to government, which is however often not reported and in any case mostly small.

imprecise, for a number of reasons. Mortgage credit often also serves as consumer credit (through home equity withdrawals), while business credit often includes business mortgage credit⁶. Financial businesses do not only trade assets but also deliver services. Conversely, nonfinancial businesses realize part of their returns in trading financial assets (see e.g. Krippner 2005 on the U.S.). But as a broad distinction this categorization will help us trace the different effect of different types of credit flows on GDP growth.

No data with similar detail has been collected and reported before, to the best of our knowledge. In fact, this has not been possible until recently; many countries have started reporting these data only since the early or mid-2000s. Beck et al. (2010) and Büyükkarabacak and Valev (2010) were the first to study similar cross country data, using a data set for 73 countries over the years 1994 to 2005⁷. Another recently completed dataset with a similar differentiation is BIS (2013), which measures total lending rather than only bank lending. In the Appendix we report definitions and sources, and compare our data to the other data sets. Table 1 presents descriptive statistics. They show that on average lending to nonfinancial business and household mortgage lending are the two principal credit categories. Credit-to-GDP ratios are very large in some countries, often due to high stocks of mortgage credit (all countries are listed in the Appendix).

<Table 1: descriptive statistics>

Two salient features in the new data stand out. The first is the expansion of credit relative to GDP over time. On average the total-credit-to-GDP ratio increased from 73% to 95% over 1990-2010. In Spain the credit-to-GDP ratio rose from 118% to 369%. In Greece, from 33% to 115%; in the UK, from 39% to 90%. Declines in the credit-to-GDP ratio were rare and often associated with episodes of financial crisis (for instance in Pakistan, the Philippines, Hungary and Argentina). Figure 1 shows that on average, much of the increase in credit relative to GDP occurred after 2002. It peaked and then declined slightly after the 2008 financial crisis.

⁶ Some countries report mortgages to business separately. For instance, ... Since no cross country consistent data on business mortgages are available, we are not able to separate out business mortgage credit from overall nonfinancial business credit.

⁷ The Beck et al (2010) data is based on the financial development and structure (FDS) data base described in Beck, Demirguc-Kunt and Levine (1999) and updated in Beck et al (2013). The present data differ from the Beck et al. (2010) in three ways. First, we observe four credit categories rather than the two categories of 'enterprise credit' and 'household credit' in Beck's data. We separately observe credit to financial business, which is not included in Beck's 'enterprise credit' measure, which includes only nonfinancial business. The difference between credit to all business and credit to nonfinancial business is small in most countries, but substantial in some. And we separately observe household consumption credit and household mortgages. Second, we observe each of the four credit categories at the source in central bank reports. Beck et al (2010) start with a 'total credit' (TC) measure taken from the FDS data base (Cihak et al 2013), which is credit to nonfinancial business (BC) plus credit to households. Credit to households includes consumer credit (CC) plus mortgages (MC). The 'household credit' measure in Beck et al. (2010) and in Büyükkarabacak and Valev (2010) is defined as (TC-BC), i.e. all non-business credit. This includes both MC and CC. Also, the Beck et al (2010) credit data are deflated by the cpi deflator and then divided by real (deflated) GDP. Our data is nominal credit divided by nominal GDP. Finally, our data cover 1990-210 whereas Beck et al (2010) cover 1994 to 2005. See the data Appendix for additional data and comparisons of the data sets.

<Figure 1: Total bank credit stocks 1990-210, average for 50 countries (% GDP)>

A second trend in the data is the changing composition of credit. Especially in OECD economies, the share in total credit of mortgage credit increased strongly. For instance, in the Netherlands this combined share was less than 30% in 1990 but 48% in 2011. Conversely, the share of total bank credit flowing to nonfinancial business dropped from 55% to 30% in the Netherlands. Banks came to finance mostly real estate and asset markets rather than nonfinancial business. On average over all countries, the 1990-2010 decline in the nonfinancial business credit share was from 47% to 37%. This was balanced by increases in the shares of financial business (from 8% to 11%), non-secured consumer credit (from 12 to 13%) and, especially, mortgages (from 32% to 38%). Figures 2a and 2b show the evolution of bank credit stocks and flows relative to GDP over time. The rate of mortgage credit growth was higher than any of the other categories from the mid-1990s to the mid-2000s. Stocks of mortgage credit were equal in size to nonfinancial business credit stocks from 2002; they clearly exceed them since the crisis. Nonfinancial business credit experienced the steepest growth after 2002 and the steepest fall after the 2007 crisis, which reflect the real-sector impact of the credit boom and bust. These dynamics prompt a rethink of banks' role, traditionally conceived as financing investment and production in the real sector. In 2012, more than half of outstanding bank loans stocks finance real estate and financial assets and instruments ⁸.

<Figure 2: Bank credit flows (left) and stocks (right) 1990-210, average for 50 countries (% GDP)>

Figure 3 depicts the credit-growth relation separately for stocks and flows. There appears to be a robustly negative cross-section relation over 1990-2011 between private credit stocks relative to GDP and real per capita GDP growth, though with significant scatter and possible nonlinearity around the trend line. There also appears to be positive correlation over time of per capita output growth with total-credit flows, as Biggs et al (2010) also report.

<Figure 3: Credit and growth, 1990-2011: stocks (left) and flows (right)>

Figure 4 brings out the link between the rising debt-to-GDP ratios and growth in credit to the financial and real estate sectors. For selected countries, we show that higher bank-debt-to-GDP ratios are almost one-on-one due

⁸ This is a lower bound measure, since the data do not include securitized credit. If banks sold loans to nonbanks we no longer observe them, since our data are taken from MFI balance sheets. The difference can be substantial. For the Netherlands, we found that total credit including securitized loans in special purpose vehicles (SPV) was 30% higher in 2008 (rising from zero until 1998) than total credit without securitization. We observe loan securitization in the Netherlands only for mortgages and loans to financial business, not in nonfinancial business credit and consumer loans. Thus the credit data used in this paper overstate the share of credit to the nonfinancial sectors in the Netherlands, and plausibly in a number of other countries where loan securitization is important. Data on loan securitization are not available in consistent cross-country format.

to the growth of credit to the financial and (especially) real estate sectors. This is unsurprising, as other debt (to the nonfinancial sectors) grows GDP *pari passu*, at stable credit-to-GDP ratios.

