Too Much Finance?

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Abstract

This paper examines whether there is a threshold above which financial development no longer has a positive effect on economic growth. We use different empirical approaches to show that there can indeed be "too much" finance. In particular, our results suggest that finance starts having a negative effect on output growth when credit to the private sector reaches 100% of GDP. We show that our results are consistent with the "vanishing effect" of financial development and that are not driven by output volatility, banking crises, low institutional quality, or by differences in bank regulation and supervision.

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..we are throwing more and more of our resources, including the cream of our youth, into financial activities remote from the production of goods and services, into activities that generate high private rewards disproportionate to their social productivity.

James Tobin (1984)

1 Introduction

This paper reexamines the relationship between financial depth and economic growth. It reproduces the standard result that, at intermediate levels of financial depth, there is a positive relationship between the size of the financial system and economic growth, but it also shows that, at high levels of financial depth, more finance is associated with less growth. This non-monotonic relationship between economic growth and the size of the financial sector is consistent with the hypothesis that there can be "too much" finance and can explain the recent finding of a vanishing effect of financial depth on economic growth.

The idea that a well-working financial system plays an essential role in promoting economic development dates back to Bagehot (1873) and Schumpeter (1911). Empirical evidence on the relationship between finance and growth is more recent. Goldsmith (1969) was the first to show the presence of a positive correlation between the size of the financial system and long-run economic growth. He argued that this positive relationship was driven by the fact that financial intermediation improves the efficiency rather than the volume of investment (this is also the channel emphasized by Greenwood and Jovanovich, 1990, and Bencivenga and Smith, 1991).[1] However, Goldsmith made no attempt to establish whether there was a causal link going from financial depth to economic growth. Several economists remained thus of the view that a large financial system is simply a by-product of the overall process of economic development. This position is well-represented by Joan Robinson's (1952) claim that: "where enterprise leads, finance follows."

In the early 1990s, economists started working towards identifying a causal link going from finance to growth. King and Levine (1993) were the first to show that financial depth is a predictor of economic growth and Levine and Zervos (1998) showed that stock market liquidity (but not the size of the stock market) predicts GDP growth. More evidence in this direction came from Levine, Loayza, and Beck (2000) and Beck, Levine, and Loayza (2000) who used different types of instruments and econometric techniques to identify the presence of a causal relationship going from finance to growth.[2] Finally, Rajan and Zingales (1998) provided additional evidence for a causal link going from financial to economic development by showing that industrial sectors that, for technological reasons, are more dependent on finance grow relatively more in countries with a larger financial sector.[3]

[1] There is limited empirical support for the Shaw (1973) and McKinnon (1973) view that finance affects growth because it mobilizes savings and thus increases the quantity (rather than the quality) of investment.

[2] Levine, Loayza, and Beck (2000) instrumented their cross sectional regressions with legal origin (La Porta et al., 1998) and Beck, Levine, and Loayza (2000) argued for causality by using the GMM estimators developed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998).

[3] While the Rajan and Zingales (1998) approach can only be used to evaluate the relative effect of financial development, it does provide strong support for the main channel through which finance should affect growth.

Although there is by now a large literature showing that finance plays a positive role in promoting economic development (Levine, 2005), there are also a few papers that question the robustness of the finance-growth nexus.[4] Demetriades and Hussein (1996) apply time series techniques to a sample of 16 countries and find no evidence of a causal relationship going from finance to growth. Arestis and Demetriades (1997) and Arestis et al. (2001) discuss how institutional factors may affect the relationship between finance and growth and warn against the one-size-fits-all nature of cross-sectional exercises. Demetriades and Law (2006) show that financial depth does not affect growth in countries with poor institutions and Rousseau and Wachtel (2002) find that finance has no effect on growth in countries with double digit inflation. De Gregorio and Guidotti (1995) show that in high income countries financial depth is positively correlated with output growth over the 1960-1985 period but that the correlation between financial depth and growth becomes negative for the 1970-85 period. They suggest that high income countries may have reached the point at which financial depth no longer contributes to increasing the efficiency of investment. Rousseau and Wachtel (2011) also find a vanishing effect of financial depth and show that credit to the private sector has no statistically significant impact on GDP growth over the 1965-2004 period.

