Credit Expansion and the Economy

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Abstract

Credit expansion has been associated with faster economic growth and with a higher occurrence of financial crises, a pair of results which seem to contradict each other. This paper advances an explanation for these results by separating credit to the private sector into credit to firms and credit to households. The empirical analysis shows that credit to firms is responsible for the positive growth effect, while the higher occurrence of crises is mainly due to credit to households. The events of the last decade, where fast credit expansion led to crises and very little growth, can be understood as a shift in the composition of credit towards its household component.

JEL classification: E44, G21.

Keywords: Credit; Growth; Financial Crises.

1 Introduction

Two large and influential literatures exploring the interactions between the financial system and the real economy are in substantial contradiction with each other. First, the voluminous finance and growth literature has long argued that credit to the private sector is conducive to faster economic growth.[1] Second, the literature on the determinants of financial crises has

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[1] Important papers in this literature include King and Levine (1993), Beck et al. (2000), Levine et al. (2000), Benhabib and Spiegel (2000), Rioja and Valev (2004), Aghion et al. (2005) and Badunenko and Romero-Avila (2013).

shown that credit to the private sector, usually its growth rate but also its level, is one of the most reliable predictors of financial mayhem.[2] The profession is thus left with the result that high levels of credit facilitate growth but rapid increases in credit bring about growth-sapping crises.

The dissonance between these two sets of results has been noted before, but few have addressed it. Two notable exceptions are Loayza and Ranciere (2006) and Ranciere et al. (2006). These papers study the possibility that credit to the private sector may have multiple effects, and set about estimating them by using a Pooled Mean Group estimator that distinguishes between short-term and long-term effects (Loayza and Ranciere 2006) or by considering a two-equation system where credit can affect two macroeconomic variables simultaneously (Ranciere et al. 2006). The present paper also advances an explanation for the apparent contradiction between the two literatures mentioned, but follows a completely different approach from Loayza and Ranciere (2006) and Ranciere et al. (2006).

At the core of the analysis lies the simple fact that credit to the private sector is actually the sum of two rather distinct elements: credit to non-financial firms and credit to households. These two types of economic agents differ in their objectives, constraints, and behaviour. Unsurprisingly, they also differ in the way they use credit and thus in the effects that the credit allocated to them has on economic growth and the occurrence of crises.

Non-financial firms (henceforth *firms*) use credit to finance the acquisition of inputs and the expansion of their capital stock, activities which are closely linked to the growth process. Households, on the other hand, are not engaged in production and use credit mainly as a tool for consumption-smoothing. Lending to households may be socially desirable for a number of reasons, but having an effect on economic growth is not one of them.[3]

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[2] For recent evidence, with an emphasis on the 2008 global financial crisis, see Schularick and Taylor (2012) and Jorda et al. (2011). For earlier evidence, with an emphasis on crises in developing countries, see Kaminsky and Reinhart (1999), Demirgüç-Kunt and Detragiache (1998, 2002) and Domac and Peria (2003).

[3] The main exception to this is student loans, which are used to accumulate human

Equally important, household and firm credit may have different effects on the occurrence of crises. Arguably, very rapid credit growth may characterize periods when borrowers' optimism turns into speculative frenzy. Following Kindleberger (1978), such episodes have a tendency to end in financial crises as asset prices are led into irrational territory before crashing down. While financial speculation may be fed by all kinds of credit, the above description seems specially relevant for the largest component of household credit - namely mortgages. Indeed, mortgages finance the acquisition of an asset whose supply is slow to react to changes in the market and whose demand is almost entirely determined by credit conditions - an ideal environment for self-fulfilling price buildups.

To summarize, credit to firms should be behind the overall association between credit and growth while excessive credit to households would be a natural explanation for the tendency of credit expansions to be followed by crises. With this in mind, I revisit the main results of the finance and growth literature and the literature on the determinants of financial crises but substitute measures of credit to the private sector with measures of credit to firms and households.