<Figure 4: Credit-to-GDP ratios, different credit aggregates, selected countries 1990-2010>.

Finally, Table 2 explores correlations of flow measures of the four categories of credit flows and the two credit aggregates (all scaled by GDP) with GDP per capita growth. Credit to the nonfinancial sectors shows the highest correlation with growth, closely followed by its two components, nonfinancial business credit and household consumer loans. In contrast, the correlations with growth of credit flows to financial sectors and real estate are less than half of those for the nonfinancial sectors.

<Table 2: Growth Correlations Of Different Credit Flows>

5. Methodology and Analysis

We now analyse the credit-growth relation more rigorously accounting for effects of stocks and flows, and for the sectoral allocation of bank credit. We start with a fixed-effect panel data baseline model over 1990-2011 for 50 countries. We regress annual stocks and flows of a total-credit measure plus the two credit categories (all as GDP ratios) on real GDP per capita growth, controlling for initial development levels, government spending, trade and inflation. Motivated by the literature, we include specifications with the square of total-credit stocks capturing the nonlinear effect of financial development (e.g. Deidda and Fattou, 2002) and an interaction term of credit flows with stocks (financial development). Four findings are noteworthy.

First, we find positive coefficients for credit flows, which suggests a positive ‘liquidity effect’. The growth effect of nonfinancial credit flows is several times larger than the growth effect of mortgage and financial credit flows: the type of credit matters to growth, in line with recent studies. Second, we find insignificant or negative coefficients for credit stocks (of either type) with output growth. Since credit stocks are measure for financial development, this suggests that many of the economies in our sample suffer from ‘too much finance’ (Arcand et al 2012). Third, there is evidence of nonlinearities in the credit-growth relation; not hump-shaped, but as in earlier studies such as Shen and Lee (2006:1907) “the relationship between growth and bank development is a weak inverse U-shape”. Our differentiation of credit flows allows us to trace this to a nonlinear relation of mortgage and financial credit stocks with growth, but not of nonfinancial credit stocks. Our interpretation is that the type of financial development (higher credit stocks in either the ‘nonfinancial’ or the ‘financial and real estate’ sectors) determines whether there are diminishing returns to financial development.

Fourth, this is also suggested by a robustly negative interaction effect between credit stocks and credit flows. With higher levels of financial development, the growth effect of credit flows diminishes. This is especially the case for credit flows to the nonfinancial sectors.

These findings are robust across specifications. We note that the liquidity effect doubles and is more significant once we control for the interaction of credit stocks and flows. Also, the negative correlation of credit stocks with growth disappears when including the interaction effect. This supports a ‘debt overhang’ type explanation for the negative correlation of credit stocks with growth: the problem may be that too much of credit flows is allocated to sustaining debt levels, rather than to re-allocating productive resources.

We proceed to look ‘under the surface’ of total-credit flows by distinguishing credit to the financial and real estate sectors from credit flows to nonfinancial business and consumer credit (Table 4). We find that both credit flows are positively correlated to growth, but with three times higher coefficients for credit flows to nonfinancial business and consumer credit. The coefficient for credit stocks in the nonfinancial sector is negative (also when controlling for flows) whereas for the financial and real estate sectors it is insignificant. This may be related to the fact that in the nonfinancial sectors, debt repayment more often substitutes for investment and consumption whereas in the financial sector, debt repayment is more often from wealth (sale of assets), with smaller negative growth effects.

<Table 3: Liquidity Effects and Financial Development Effects: Panel Regressions>

We now examine whether the above results are indeed evidence of a casual relation between credit and growth. Causality and endogeneity issues are looming large in the credit-growth literature, since it is always possible that higher growth causes acceleration of lending (rather than the other way round), or an unobserved third factor causing both. In a seminal paper, Rajan and Zingales (1998) proposed to interact credit stocks with an industry-specific measure for dependence on external finance. A positive coefficient of this interaction term in a growth regression was interpreted as evidence that industries which are more dependent on external finance grow faster at higher levels of financial development. In this study and a number of subsequent applications⁹, there is evidence that financial development (crisis) causes growth (contraction), rather than the other way

⁹ Using European micro-level data for 1996–2005, Bena and Ondko (2012) show that firms in industries with growth opportunities use more external finance in financially more developed countries. This result is particularly strong for firms that are more likely to be financially constrained and dependent on domestic financial markets, such as small and young firms. Kroszner et al (2007) use a similar approach to show that sectors highly dependent on external finance experience a greater contraction during a banking crisis in countries with deeper financial systems. Raddatz (2006) shows that sectors with larger liquidity needs are more volatile and experience deeper crises in financially underdeveloped countries.

round. We present the results of applying this methodology to our data on credit stocks ¹⁰ in table 5. We now aggregate annual observation in 3-year averages, in order to ...¹¹ The specification is based on the Braun & Larrain (2005), as follows:

$$Growth_{i,c,t} = \alpha_1 share_{i,c,t-1} + \alpha_2 credit_{i,c,t} + \alpha_3 (credit_{i,c,t} \times external\ financial\ dependence_c) + \alpha_4 dummy\ variables + \varepsilon_{i,c,t}$$

The results are broadly in line with the panel data estimations; if anything they strengthen the results. We find that larger industry shares correlate to lower growth, with no difference in this effect between the nonfinancial sectors and financial plus real estate credit. The coefficient for credit stocks is now negative, again with no difference between credit categories. For the negative effect of debt on growth, it does not matter where the debt originated – it's debt that needs to be repaid and depresses balance sheets. The coefficient for credit flows to the nonfinancial sectors (money financing investment and wages) is, clearly positive. The coefficient for credit flows to the financial and real estate sectors (financing non-produced assets and real estate) is insignificantly different from zero. The negative coefficient on the interaction effects suggest that *more* external dependence on finance lead to a *smaller* growth-retarding effect from credit stocks is now. One way to understand this is to note that debt is harmful to growth only when its repayment substitutes for investment and wages. In industries with larger external dependence on finance, where new finance can more easily be attracted, that need not be the case. Debt can then more easily be refinanced and is less of a balance sheet threat. Repayment problems are less likely to be so acute that they bite into investment or employment. Overall, the Rajan-Zingales results are in line with our earlier findings that credit flows in general are good for growth while credit stocks have insignificant or negative growth effects; and in particular, that credit flows to the nonfinancial sectors are good for growth.