The recent crisis also raised concerns that some countries may have financial systems which are “too large” compared to the size of the domestic economy.[5] The idea that there could be a threshold above which financial development hits negative social returns is hardly new. Minsky (1974) and Kindleberger (1978) emphasized the relationship between finance and macroeconomic volatility and wrote extensively about financial instability and financial manias. More recently, in a paper that seemed controversial then, and looks prophetic now, Rajan (2005) discussed the dangers of financial development suggesting that the presence of a large and complicated financial system had increased the probability of a “catastrophic meltdown.” In an even more recent paper, Gennaioli, Shleifer, and Vishny (2010) show that in the presence of some neglected tail risk financial innovation can increase financial fragility even in the absence of leverage.

Easterly, Islam, and Stiglitz (2000) empirically show that there is a convex and non-monotone relationship between financial depth and the volatility of output growth. Their point estimates suggest that output volatility starts increasing when credit to the private sector reaches 100% of GDP. Besides increasing volatility, a large financial sector may also lead to a suboptimal allocation of talents. Tobin (1984), for instance, suggested that the social returns of the financial sector are lower than its private returns and worried about the fact that a large financial sector may “steal” talents from the productive sectors of the economy and therefore be inefficient from society’s point of view.[6]

[4] Among the remaining skeptics, Levine (2005) cites Robert Lucas (1988). Rodrik and Subramanian (2009) also suggest that economists may overemphasize the role of finance in economic development. For a recent survey see Panizza (2011).

[5] Wolf (2009) noted that over the last three decades the US financial sector grew six times faster than nominal GDP and argued that there is something wrong with a situation in which: “instead of being a servant, finance had become the economy’s master.” Rodrik (2008) asked whether there is evidence that financial innovation has made our lives measurably and unambiguously better.

[6] There are two distortions that may create a wedge between private and social returns: bank bailouts and the remuneration structure of bank managers (Rajan, 2010, Crotty, 2009). The second distortion may also lead to a reduction of shareholder value. Deidda (2006) develops a model in which the financial sector

Although there seem to be a contradiction between the empirical literature that finds a positive effect of financial depth on economic development and the literature that has shown that credit growth is a predictor of banking and currency crises (e.g., Kaminsky and Reinhart, 1999), the fact that a large financial sector may increase volatility does not necessarily mean that large financial systems are bad. It is possible that countries with large financial sectors pay a price in terms of volatility but are rewarded in terms of higher growth (Rancière, Tornell, and Westermann, 2008). Loayza and Rancière (2006) reconcile these two findings by using a panel error correction model to jointly estimate the short and long-run effects of financial depth. They find that a positive long-run relationship between financial depth and economic growth coexists with a negative short-run relationship between these two variables, and that this negative short-run relationship is mostly driven by financial crises. These authors, however, do not allow for a non-monotone effect of financial depth. In order to ascertain whether there can be "too much" finance, it is thus necessary to test whether there is a threshold above which financial depth starts having a negative impact on growth.

Surprisingly, there is limited work that considers a non-monotone relationship between financial and economic development. To the best of our knowledge, Deidda and Fattouh (2002) and Rioja and Valev (2004) are the only authors who consider a non-monotone relationship between financial and economic development. Deidda and Fattouh (2002) use cross-country data and a threshold regressions model to show that financial depth has a positive but statistically insignificant impact on output growth in countries with low level of economic or financial depth and that financial depth has a positive and statistically significant impact on growth in countries with higher levels of economic and financial depth. Rioja and Valev (2004) split a panel of 72 countries into three regions and show that there is no statistically significant relationship between finance and growth at low levels of financial depth, there is a strong and positive relationship at intermediate levels of financial depth, and that there is a weaker but still positive and statistically significant effect of finance at higher levels of financial depth.

In this paper we use different datasets and empirical approaches to show that there can indeed be “too much” finance. In particular, our results show that the marginal effect of financial depth on output growth becomes negative when credit to the private sector reaches 80-100% of GDP. This result is surprisingly consistent across different types of estimators (simple cross-sectional and panel regressions as well as semi-parametric estimators) and data (country-level and industry-level). The threshold at which we find that financial depth starts having a negative effect on growth is similar to the threshold at which Easterly, Islam, and Stiglitz (2000) find that financial depth starts having a positive effect on volatility. This finding is consistent with the literature on the relationship between volatility and growth (Ramey and Ramey, 1995) and that on the persistence of negative output shocks (Cerra and Saxena, 2008). However, we show that our finding of a non-monotone relationship between financial depth and economic growth is robust to controlling for macroeconomic volatility, banking crises, and institutional quality.