2   Data and descriptive statistics

My source for credit data is the 'Long series on credit to the private non-financial sector', first published by the Bank for International Settlements in April 2013.[4] The dataset disaggregates credit to the private sector into credit to firms and credit to households using a common methodology for a large set of countries. Another advantage is the coverage of different sources of credit: not just bank credit but also credit from non-bank financial intermediaries and credit obtained through the bond and short-term paper markets. For the average country in our sample, 30% of total credit was

capital and could therefore be expected to have a positive effect on growth. Student loans are relatively unimportant in most countries other than the United States - and even there they accounted for just 8% of total household credit in 2011.

[4]See Dembiermont et al. (2013) for a description of the data.

not bank credit in the year 2011. I use three series from this dataset: total credit (from all sources) allocated to the private sector, total credit allocated to firms, and total credit allocated to households. The sum of the last two series equals the first one. The data is available quarterly, I average it into annual values and normalize it by each country's nominal GDP in the year in question.

The BIS data offers a good coverage of countries with elaborate financial systems. Credit to the private sector is available for 39 countries while the data on credit to firms and credit to households covers 34 countries. In both cases all developed economies in Western Europe, North America and the Asia-Pacific region, plus most major emerging economies, are included. On the other hand, the time coverage is very uneven. Time series begin in different years for different countries, and the series of total credit to the private sector often begin much earlier than those of credit to firms and households. This results in about 70% more observations for the former as compared to the latter two.[5]

A couple of points are worthy of notice. First, household credit and firm credit are of the same order of magnitude in most countries. In 2010, the average ratio of household credit to firm credit for the countries in our sample was 0.80. Second, and this will be of relevance later on, household credit has had a tendency to grow faster than firm credit and this tendency markedly accelerated over the first decade of this century. This is illustrated in figure 1, where the ratio of household credit to firm credit averaged over three different groups of countries is plotted over time.[6] While differences in levels are apparent across these three groups, their evolution over time is remarkably similar. In all four cases we see a slowly increasing ratio of household credit to firm credit up to the year 2000, followed by a much steeper rise over the first few years of the 21st century.

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[5]See table A1 in the Appendix for more details on time coverage by country.

[6]Since the country coverage of our data increases over time, plotting the average over all available observations would introduce bias due to composition effects. Figure 1 gets around this by considering a constant set of countries with complete time series over three selected time periods.

[Figure 1 here]

3   Empirical analysis

3.1   Finance and growth

I follow the literature and use panel data analysis with 5-year growth in-
tervals as pioneered by Levine et al. (2000) and Beck et al. (2000). The
empirical specification is then:

$$g_{it} = \alpha_i + \lambda_t + \beta F_{it} + \gamma X_{it} + \varepsilon_{it} \tag{1}$$

where g_{it} is the annual growth rate of GDP per capita in country i during
growth interval t, F_{it} is either total credit to the private sector or, in the
present case, total credit to households and total credit to firms (in all cases
normalized by GDP), and X_{it} is a set of control variables taken from the
literature.[7] Equation (1) also includes country-specific fixed effects and a
full set of time dummies.

As is standard in the literature, I estimate (1) using the system GMM
methodology of Arellano and Bover (1995) and Blundell and Bond (1998),
taking as endogenous the credit measures and all controls. Results are pre-
sented in table 1.

[Table 1 here]

The first column of table 1 reproduces the standard result of the finance
and growth literature using the BIS data. Total credit to the private sector
has a positive effect on growth which is statistically significant at the 1%
level. The coefficient of private credit takes a value of 0.9, which is somewhat
smaller but not too removed from the values of $1.4 - 1.5$ obtained by Beck

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[7]I control for the initial level of GDP per capita, average years of schooling in the adult
population, government consumption over GDP, exports plus imports over GDP, and the
inflation rate. With the exception of GDP per capita and average years of schooling, all
variables are averaged over the five years of each growth period. All regressors are used
in log form.

et al. (2000) and Levine et al. (2000) using the same methodology but different time and country coverage and a more restricted measure of credit.