<table 4: Growth Effect of Credit Flows and Stocks Rajan-Zingales Specification >

Another way to account for endogeneity is to estimate a dynamic panel model in a GMM specification. Again, we utilize 3-yearly observations. Tables 5a, 5b and 5c present the result for total credit and the two credit aggregates, respectively. The results are stronger than the panel fixed regressions. Credit stock coefficients are negative, with a significant nonlinear term and more negative coefficients for nonfinancial-sector credit stocks. Credit flow coefficients are positive, with clearly larger coefficients for credit to the nonfinancial sectors than

¹⁰ We do not interact the Rajan and Zingales (1998) measure with credit flows since the two are substantially similar. Since external dependence is defined as the annual excess of investment over profit, i.e. investment not financed from retained earnings, this is equal by definition to flows of external finance, i.e. credit in the absence of market financing..

¹¹ The results are qualitatively identical to results utilizing annual observations, which are available on request

for either total credit or mortgages credit and loans to financial business. Interaction terms are again robustly negative. Controlling for the flow effects by including an interaction term strongly increases the coefficient for credit flows, of both types. The results are robust to varying the number of lags and the number of variables which were instrumented.

< Table 5a, 5b, 5c: Growth Effects of Credit Stocks and Fows: GMM results >

6. Summary, Discussion and Conclusions

In this paper we used newly collected data to re-examine the credit-growth nexus over 1990-2010 in 50 economies. We make two contributions. We distinguish between stock and flow effects of credit on growth and between the uses of credit into ‘nonfinancial business and consumption’ and ‘financial and real estate’ credit. Our new data show that over 1990-2010, there was strong growth of credit stocks relative to GDP while the share of nonfinancial credit in total credit decreased substantially. In the analysis, we find positive growth effects of credit flows, which suggests a positive ‘liquidity effect’. This diminishes at higher level of development, as a negative interaction effect between credit stocks and credit flows suggests. The growth effect of nonfinancial credit flows is several times larger than the growth effect of mortgage and financial credit flows. We find insignificant or negative growth effects of credit stocks, suggesting that many of the economies in our sample suffer from ‘too much finance’ (Arcand et al 2012). Third, there is evidence of nonlinearities in the credit-growth relation; not hump-shaped, but U-shaped (Shen and Lee 2006). The results are robust to using the Rajan and Zingales’ (1998) methodology and GMM specifications.

This paper builds on a number of recent papers which take the next step in studying the finance-growth nexus. Already before the crisis a number of contributions had pointed out different ways in which financial development affects growth, with some of these channels negative rather than positive. Going beyond a ‘banks vs. markets’ approach, there is a need to study the different effect of different kinds of credit, and to think hard about what financial development is – especially, how to view stock and flow effects, and how to evaluate credit’s impact on asset markets, as distinct from goods-and-services markets. By collecting and analysing new data, we contribute to this effort.

This research agenda can be extended in several directions. First, the impact of equity and other asset market is equally subject to stock and flow effects, which need to be included in the analysis of financial development. For some countries (such as the US and UK), a focus on bank credit implies missing a large part of the picture. Second, by restricting the analysis to domestic credit, we misunderstand the situation in countries

where international capital flows and/or foreign banks are important for household and business credit (e.g. Ireland, Hungary and Latvia). Third, to the extent that the composition of domestic credit is largely financed by international capital flows, this will shape the finance-growth nexus also in the domestic arena. Fourth, much remains to be done in the measurement of credit flows. Some central banks provide detailed public data while others do not. Harmonization of data provision would greatly assist further research. Finally, some papers have started modelling stock versus flow effects (Biggs et al 2010) and enterprise versus household credit (Japelli and Pagano 1994) but most work in this area so far is empirical. We are also in need of a better theoretical understanding of the functional differentiation of credit. We trust this paper is an inspiration.

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Data Appendix

The aim of the data base is to provide a detailed description of monetary financial institutions' (banks and credit unions) loan assets where the counterparty is a non-government nonbank. We collected data from the consolidated balance sheet of monetary financial institutions' from central bank sources of 53 countries over 1990-2011. On the asset side of the balance sheet, loans to nonbanks are reported. We included a country in the data set if loans were reported separately for mortgages to households, household consumption credit, credit to nonfinancial business, and credit to financial business (insurance firms, pension funds, and other nonbank financial firms). An alternative would be to collect data from the liabilities side of the counterparty, in a country's flow of fund data. However, not all countries provide sufficiently detailed flow of funds data on bank loans by sector. What is often reported is total borrowing, including equity market borrowing. We did not include this since, to the extent that equity is held in the private nonfinancial sector, this is a debt from the private nonfinancial sector to the private nonfinancial sector.

For each country, the source is always the country's central bank. There is large diversity in reporting formats. Only few central banks distinguish deposit taking institutions within the broader category of Monetary Financial Institutions. Most do not differentiate between lending to public sector firm and private sector firms, or between domestic currency loans and foreign currency loans. Some central banks (e.g. Switzerland's) report credit to ten or fifteen business sectors of the economy separately, which we collapsed into 'financial' and 'nonfinancial'. Some report bank lending to nonbanks as well as interbank lending (which we excluded from the data). In a few cases (Israel), bank loans were reported from the borrower's viewpoint, i.e. as liabilities. Some report only 'household' and 'business' lending. IN these cases, we assigned household lending to mortgages, unless we had evidence that it was unsecured consumer lending. Some data go back much before 1990; Switzerland's goes back to 1906, the US to 1952. But on average, data before 1990 were rare.