Our results differ from those of Rioja and Valev (2004) who find that, even in their “high region,” finance has a positive, albeit small, effect on economic growth. This difference is

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can have a negative effect on growth because it subtracts resources from the productive sectors.

probably due to the fact that they set their threshold for the "high region" at a level of financial depth which is much lower than the level for which we start finding that finance has a negative effect on growth.[7]

Our results are instead consistent with the vanishing effect of financial depth found by Rousseau and Wachtel (2011). If the true relationship between financial depth and economic growth is non-monotone, models that do not allow for non-monotonicity will lead to a downward bias in the estimated relationship between financial depth and economic growth. Empirical work that used data up to the 1990s found a positive effect of financial depth on growth because the sample included few countries with a level of financial depth above the point at which finance starts having a negative marginal effect. Over the last twenty years financial sectors have grown rapidly.[8] As the downward bias increases with the size of the financial sector, it is not surprising that exercises that use recent data find a vanishing effect of financial depth. This vanishing effect, however, is not driven by the fact that something changed in the fundamental relationship between financial depth and economic growth, but by the fact that models that do not allow for a non-monotone relationship between financial depth and economic growth are miss-specified.

The rest of this paper is organized as follows. Section 2 looks at the relationship between financial depth and economic growth using country-level data. Section 3 studies the role of volatility, crises, institutional quality, and bank regulation and supervision. Section 4 investigates non-linearities using industry-level data and the Rajan and Zingales (1998) approach. Section 5 concludes.

2 Country-Level Data

We build on the large literature that uses country-level data to show the presence of a causal positive relationship going from financial depth to economic growth (Levine, 2005) and use parametric and non-parametric techniques to look at what happens if we allow for a non-monotonic relationship between financial depth and economic growth.[9]

In order to compare our results with the existing literature we stay as close as possible to the set-up described in Beck and Levine (2004). We think that this paper is a good benchmark because it is one of the most recent empirical pieces on financial depth and economic growth by the two leading scholars in the field and it is thus a good proxy of the quasi-consensus in the economics literature.[10] However, we deviate from Beck and Levine's in a few important

[7] In Rioja and Valev (2004) the highest threshold for credit to the private sector is 37 percent of GDP. Our result also differ from those of Deidda and Fattouh (2002) who, however, concentrate on non-linearities at the bottom of the distribution of the financial development variable.

[8] A typical regression that uses 5-year non overlapping growth periods to study the relationship between financial depth and economic growth over the period 1960-90 includes 16 country-periods (3.5% of the total number of observations) for which the standard measure of financial depth (credit to the private sector as a share of GDP) is greater than 90%. A similar regression that covers the 1960-2010 period includes 99 country-periods (11% of the total number of observations) for which credit to the private sector is greater than 90% of GDP.

[9] Most studies use the log of financial development and therefore allow for a non-linear relationship between financial development and economic growth. However, they do not include higher polynomial terms and thus they do not allow for a non-monotonic relationship between these two variables.

[10] With the caveats mentioned in the introduction.

ways, which we describe below.

As in most of the literature that looks at the relationship between finance and growth, we quantify financial depth by using credit to the private sector. The use of this variable is usually justified with the argument that a financial system that lends to private firms is more likely to stimulate growth through its risk evaluation and corporate control capacities than a financial system that only provides credit to the government or state-owned enterprises (King and Levine, 1993). There are many reasons why this variable, which only captures quantities, is an imperfect measure of financial development (for a discussion, see Levine, 2005) but at this stage it remains the best indicator of financial depth which is available for a large cross-section of countries.

In measuring credit to the private sector, we depart from Beck and Levine (2004) and use total credit to the private sector extended by deposit banks and other financial institutions (this is the same variable used by King and Levine, 1993) instead of using total credit to the private sector extended by deposit banks. Until the late 1990s, bank credit to the private sector was almost identical to total credit to the private sector. Since most papers that study the relationship between financial depth and growth use data that end in the year 2000, the choice between these two variables did not really matter. However, these two measures of financial depth started diverging at the beginning of the new millennium and there are now several countries in which total credit to the private sector is much larger than bank credit to the private sector. In the United States, for instance, the creation of a "shadow banking system" has led to a situation in which total credit to the private sector is almost four times larger than credit extended by deposit-taking banks. Moreover, since we are attempting to assess the impact of financial depth in countries where the sector is particularly large, it is arguably wiser to use a measure of financial depth that is more in tune with our hypothesis of there being potentially "too much" finance.