The second column of table 1 reruns the standard regression but restricts the time coverage to the first decade of the 21st century. As previously documented by Rousseau and Wachtel (2011) using a more restricted measure of credit, the positive growth effect disappears over this period: the estimated coefficient is negative and not statistically significant. This instability in the result brings doubts over the finance and growth nexus.

Column 3 incorporates our measures of credit to households and credit to firms. Results now tell a different story as credit is not universally growth-enhancing. Instead, we find a positive growth effect from credit to firms but a negative growth effect from credit to households. Both results are statistically significant although the coefficient on credit to firms is estimated with more accuracy. Furthermore, this result continues to hold in column 4, when we restrict our sample to the period 2000-2010. Even though this last regression contains just 65 observations, coefficients remain statistically significant at the 10% level and do not change much in magnitude. The stability of the result to this change in sample coverage is reassuring, and suggests a straightforward explanation for the disappearance of the positive growth effect of private credit over the last 10 years: as documented above, during this period most credit to the private sector was being directed to households.[8]

3.2 Determinants of financial crises

Again, I follow the literature and use logistic regressions to analyse the determinants of financial crises. The empirical specification is therefore:

$$P(crisis_{i,t} = 1) = \Phi(\beta X_{i,t}) + \varepsilon_{it} \tag{2}$$

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[8] Table 1 also reports the Arellano-Bond test for serial correlation of order two in the error term in differences for columns 1 and 3 (the test is not possible in columns 2 and 4 as these use only two time periods). In both instances the test does not reject the null of no serial correlation. I do not report the Hansen test of overidentifying restrictions as the large number of instruments renders it very weak.

where $crisis_{i,t}$ is a binary variable taking a value of 1 if a systemic financial crisis begins on year t in country i (and a value of 0 otherwise), Φ is the logistic function, β a vector of parameters to be estimated and $X_{i,t}$ a set of determinants of financial crises. Other than the level and growth rate of private credit, $X_{i,t}$ includes the level of GDP per capita, its growth rate, the inflation rate, and the ratio of M2 to international reserves (all lagged by one year) as additional determinants. Equation (2) is estimated using yearly data.

Our dating of systemic financial crises comes from Laeven and Valencia (2008), which is probably the most accepted source in the literature, extended for the years 2008-2010 using Reinhart and Rogoff (2011). The addition of these last three years is crucial as they incorporate the Global Financial Crisis of 2008. Table A2 in the Appendix presents a comprehensive list of all crises considered.

Results are reported in table 2. The first column uses all observations over the period 1960-2010. In line with the recent estimates of Schularick and Taylor (2012), the level of credit to the private sector is a statistically significant predictor of crises, but not its growth rate. On the other hand, column 2 removes the last five years of data and finds a statistically significant effect of the growth rate of credit, but not its level. This is in line with earlier results in the literature such as Demirgüç-Kunt and Detragiache (1998, 2002) and Domac and Peria (2003). It seems that the incorporation of the Global Financial Crisis, which affected almost exclusively developed nations, tends to shift the predictive power from the growth rate to the level of private credit.

[Table 2 here]

Column 3 substitutes credit to the private sector by credit to firms and households over the period 1960-2010. The level of household credit has a positive and statistically significant association with financial crises, and the magnitude of its coefficient is three times the one obtained for private credit

in column 1. Firm credit has also a positive association with financial crises but the coefficient is much smaller and statistically significant only at the 10% level. For both household and firm credit, it is the level and not the growth rate of the variable that helps predict crises.