To give an impression of the complexity of the data collection process consider data for the Philippines. Starting from http://www.bsp.gov.ph/statistics/efs_fsa1.asp one can choose "Loans Outstanding: Universal and Commercial Banks". This file has two sheets, 1993-2001 and 2001-2013. It becomes apparent that before 2001 only commercial banks were reported, after 2001, both universal and commercial banks. However there is no break in the series when joined. The reason become clear when one downloads also http://www.bsp.gov.ph/statistics/spei_pub/Table%2048.pdf to see that Universal banks provide by far the most loans (1.8 bln) followed by commercial banks (KB) (0.2bln). The remainder is government and foreign-currency loans, jointly around 10% of all loans. Finally, while reviewing the various sources it becomes clear that these data do not include real estate loans; they are in a separate file at http://www.bsp.gov.ph/statistics/efs_fsa1.asp. In many cases data collection was comparatively more

straightforward. For instance, for Taiwan, starting from the central banks' website (<http://www.pxweb.cbc.gov.tw/Dialog/Saveshow.asp>) one navigates to the 'Statistics' part, then >> database by category >> loans and discounts at all banks >>by industry>> year, and this yields the data.

In our data, domestic bank credit includes loans by both domestic and foreign banks, in domestic and foreign currency. For reasons of consistency, it excludes non-bank lending and securitized bank loans. There are some countries which have large stock markets or much securitization, so that loan assets on banks' balance sheets paint only a small part of the picture. For one extreme example, this is why 'total credit' values for the US are comparatively low: most credit instruments in the US are market credit instruments, no bank loans to financial business are reported, and a large part of loans (especially, mortgages) is securitized so that it cannot be observed on banks' balance sheets. The total stock of credit market instruments relative to GDP in the US was 386% in 2011 (BEA flow of fund data), of which only 34% was bank credit (this data). The stock in 2011 of credit market instruments to the finance and real estate sectors relative to GDP was 200% and 99%, respectively (BEA flow of fund data), of which only 19% was bank credit (this data), all of it mortgage loans. However, the US is exceptional in this respect.

A similar issue exists for bank lending to government. In principle, to the extent that government spending causes GDP, this is one of the channels through which bank loans affect GDP. However, most government spending is financed by bonds rather than private loans, and total government lending by banks is usually small. We choose not to include this in our data.

Mortgages include household mortgages, which is only part of total mortgages. Some countries also report business mortgage lending separately from other lending to business, and in such cases it is clear that a substantial part of lending to business is lending secured by real estate. Since only few countries report this, we cannot include total mortgages and include only household mortgages. Apart from data availability issues, there are also analytical reasons to focus on household mortgages. The use of secured lending to business will be more linked to production and trade, and thus GDP, while the use of mortgages to household is almost exclusively to purchase real estate assets. Thus, the impact on GDP will be different.

< Table A1: the countries included, the start and end data of each series, and the average values for the four credit types >

Comparison to similar data

Beck et al. (2010) and Büyükkarabacak and Valev (2010) were the first to study similar data, using a data set for 73 countries over the years 1994 to 2005. Our data is not an update of this, but is newly collected. There are two principal reasons. We aimed to separate out mortgage and other household credit and to observe each credit

category at source. The Beck et al (2010) data is based on the financial development and structure (FDS) data base described in Beck, Demirguc-Kunt and Levine (1999) and updated in Beck et al (2013). Here "private credit" captures the financial intermediation with the private nonfinancial sector, including mortgages, as explained in note 5 in Beck, Demirguc-Kunt and Levine (1999) ("claims on real estate (=mortgage credit) is included for nonbanks lending"). The definition in the data of the variable "private credit by deposit money banks to GDP (%)" is "private credit by deposit money banks to GDP". In addition, the Beck et al (2010) credit data are deflated by the cpi deflator and then divided by real (deflated) GDP. Our data is nominal credit divided by nominal GDP.

In observing the different credit aggregates, Beck et al (2010) start with a 'total credit' (TC) measure taken from the FDS data base, which is credit to nonfinancial business (BC) plus credit to households. Credit to households includes consumer credit (CC) plus mortgages (MC). The 'household credit' measure in Beck et al. (2010) and in Büyükkarabacak and Valev (2010) is defined as (TC-BC), i.e. all non-business credit. This includes both MC and CC. Beck et al.(2010) and in Büyükkarabacak and Valev (2010) are ground breaking in that they are the first studies to look at growth effects of different credit aggregates across countries. One limitation of their data so is that but CC and MC are not separately observed. In the present paper we build on their work to show that mortgage and consumer credit have very different effects on growth. Table A2 show a comparison of our data to the Beck et al (2010) data.

< Table A2: comparing to the Beck Data >

A more recent comparable data set is the March 2013 Bank of International Settlement 'Long series on credit to private non-financial sectors' (BIS 2013). A description of the data is in Dembiermont et al (2013), including a link to data documentation. The principal differences with the current data are that BIS (2013) includes all lending to the nonfinancial sector, whereas we include bank lending to the nonbank sectors. This implies on one hand that the BIS data provide a more complete picture of all loans to the private sector, while on the other hand they do not include lending to the nonbank financial sector, which is substantial in some countries. A limitation of the BIS data is that by including in one credit measure also nonbank lending (which mostly is lending through securities markets), it is not possible to study the unique role of bank loans. For some countries BIS (2013) provides data for both total credit and bank credit, and in such instances the magnitude of the difference can be examined. For instance, in the long series for Norway, the data until 1974 are based on bank credit data, while the data after 1974 are from the financial accounts and the include all lending to the private nonfinancial sector. The stock of lending more than triples from 44 bn Crown to 155 bn Crown in March 1975, due to the inclusion of equity market lending (the Oslo stock exchange was founded already in 1819). In the years studied

in the present paper, bank lending in Norway (from 443 bn Crown in 1990 to 2,026 Crown in 2012) remained about one third of total lending (1,182 Crown in 1990, 6,026 Crown in 2012). In our data, the level of lending by Norwegian MFIs is about two thirds higher throughout the period, increasing from 783 bn Crown in 1990 to 3,346 Crown in 2011. The difference is probably due to non-bank MFIs such as credit unions which create credit but have no bank status in the statistics.