In a previous version of this paper (Arcand et al., 2011), we followed Beck and Levine (2004) and used the turnover ratio in the stock market as a second indicator of financial depth. However, controlling for the turnover ratio imposes severe constraints in term of country and time coverage. Therefore, we now decided to concentrate on credit to the private sector. The results described below are robust to controlling for the turnover ratio.[11]

As is standard in the literature on financial depth and economic growth, all of our regressions include the log of initial GDP per capita to control for convergence, the initial stock human capital accumulation, trade openness, inflation, and the ratio of government expenditures to GDP. Our data cover the period 1960-2010 and we estimate models for different sub-periods.[12]

[11] The results are in Arcand et al., (2011). In the regressions that include turnover we find that there is a positive and monotone relationship between the turnover ratio and economic growth, and that the non-monotone relationship between credit to the private sector and economic growth is robust to controlling for the turnover ratio.

[12] Table 10 describes all the variables used in the empirical analysys and provides a list of sources. Table 11 reports the summary statistics.

2.1 Cross-Sectional Regressions

We follow Beck and Levine (2004) and start our analysis with a set of simple cross-country regressions in which we regress average GDP per capita growth for the different time periods over the set of variables described above. While we are aware of the fact that there serious endogeneity problems with the simple cross-sectional regressions of this section, we think that there is some value in this exercise as simple OLS is the most transparent way to look at the data.

Column 1 of Table 1 estimates a specification similar to that used by Beck and Levine (2004). Even though we use a slightly different time period (1970-2000 instead of 1975-1998), we can reproduce their result of a positive and statistically significant correlation between GDP growth and the log of credit to the private sector over GDP.

In Column 2, we start exploring the "too much" finance hypothesis by replacing the log of credit to the private sector with the level of credit to the private sector (PC) and a quadratic term in this variable (PC^2). We find that both PC and PC^2 are statistically significant. While the coefficient of the linear term is positive, the quadratic term is negative, indicating a concave relationship between credit to the private sector and GDP growth. The last row of the table shows that the point estimates indicate that financial depth starts yielding negative returns when credit to the private sector reaches 83% of GDP.

In Columns 3 and 4, we estimate the same models of columns 1 and 2, now focusing on the period 1970-2005. We still find a positive correlation between the log of credit to the private sector and GDP growth (column 3), but the coefficient is slightly smaller than that of column 1 and less precisely estimated. The linear and quadratic terms of column 4 are instead very close to those of column 2 and they still indicate that the marginal effect of credit to the private sector becomes negative at 82% of GDP. If we estimate the model for the period 1970-2010 we obtain similar results (columns 5 and 6 of Table 1).

Figure 1 plots the marginal effect of credit to the private sector on growth based on the estimates of column 6,Table 1. It shows that the positive effect of financial depth is no longer statistically significant when credit to the private sector reaches 51% of GDP (nearly 40% of the observations in the regression of column 6 are above this threshold) and that the effect of financial depth becomes negative and statistically significant when credit to the private sector surpasses 97% of GDP (10% of the observations in the regression of column 6 are above this threshold).

We obtain similar results if we move our starting year to 1980 and estimate the model for the period 1980-2010 (columns 1 and 2 of Table 2). However, if we estimate the model for the period 1990-2010, we find that the coefficient associated with the log of credit to the private sector decrease by nearly 50% and it is no longer statistically significant (column 3). This is consistent with Rousseau and Wachtel's (2011) vanishing effect. However, the vanishing effect does not apply to the quadratic model of column 6. In that case, both coefficients remain statistically significant and still imply a turning point when credit to the private sector approached 100% of GDP.