When I re-estimate these last results removing the last five years of data I find no major differences when it comes to household credit (column 4). The coefficient on the level of household credit increases slightly and remains statistically significant at the 1% level. The growth rate of household credit remains not statistically significant. The results for firm credit change somewhat more, as statistical significance is lost for the level of this variable but characterizes its growth rate. While the change in the results for firm credit mimic those for overall credit to the private sector, it is reassuring to find a clear and unchanging relationship between household credit and the occurrence of crises. Finally, I note that I also tried estimating the effect of credit growth over the last 3 and 5 years instead of the last year, and obtained very similar results.

Putting the above results together, we observe that the apparent contradiction between the finance and growth literature and the literature on the determinants of financial crises may be satisfactorily explained. Once credit is disaggregated into its two main components, firm credit appears to be behind the positive growth effect while household credit is the main factor behind the enhanced occurrence of crises.

To drive the point home, I return to the estimates of table 1 but control for the occurrence of financial crises. If the negative effect of household credit on growth is the result of a higher occurrence of crises, we should see its coefficient move towards zero once crises are controlled for. In table 3, crises are controlled either by introducing a dummy variable taking a value of 1 if a crisis takes place within the 5-year interval in question (column 2) or by using the share of each 5-year interval for which a crisis was ongoing (column 3). Column 1 reproduces the results when crises are not controlled for.

As expected, the two variables controlling for the effects of crises have coefficients which are negative and statistically significant at the 1% level. More important, when these are introduced the coefficient on household credit falls in magnitude in columns 2 and 3 and loses statistical significance in column 3, which uses the more accurate measure of crises. I conclude that household credit is not damaging to growth as long as it is not allowed to degenerate into a financial crisis.

[Table 3 here]

4   Concluding remarks

This paper advances that pooling together household and firm credit, as much of the literature does when considering the effects of credit to the private sector, may not be advisable. Households and firms are different and we should expect different effects. Indeed, my analysis suggests that only firm credit has positive growth effects while most of the relationship between credit and crises comes about through household credit.

The result has a number of policy implications which future research should explore in more detail. Much of the policy effort following the Global Financial Crisis of 2008 has been directed at getting banks lending again. This paper puts in doubt the desirability of such unqualified policy objective - to whom you give credit matters as much as whether you give credit or not. Financial regulators and the Central Bank ought to pay attention not just to the level of private credit but also to its composition.

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Appendix

Data sources: Credit data and the years of systemic financial crises as indicated in the text. GDP per capita, government consumption over GDP, trade over GDP, and inflation come from the World Bank. Average years of schooling is from Barro and Lee (males and females, over 25 years old). All control variables are available for all countries over the whole period 1960-2010 with one exception (Argentina, for which there is no data on government consumption for 1980-1985 and no GDP per capita for 2010). For inflation we take the log of 1 plus the inflation rate given that inflation can be negative. Growth rates are calculated using log differences of GDP per capita.

[Table A1: country and time coverage of BIS credit data]

[Table A2: start years of systemic financial crises]

Table 1
Growth and credit to the private sector.

	(1) 1960-2010	(2) 2000-2010	(3) 1960-2010	(4) 2000-2010
Dependent variable: growth rate of GDP per capita				
Estimation method: System GMM				
Credit to the private sector / GDP	0.907***	-0.511		
	(0.185)	(0.326)		
Credit to households / GDP			-0.423*	-0.727*
			(0.232)	(0.425)
Credit to firms / GDP			0.651***	0.841*
			(0.237)	(0.456)
Initial GDP per capita	-1.289***	-1.889***	-1.179***	-1.083***
	(0.126)	(0.187)	(0.184)	(0.296)
Average years of schooling	1.984***	2.933***	1.266**	0.156
	(0.351)	(0.968)	(0.504)	(1.367)
Government spending / GDP	-1.530***	1.117	-2.010***	-0.470
	(0.292)	(0.756)	(0.378)	(0.937)
Trade / GDP	0.466***	1.859***	0.196	0.618
	(0.138)	(0.430)	(0.170)	(0.433)
Inflation rate	-0.644*	-6.876***	-6.951***	-4.724*
	(0.366)	(1.811)	(2.077)	(2.691)
Time dummies	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
Number of observations	296	77	171	63
Countries	39	39	33	33
Arellano-Bond test for AR(2)	0.098	--	0.438	--

Note: Standard errors in parenthesis. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. All variables are measured in logs. GDP per capita and average years of schooling are measured at the first year of each growth period. Credit to GDP, government spending, trade and inflation are averaged over all years of each growth period.