< *Table A3: comparing to the BIS Data* >

Tables and Figures

FIGURES

Figure 1: Total bank credit stocks 1990-210, average for 50 countries (% GDP)

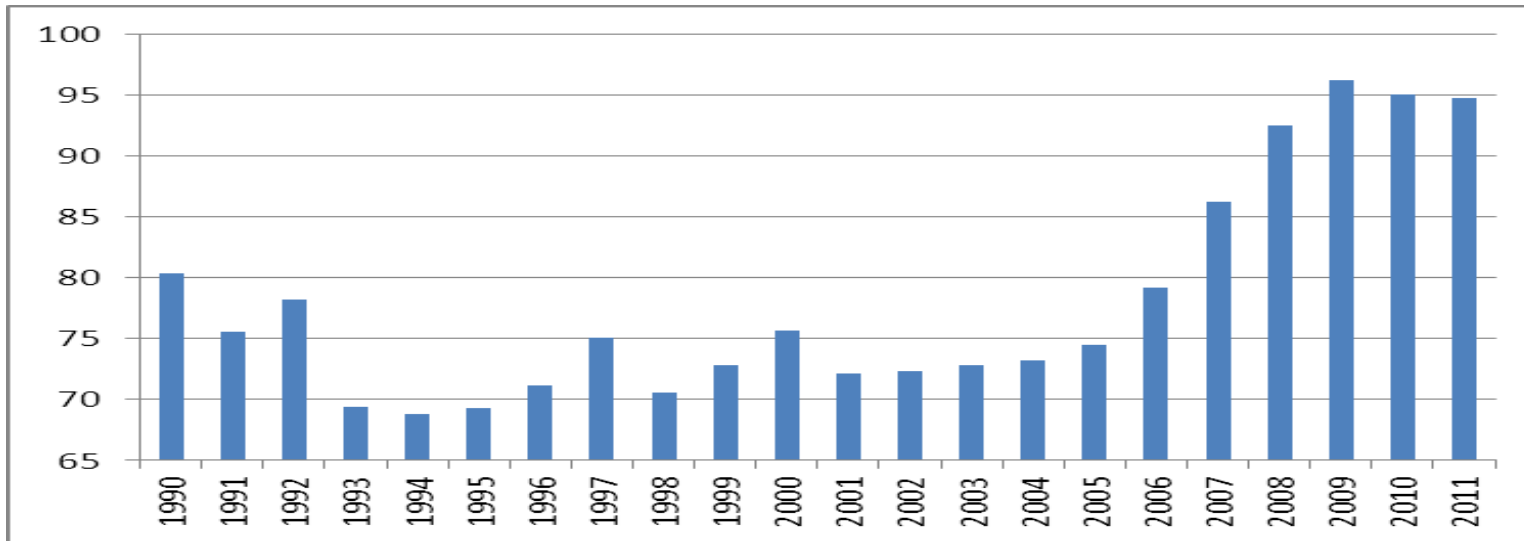


Figure 2: Bank credit flows (left) and stocks (right) 1990-210, average for 50 countries (% GDP)

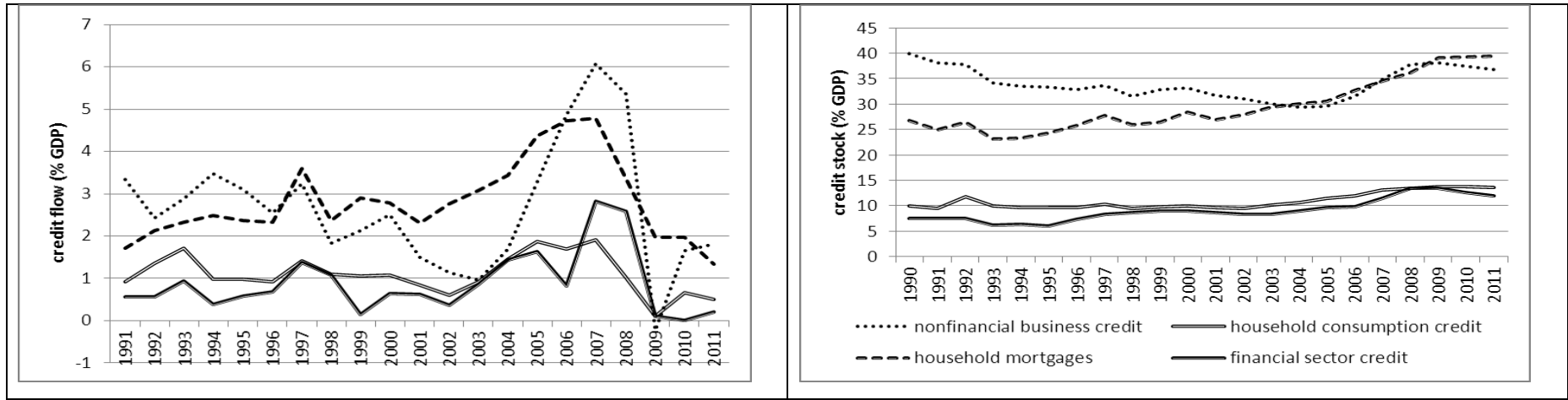
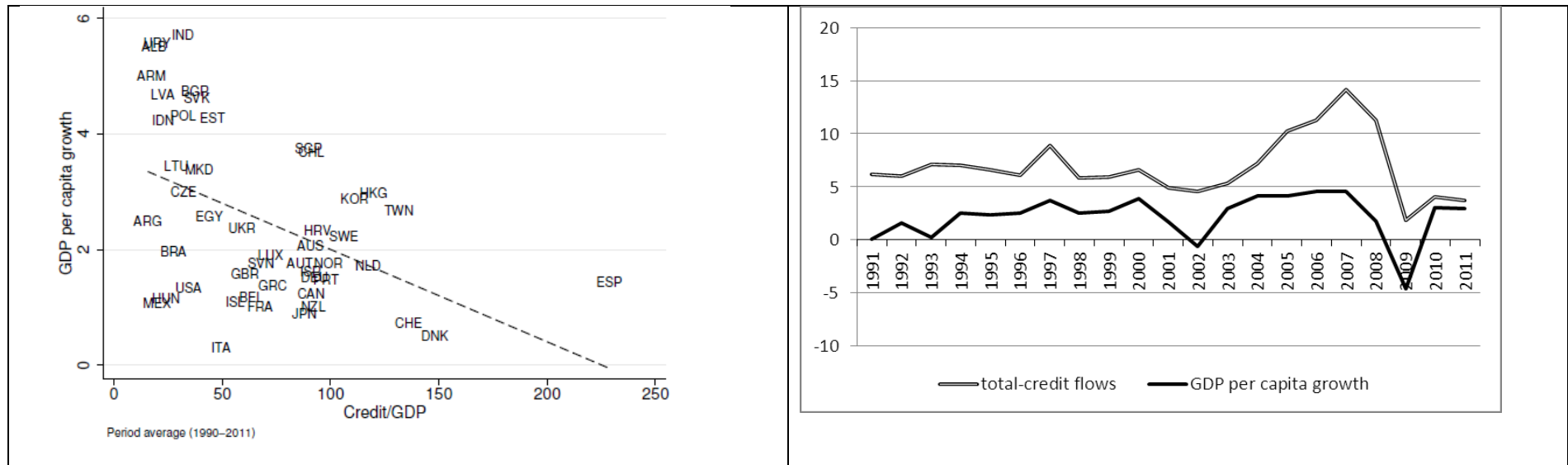