Figure 1 shows that the correlation between credit to the private sector and economic growth is positive and statistically significant when financial depth is low and negative and statistically significant when financial depth is high. These are necessary but not sufficient conditions for the presence of a non-monotonic relationship between credit to the private sector and economic growth. Given a model of the type $y_i = aPC_i + bPC_i^2 + Z_iC + u_i$, Lind and Mehlum (2011) show that in order to check for the presence of an inverted U relationship it is necessary to formulate the following joint null hypothesis:

$$H_0 : (a + b2PC_{\min} \leq 0) \cup (\ a + 2bPC_{\max} \geq 0). \tag{1}$$

against the alternative:

$$H_1 : (a + b2PC_{\min} > 0) \cap (a + 2bPC_{\max} < 0). \tag{2}$$

Where $PC_{\min}$ and $PC_{\max}$ are the minimum and maximum values of credit to the private sector. The test described in (1) and (2) is non-trivial because of the presence of inequality constraints. Lind and Mehlum (2011) use Sasabuchi's (1980) likelihood ratio test to build a test for the joint hypotheses of Equations (1) and (2).

The first column of Table 3 reports the results of the Sasabuchi-Lind-Mehlum (SLM) test based on the results of column 2 of Table 1. The top panel of the table shows that the marginal effect of credit to the private sector is positive and statistically significant at $PC_{\min}$ and negative and statistically significant at $PC_{\max}$ (we already saw this in Figure 1). The bottom panel of the table shows that the SLM test rejects H_0 and thus indicates that our results are consistent with the presence of an inverted U relationship between credit to the private sector and economic growth. The last row of Table 3 reports a 90% Fieller interval and shows that the relationship between credit to the private sector and economic growth is not statistically significant when PC ranges between 65% and 124% of GDP. The second and third columns of Table 3 shows that the SLM test yields even stronger results when we use regressions based on more recent data.

2.1.1 Semi-parametric estimations

The OLS regressions of Table 1 support the idea that the square of credit to the private sector belongs in the regression model and that the effect of credit to the private sector on growth is concave and non-monotone. However, our results differ from those of Rioja and Valev (2004) who find an S-shaped relationship between financial depth and economic growth which could be better described by a cubic polynomial. Our results could thus be spurious and driven by the particular parametric relationship that we chose to estimate. To address this issue and uncover the true relationship between financial depth and economic growth, we estimate a set of semi-parametric regressions which allow financial depth to take a general functional form.

Formally, we use the differencing procedure suggested by Yatchew (2003) and approximate the functional space with a penalized spline smoother (Wand, 2005) to estimate different variants of the following model:

$$GR_i = \beta_0 + X_i\beta + f(PC_i) + \varepsilon_i. \tag{3}$$

When we estimate the model of column 6, Table 1 without controlling for inflation, government consumption and trade openness and by allowing credit to the private sector to take a general form, we find that the relationship between PC and GDP growth is concave and non-monotone. The semi-parametric estimator plotted by the solid black line in the left panel of Figure 2 shows that GDP growth reaches a maximum when credit to the private sector is at 92% of GDP. This threshold is slightly higher but similar to the one obtained with the quadratic model. The figure also shows that the quadratic fit (the solid light line) obtained from Table 1 is a good approximation of the semi-parametric fit. The solid black line in the right panel of Figure 2 shows the results of the semi-parametric estimation of a model which includes the same controls used in column 6 of Table 1. Again, we find that the relationship between PC and GDP growth is concave and non-monotone and that the level of financial depth that maximizes GDP growth is slightly lower than what we found with the simple quadratic model of Table 1 (78% percent of GDP instead of 88% of GDP). Also in this case, the quadratic fit (the light solid line) appears to be a good approximation of the semi-parametric estimation of the relationship between financial depth and economic growth.

Summing up, the preliminary analysis based on cross-sectional data suggests that there is a non-monotonic, concave relationship between private credit and GDP growth and that a quadratic functional form does a good job at approximating this non-linear relationship.

2.2 Panel Regressions

Having established the presence of a non-monotonic relationship between credit to the private sector and economic growth using cross-sectional data, we now exploit the time variation of our sample by splitting our 30 years of data into 6 non-overlapping 5-year periods.