Table 2
Systemic financial crises and credit to the private sector.

	(1) 1960-2010	(2) 1960-2005	(3) 1960-2010	(4) 1960-2005
Credit to the private sector / GDP				
Level	1.035**	0.516		
	(0.485)	(0.746)		
Change over last year	2.732	8.500**		
	(2.669)	(3.558)		
Credit to households / GDP				
Level			3.066***	3.750**
			(0.963)	(1.578)
Change over last year			-7.186	-33.884
			(8.094)	(23.018)
Credit to firms / GDP				
Level			1.345*	2.024
			(0.716)	(1.490)
Change over last year			1.576	12.168**
			(2.212)	(6.108)
One-year lag of:				
GDP per capita (in logs)	-0.276*	-0.377*	-0.356	-0.913*
	(0.160)	(0.224)	(0.308)	(0.520)
Growth rate	0.001	-0.090	0.056	-0.083
	(0.056)	(0.063)	(0.081)	(0.100)
Inflation rate	0.001	0.000	0.030***	0.032**
	(0.000)	(0.001)	(0.010)	(0.012)
M2 / Reserves	-0.002	-0.030	-0.001	-0.012
	(0.004)	(0.031)	(0.003)	(0.022)
Observations	1,163	980	696	539

Dependent variable: dummy variable for the start year of systemic financial crises
Estimation method: Logistic regression

Note: Standard errors in parenthesis. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
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Table 3
Growth and credit: controlling for systemic financial crises

Dependent variable: growth rate of GDP per capita			
Estimation method: System GMM			

	(1) 1960-2010	(2) 1960-2010	(3) 1960-2010
Credit to households	-0.423*	-0.376*	-0.218
	(0.232)	(0.224)	(0.219)
Credit to firms	0.651***	0.769***	0.780***
	(0.237)	(0.231)	(0.223)
Crisis dummy		-1.267***	
		(0.240)	
Share of years in crisis			-2.516***
			(0.432)
Controls	included	included	included
Observations	171	171	171
Countries	33	33	33
Arellano-Bond test for AR(2)	0.438	0.632	0.593

Note: Standard errors in parenthesis. *** p<0.01, ** p<0.05, * p<0.1. All variables are measured in logs. GDP per capita and average years of schooling are measured at the first year of each growth period. Credit to GDP, government spending, trade and inflation are averaged over all years of each growth period.

Table A1
Country and time coverage of BIS data, in terms of 5-year intervals

Number of observations per country	Total credit to the private sector	Total credit to households and total credit to firms
10 observations (1960-2010)	Australia, Austria, Canada, Denmark, Greece, India, Italy, Korea, Netherlands, Norway, Portugal, Sweden, Thailand, United Kingdom, United States	Italy, Korea, United Kingdom, United States
9 observations (1965-2010)	Japan, Malaysia, South Africa	Canada, Japan
8 observations (1970-2010)	Argentina, Belgium, Finland, France, Germany, Ireland, Spain	Finland, Germany
7 observations (1975-2010)	Hong Kong, Indonesia	Australia, France, Norway
6 observations (1980-2010)	Mexico, Switzerland	Belgium, Portugal, Spain, Sweden
5 observations (1985-2010)	China, Turkey	Turkey
4 observations (1990-2010)	Brazil, Czech Rep., Hungary, Poland, Saudi Arabia, Singapore	Hong Kong, Hungary, Netherlands, Singapore, Thailand
3 observations (1995-2010)	Russia	Austria, Czech Rep., Denmark, Greece, Mexico, Poland
2 observations (2000-2010)	Luxembourg	Indonesia, Ireland, Switzerland
1 observation (2005-2010)		China, India, Luxembourg
Total number of countries	39	33
Total number of observations	298	171