Figure 3: Credit and growth, 1990-2011: stocks (left) and flows (right)



TABLES

Table 1: descriptive statistics

Domestic bank credit to ... as % of GDP	N	mean	s.d.	minimum	maximum
a. nonfinancial business	763	33.8	19.3	1.6	94.6
b. financial business	553	9.7	13.2	0.0	85.3
c. households (nonsecured)	542	11.3	13.8	0.3	96.2
d. households (mortgages)	763	31.0	28.6	0.2	199.0
total (a+b+c+d)	763	79.8	53.0	2.0	389.5
the nonfinancial sectors (a+c)	763	41.8	26.4	1.6	190.5
finance & real estate (b+d)	763	38.0	33.7	0.2	199.0

Table 2: Growth Correlations Of Different Credit Flows

	A	b	c	d	a+b+c+d	a+c	b+d	GDP p.c. growth
Credit to...								
a. nonfinancial business	1.00							
b. households (nonsecured)	0.38	1.00						
c. households (mortgages)	0.40	0.29	1.00					
d. financial business	0.19	0.04	0.22	1.00				
total (a+b+c+d)	0.77	0.46	0.72	0.63	1.00			
nonfinancial sectors (a+c)	0.97	0.59	0.42	0.18	0.79	1.00		
finance & real estate (b+d)	0.37	0.20	0.74	0.82	0.86	0.37	1.00	
GDP p.c. growth	0.31	0.27	0.10	0.11	0.27	0.34	0.13	1.00

Table 3: Liquidity Effects and Financial Development Effects: Fixed Effect Panel Regressions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	(1)-(4): nonfinancial business and consumer credit				(5)-(8): mortgages + financial business			
log initial GDP p.c.	0.396**	0.285**	0.260**	0.207	0.403**	0.323**	0.350***	0.314**
	(0.156)	(0.127)	(0.125)	(0.142)	(0.152)	(0.124)	(0.123)	(0.132)
Credit flows/GDP *100		0.272**	0.307**	0.620**				
		(0.119)	(0.128)	(0.287)				
Credit stocks/GDP,*100	-0.057**		-0.079**	-0.058*				
	(0.024)		(0.037)	(0.031)				
Stocks x flows				-0.004				
				(0.002)				
Trade, % GDP	0.008	0.019	0.012	0.015	0.010	0.025**	0.022*	0.023**
	(0.014)	(0.011)	(0.012)	(0.011)	(0.013)	(0.010)	(0.011)	(0.011)
Gov. cons, % GDP	-0.223*	-0.125	-0.081	-0.042	-0.172	-0.246*	-0.161	-0.141
	(0.126)	(0.163)	(0.163)	(0.172)	(0.140)	(0.140)	(0.166)	(0.165)
Inflation	-0.002	-0.245**	-0.254**	-0.272**	-0.002	-0.208*	-0.202*	-0.201*
	(0.003)	(0.118)	(0.124)	(0.130)	(0.003)	(0.106)	(0.105)	(0.105)
Credit stocks/GDP,*100					-0.034*		-0.033	-0.020
					(0.020)		(0.023)	(0.022)
Credit flows/GDP*100						0.074**	0.095**	0.256***
						(0.033)	(0.039)	(0.073)
Stocks x flows								-0.002***
								(0.001)
Constant	2.479	1.190	4.050	2.591	-0.147	3.148	2.125	1.496
	(2.927)	(2.883)	(2.859)	(2.775)	(2.810)	(2.937)	(2.891)	(2.872)
Observations	763	713	712	712	763	713	712	712
R-squared	0.205	0.255	0.274	0.294	0.201	0.227	0.232	0.238
Number of nid	50	50	50	50	50	50	50	50

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4: Growth Effect of Credit Flows and Stocks Rajan-Zingales Specification

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
VARIABLES	(1)- (4): total credit				(5)-(8): nonfinancial business and consumer credit				(9)-(12): mortgages and financial business credit			
lagged industry share	-3.726***	-3.721***	-3.725***	-3.727***	-3.727***	-3.721***	-3.725***	-3.726***	-3.725***	-3.723***	-3.725***	-3.727***
	(0.438)	(0.440)	(0.438)	(0.438)	(0.437)	(0.440)	(0.435)	(0.435)	(0.439)	(0.440)	(0.439)	(0.439)
Ext. fin dep.*stocks	0.040**		0.034	0.077***	0.102**		0.094*	0.156***	0.053*		0.041	0.097**
	(0.018)		(0.021)	(0.023)	(0.045)		(0.050)	(0.054)	(0.031)		(0.034)	(0.038)
Stocks	-0.028***		-0.042***	-0.042***	-0.079***		-0.121***	-0.121***	-0.032*		-0.041**	-0.041**
	(0.009)		(0.011)	(0.011)	(0.020)		(0.024)	(0.024)	(0.017)		(0.018)	(0.018)
Flows		0.068*	0.116***	0.115***		0.216***	0.340***	0.340***		0.029	0.075	0.076
		(0.038)	(0.042)	(0.042)		(0.081)	(0.091)	(0.091)		(0.056)	(0.062)	(0.063)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,537	11,537	11,537	11,537	11,537	11,537	11,537	11,537	11,537	11,537	11,537	11,537
R-squared	0.278	0.279	0.279	0.280	0.278	0.279	0.280	0.281	0.278	0.278	0.278	0.279

Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 5a: Growth Effect of Credit Flows and Stocks: GMM results - total credit