As is now standard, we estimate our model using the GMM system estimator originally proposed by Arellano and Bover (1995) and Blundell and Bond (1998). In all of our regressions we use the two-step procedure proposed by Arellano and Bond (1991) and obtain robust standard errors using the Windmeijer (2005) finite sample correction.[13]

As in the cross country analysis, we start by replicating the standard model that impose a monotonic relationship between financial depth and economic growth. In the first four columns of Table 4, we measure financial depth using the log of credit to the private sector over GDP (this is the same variable used by, among others, Beck and Levine, 2004) and in the last four columns we use the level of credit to the private sector over GDP. Besides the lagged value of credit to the private sector over GDP (or the log of this variable), all regressions include time fixed effects and the lagged values of the controls that are normally used in the literature that studies the link between financial development and economic growth: initial GDP per capita, average years of education; government consumption over GDP; trade openness; and inflation.[14] The bottom panel of the table reports the standard specification tests and show that all regressions reject the null of no first order autocorrelation, and that most models do not reject the null of no second order autocorrelation (the exception is

[13] One source of concerns when estimating fixed effect model is that the limited within-country variability of the data tends to amplify the attenuation bias brought about by the presence of measurement errors. However, our variables of interest display substantial cross-country and within-country variation. Credit to the private sector, for instance, has a between-country standard deviation of 0.30 and a within-country standard deviation of 0.22 (the overall standard deviation is 0.37). All regressions use all available lags as instrument, but the results are robust to only using up to 4 lags.

[14] As in Beck and Levine, we take logs of all this variables. We deal with zero values by applying the inverse hyperbolic sine transformation ($\widehat{x} = \ln(x + \sqrt{x^2+1})$) described by Burbidge et al. (1988).

column 4, where the AR2 coefficient is marginally significant with a p-value of 0.09). The Hansen test of overidentification restrictions never rejects the null, and thus support the validity of our exclusion restrictions.[15]

The first column of Table 4 estimates the model for the period 1960-1995 and confirms the presence of a positive and statistically significant correlation between the log of financial depth and economic growth. Our point estimate of 1.9 is close to what found by Beck and Levine (2004) who in their system estimations find coefficients that range between 1.7 and 2.2. When we estimate the model for the period 1960-2000 (column 2), we still find a positive and statistically significant correlation between financial depth and economic growth. However, the coefficient is now much lower (about one-third that of column 1) and less precisely estimated. If we use even more recent data (1960-2005 in column 3 and 1960-2010 in column 4), we find even smaller coefficients which are no longer statistically significant. The last four columns of Table 4 show the same pattern using the level of financial development: the correlation between financial depth and growth decreases when we add more data and is not statistically significant for the 1960-2005 and 1960-2010 periods. Like in the cross-country regressions, the models of Table 4 show the vanishing effect of financial deepening documented in great detail by Russeau and Wachtel (2011). The fact that using more recent data weakens the relationship between financial depth and growth is also consistent with De Gregorio and Guidotti's (1995) finding that the positive correlation between credit to the private sector and GDP growth weakened after the 1970s.

There are two possible explanations for the vanishing effect documented in Table 4. One possibility is that something has changed in the fundamental relationship between financial depth and economic growth. The second explanation has to do with the fact that the true relationship between financial development and economic growth is non-monotone and the models of Table 4 are miss-specified and suffer from a downward bias.

This downward bias is likely to be small for regressions that include relatively few country-period with high levels of financial development. However, financial sectors grew rapidly over the 2000-10 period, with the cross-country average of credit to the private sector going from 36% of GDP in 1985 to 55% of GDP in 2005 (left panel of Figure 3). Over the same period, the number of countries in which private credit was greater than 90% of GDP increased from 4% to 22% of the total (right panel of Figure 3). As a consequence, the regressions of columns 1 and 5 of Table 4 include 27 observations (5% of the total) for which PC is greater than 90% of GDP, but the regressions of columns 4 and 8 include 99 observations (11% of the total) for which PC is greater that 90% of GDP.

If the relationship between financial depth and growth is indeed non-monotonic, the increase in the share of observations with a large financial sector must have played a role in amplifying the downward bias of the miss-specified regressions of Table 4, leading to the low and insignificant point estimates of columns 3-4 and 7-8. In other words, even if wrong, the standard specification worked well with smaller financial sectors, but may lead to a severe downward bias in the presence of larger financial sectors.

In Table 5 we explore non-linearities by using the same approach that we used with

[15] The high p-values of the OID test, however, suggest that we might be overfitting the model. By reducing the number of lags in the set of instruments, we find results which are similar to those of Table 4, but with slightly lower values of the OID test.

the cross-sectional regressions of Table 1. Specifically, we augment the model of the last 4 columns of Table 4 with the square of credit to the private sector over GDP and check for the presence of a non-monotonic relationship between credit to the private sector and GDP growth. We find that both the linear and quadratic terms are always statistically significant. The point estimates of the regressions that use data for the period 1960-1995 and 1960-2000 (columns 1 and 2) suggest that the marginal effect of financial depth becomes negative when credit to the private sector reaches 140% of GDP (last row of Table 5). Including more recent data lowers this threshold to 100% (for the 1960-2005 period, column 3) and 90% (for the 1960-2010 period, column 4). Using more recent data also leads to more precise estimates of the quadratic term. This fact is consistent with the idea that recent data amplify and the downward bias of the miss-specified models of Table 4.