Table A2
Start years of systemic financial crises (for countries in our sample)

Year	Countries
1977	Spain
1980	Argentina
1981	Mexico
1982	Turkey
1983	Thailand
1988	United States
1989	Argentina
1990	Brazil
1991	Finland, Hungary, Norway, Sweden
1992	Poland
1993	India
1994	Brazil, Mexico
1995	Argentina
1996	Czech Republic
1997	Indonesia, Japan, Korea, Malaysia, Thailand
1998	China, Russia
2000	Turkey
2001	Argentina
2007	Ireland, United Kingdom, United States
2008	Austria, Belgium, Denmark, France, Germany, Greece, Hungary, Italy, Netherlands, Portugal, Russia, Spain, Sweden, Switzerland

Figure 1

Household credit / Firm credit, 3 groups of countries over time
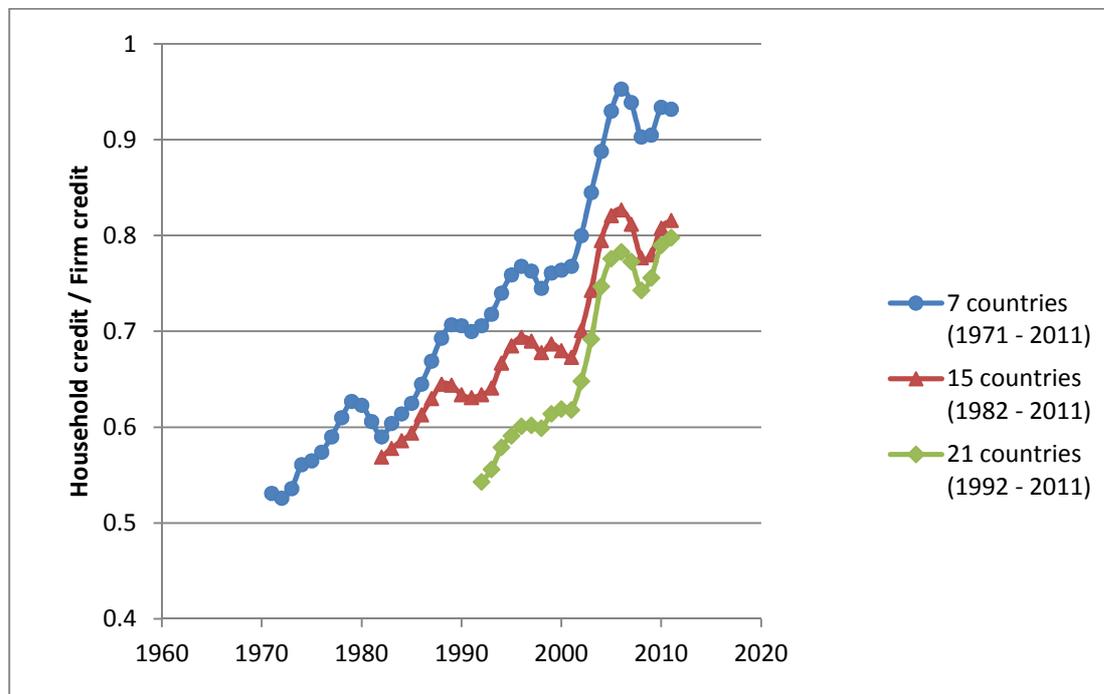
Country groups
7 countries: Canada, Finland, Germany, Italy, Japan, Korea, United States.
15 countries: 7 countries plus Australia, Belgium, France, Norway, Portugal, Spain, Sweden, United Kingdom.
21 countries: 15 countries plus Hong Kong, Hungary, Netherlands, Singapore, Thailand, Turkey.