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
total credit stock/GDP,*100	-0.072** (0.030)	-0.151*** (0.042)		-0.027* (0.015)	0.003 (0.024)	-0.082* (0.041)	-0.378** (0.170)		0.011 (0.088)	-0.011 (0.066)
Total credit stock/GDP,*100, ^2		0.000*** (0.000)					0.001* (0.000)			
Total credit flow /GDP *100			0.289*** (0.081)	0.198*** (0.065)	0.370*** (0.096)			0.348** (0.133)	0.293*** (0.103)	0.517*** (0.174)
Stock x flow					-0.001*** (0.000)					-0.001** (0.001)
initial GDPpc, at the beginning of 3-year	-1.107 (1.077)	-0.506 (0.468)	-3.240*** (0.983)	-1.482* (0.742)	-2.001*** (0.585)	-1.131* (0.579)	0.525 (0.636)	-0.674 (0.664)	0.023 (0.447)	-0.066 (1.083)
Trade	0.018** (0.008)	0.024*** (0.009)	0.010* (0.005)	0.010** (0.004)	0.006 (0.005)	0.021* (0.011)	0.047 (0.028)	-0.001 (0.006)	-0.004 (0.012)	-0.001 (0.016)
gvt consumption	0.022 (0.121)	0.102 (0.173)	0.075 (0.101)	0.012 (0.060)	0.006 (0.078)	0.021 (0.151)	0.229 (0.368)	-0.107 (0.076)	-0.170 (0.198)	-0.092 (0.218)
inflation	-0.005 (0.006)	-0.005 (0.006)	-0.264*** (0.093)	-0.225*** (0.075)	-0.212*** (0.067)	-0.004 (0.005)	-0.005 (0.007)	-0.154** (0.073)	-0.073 (0.235)	-0.179 (0.141)
Constant	15.890* (9.265)	12.288** (5.803)	31.455*** (8.628)	17.667*** (6.302)	20.289*** (4.746)	16.483*** (6.045)	11.224 (6.924)	9.875* (5.227)	3.924 (3.629)	4.627 (9.325)
Observations	761	761	710	710	710	761	761	710	710	710
Number of id	50	50	50	50	50	50	50	50	50	50
Sargan	127.0	136.9	93.69	135.1	162.5	63.62	68.26	109.0	59.73	58.83
sarganpvalue	0	1.57e-08	8.16e-07	1.72e-08	1.38e-08	0.0102	0.00637	7.42e-08	0.0231	0.00954
Hansen	45.93	47.44	46.75	48.35	46.13	37.60	22.26	37.27	23.72	22.00
hansenpvalue	0.176	0.813	0.131	0.756	0.995	0.579	0.995	0.679	0.981	0.968
ar2	0.00142	0.00105	0.197	0.0971	0.192	0.00143	0.00562	0.0771	0.0206	0.122

Standard errors in parentheses,

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

Table 5b: Growth Effect of Credit Flows and Stocks: GMM results - nonfinancial business and consumer credit

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
nonfin+cons credit stocks	-0.223**	-0.367***		-0.091**	-0.061	-0.252**	-1.061**		-0.104	-0.294
	(0.086)	(0.094)		(0.043)	(0.051)	(0.116)	(0.501)		(0.165)	(0.178)
nonfin+cons credit stocks , ^2		0.001**					0.004*			
		(0.000)					(0.002)			
nonfin+cons credit flows			0.689***	0.494***	0.916***			0.691**	0.505***	0.918**
			(0.156)	(0.122)	(0.194)			(0.267)	(0.124)	(0.379)
Stock x flow					-0.005***					-0.004
					(0.001)					(0.003)
initial GDPpc,	-0.914	-0.071	-2.937***	-1.117**	-0.739	-1.877**	0.339	-0.517	0.333	0.493
	(0.561)	(0.499)	(0.797)	(0.542)	(0.506)	(0.798)	(0.751)	(0.802)	(0.753)	(0.935)
Trade	0.023	0.027**	0.009*	0.010**	0.007	0.028*	0.057	-0.000	0.005	0.018
	(0.015)	(0.013)	(0.005)	(0.004)	(0.004)	(0.015)	(0.035)	(0.008)	(0.012)	(0.017)
gvt consumption	-0.132	-0.111	0.136	0.005	0.000	-0.059	0.010	-0.054	-0.098	-0.019
	(0.188)	(0.197)	(0.100)	(0.075)	(0.066)	(0.168)	(0.500)	(0.100)	(0.089)	(0.198)
Inflation	-0.006	-0.005	-0.334***	-0.301***	-0.306***	-0.007	-0.009	-0.217*	-0.239*	-0.449**
	(0.007)	(0.006)	(0.121)	(0.092)	(0.085)	(0.008)	(0.012)	(0.125)	(0.140)	(0.175)
Constant	20.515**	15.773***	27.335***	16.263***	11.422***	29.015***	27.994*	7.742	4.940	9.061
	(8.030)	(5.809)	(6.933)	(3.864)	(2.998)	(9.068)	(15.421)	(6.150)	(6.488)	(10.662)
Observations	761	761	710	710	710	761	761	710	710	710
Number of id	50	50	50	50	50	50	50	50	50	50
Sargan	111.2	119.5	75.77	117.3	167.4	54.68	56.61	107.3	56.55	56.85
Sarganpvalue	4.14e-09	2.47e-06	0.000177	3.08e-06	3.47e-09	0.0609	0.0654	1.25e-07	0.0432	0.0149
Hansen	45.92	45.55	45.76	45.58	47.29	32.94	24.16	33.50	23.06	19.95
Hansenpvalue	0.177	0.862	0.153	0.839	0.993	0.778	0.988	0.822	0.985	0.986
ar2	0.00266	0.00311	0.521	0.379	0.652	0.00641	0.0812	0.199	0.0377	0.861

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

Standard errors in parentheses

Table 5c: Growth Effect of Credit Flows and Stocks: GMM results - mortgages and financial business credit

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
mortg+fin.bus. credit stocks	-0.094*** (0.032)	-0.177** (0.074)		-0.048** (0.023)	-0.027* (0.016)	-0.088** (0.038)	0.617* (0.335)		0.130 (0.090)	0.310 (0.260)
mortg+fin.bus credit stocks , ^2		0.000 (0.000)					-0.003* (0.002)			
mortg+fin.bus credit flows			0.317** (0.147)	0.180** (0.074)	0.504** (0.231)			0.429** (0.200)	0.432** (0.182)	1.180** (0.544)
Stock x flow					-0.003* (0.002)					-0.006 (0.004)
initial GDPpc,	-1.278 (1.171)	-0.475 (0.731)	-3.075** (1.202)	-1.070 (1.057)	-0.667 (0.925)	-1.042* (0.520)	-0.157 (0.863)	-2.131** (0.919)	-0.245 (0.296)	0.683 (1.258)
Trade	0.016** (0.006)	0.018** (0.007)	0.010* (0.005)	0.009** (0.004)	0.005 (0.004)	0.015** (0.007)	-0.036 (0.028)	0.007 (0.005)	-0.014 (0.019)	-0.039 (0.037)
gvt consumption	0.087 (0.136)	0.118 (0.138)	-0.027 (0.076)	-0.002 (0.080)	-0.065 (0.068)	0.041 (0.134)	-0.807* (0.477)	-0.089 (0.082)	-0.407* (0.208)	-0.874 (0.639)
Inflation	-0.004 (0.005)	-0.004 (0.005)	-0.198** (0.082)	-0.183*** (0.058)	-0.132*** (0.043)	-0.003 (0.004)	0.004 (0.006)	-0.162** (0.065)	0.195 (0.128)	0.499 (0.354)
Constant	14.247 (11.316)	7.637 (6.852)	31.863*** (10.786)	13.991 (9.479)	10.193 (8.062)	12.649** (5.128)	8.114 (9.572)	23.834*** (7.538)	7.361 (4.858)	1.105 (14.932)
Observations	761	761	710	710	710	761	761	710	710	710
Number of id	50	50	50	50	50	50	50	50	50	50
Sargan	134.1	151.5	101.7	140.5	154.2	64.43	62.08	113.6	50.14	34.34
Sarganpvalue	0	1.64e-10	6.05e-08	3.26e-09	1.38e-07	0.00848	0.000511	1.62e-08	0.131	0.548
Hansen	47.56	47.43	44.19	48.09	48.08	39.44	22.06	34.63	22.05	21.68
Hansenpvalue	0.138	0.813	0.194	0.765	0.992	0.495	0.852	0.783	0.991	0.971
ar2	0.00133	0.000785	0.0741	0.0131	0.00685	0.00110	0.0216	0.0567	0.0256	0.212

Standard errors in parentheses

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

Table A1: The data: start and end dates and credit-to-GDP ratios, by country

country	start	End	Credit to ... (%GDP)				
			nonfinancial business	financial business	households (nonsecured)	households (mortgages)	total
ALB	1998	2011	14.6	32.8	.	3.9	36.1
ARG	1993	2011	10.5	.	3.0	2.0	15.5
ARM	2005	2011	11.2	.	4.1	1.9	17.2
AUS	1994	2011	34.7	6.8	7.5	48.5	97.5
AUT	1995	2011	47.7	6.6	.	38.2	92.5
BEL	1999	2011	30.2	1.4	.	33.2	64.8
BGR	1998	2011	25.7	.	6.4	5.3	37.4
BRA	1994	2011	19.7	3.9	.	7.8	31.4
CAN	1990	2011	18.4	0.2	26.0	46.6	91.2
CHE	1990	2011	43.2	1.5	.	92.9	137.6
CHL	1990	2011	43.4	.	36.4	11.3	91.1
CZE	1999	2011	17.0	3.8	5.3	9.8	35.9
DEU	1990	2011	53.0	3.2	10.9	28.5	95.6
DNK	2000	2011	44.1	7.2	25.3	78.7	155.3
EGY	1991	2011	36.2	.	.	7.7	43.9
ESP	1992	2011	59.7	.	62.1	106.9	228.7
EST	1999	2011	26.3	7.2	2.5	24.1	60.2
FIN	2009	2011	31.6	1.1	15.2	42.6	90.5
FRA	1993	2011	36.2	4.1	4.7	26.6	71.6
GBR	1990	2011	14.5	18.2	8.8	37.0	78.5
GRC	1998	2011	40.1	2.4	11.7	21.5	75.7
HKG	1990	2011	68.8	15.2	11.6	39.3	135.0
HRV	2001	2011	61.3	9.4	.	32.6	103.4
HUN	1990	2011	15.4	3.3	3.3	5.3	27.3
IDN	2002	2011	15.3	2.4	5.3	2.0	25.0
IND	2001	2011	25.3	2.4	3.3	3.2	34.2
ISL	2003	2011	14.1	.	.	41.7	55.9
ISR	1999	2011	58.9	.	10.8	21.0	90.7
ITA	1998	2011	22.7	11.7	2.8	23.9	61.1
JPN	1990	2011	56.6	8.5	3.2	28.0	96.4
KOR	2007	2011	60.2	4.8	20.5	30.3	115.8
LTU	1993	2011	18.4	1.7	3.0	7.4	30.4
LUX	1999	2011	30.2	50.9	8.3	33.8	123.2
LVA	1993	2011	14.8	1.4	2.2	5.5	23.9

Table A1 (continued)

country	start	end	Credit to ... (%GDP)					
			nonfinancial business	financial business	households (nonsecured)	households (mortgages)	Total	
MEX	2000	2011	8.0	.		3.1	8.7	19.8
MKD	2003	2011	12.0	.	.		7.1	19.1
NLD	1990	2011	49.1	20.0		8.1	60.0	137.2
NOR	1990	2011	33.6	.	.		65.4	99.0
NZL	1990	2011	32.0	25.1		4.8	55.1	117.1
POL	1996	2011	11.1	1.2		8.9	11.8	33.0
PRT	1990	2011	43.0	6.0		11.4	43.5	103.8
SGP	1990	2010	64.0	14.4	.		25.8	104.1
SVK	2004	2011	21.3	2.7	.		16.9	40.9
SVN	2004	2011	47.8	.	.		19.9	67.8
SWE	1996	2011	46.8	48.1	.		59.2	154.1
TWN	1997	2011	69.0	4.2		19.6	43.0	135.7
UKR	2005	2011	39.6	5.2	.		19.4	64.3
URY	2005	2011	13.2	.	.		6.6	19.8
USA	1990	2011	9.5	.		6.0	18.8	34.4

(Tables A2 and A3 to be added)