Figure 4 plots the marginal effect of credit to the private sector on economic growth. It shows that the positive effect of financial depth is no longer statistically significant when credit to the private sector reaches 42% of GDP (more than 30% of the observations in the regression of column 4 are above this threshold), it becomes negative when PC is at 90% of GDP (11% of of the observations in the regression of column 4 are above this threshold), and negative and statistically significant when financial depth reaches 113% of GDP (6% of the observations in the regression of column 4 are above this threshold). Column 4 of Table 3 shows that the SLM test rejects H_0 and thus supports the presence of a non-monotonic relationship between financial depth and economic growth.

In 2006 (the last year for which we have complete data on credit to the private sector), there were 64 countries above the 50% threshold, 27 countries above the 90% threshold, (these are the countries included in Figure 5), and 17 countries above the 113% threshold. The list of countries above the 110% threshold includes almost all the countries which have been most affected by the current crisis: Iceland, the United States, Ireland, the United Kingdom, Spain, and Portugal. The exception is Greece, which has a relatively small financial sector but serious public finance problems.

Although growth model are not normally used for forecasting purposes, it is interesting that the quadratic model of column 3 in Table 5 (that is the model estimated over the period 1960-2005) does a better job at forecasting output growth over the period 2005-2010 than the linear model of column 7 of Table 4 (the mean squared errors of the out-of-sample forecast for GDP growth over 2005-2010 of the two models are 5.6 and 6.4, respectively). The same applies if we use the model estimated over 1960-2000 to forecast growth over 2005-2010. In this case, the mean squared error of the linear model is 9.4 and that of the quadratic model is 6.3.[16]

The remaining three columns of Table 5 show that our results are robust to controlling for different types of outliers. In column 5 we exclude all the countries with a very large financial sector (in particular, we exclude six countries that at any point in time had a level of credit to the private sector greater than 165% of GDP). The results are similar to those of full sample of column 4. If anything, we now find a lower threshold (69% of GDP) above which the marginal effect of credit to the private sector becomes negative. Next, we

[16] In fact, a quadratic model without controls yields better out of sample forecasts (MSE 5.7, when we use 1960-2005 to forecast 2005-2010) than the linear model with the full set of controls used in Table 4 (MSE 6.4, when we use 1960-2005 to forecast 2005-2010).

exclude the United States, Iceland, Spain, and Ireland. We find that our results are robust to dropping these countries that have a large financial sector and were severely affected by the recent financial crisis (Column 6; we explore the effect of banking crises in the next section). Finally, we show that our results are robust to dropping the top and bottom 1% of the distribution of the dependent variable. (in particular, column 7 drops all observations for which average GDP growth over any given five year period is lower than -6% and greater than 9%).

The literature that uses panel data to study the relationship between financial depth and economic growth has traditionally focused on five-year growth spells. As Loayza and Rancière (2006) find that credit expansion may have a negative short-run and a positive long-run impact on growth, it would be interesting to check whether our findings are robust to using longer growth spells. In the cross-country estimations of Table 1, we already showed that our results hold when we use 30, 35, and 40-year growth spells. Since we have observations for the 1960-2010 period, we can also use panel data to study the relationship between financial depth and economic growth using ten-year growth episodes. We start with a linear specification similar to that of Table 4 and find that credit to the private sector is significantly correlated with economic growth when we use data for the period 1960-2000 (column 1 of Table 6). However, the vanishing effect is also at work for the 10-year panel, and we find that the correlation between financial depth and growth is no longer statistically significant when we use data for the period 1960-2010 (column 2 of Table 6; the specification tests in the bottom panel of the table suggest that there may be problems with the exclusion restrictions of column 2). When we use the quadratic model, instead, we find that the coefficients are statistically significant in both sub-periods (columns 3 and 4 of Table 6). The point estimates of columns 3 and 4 suggest that the marginal effect of financial depth becomes negative when credit to the private sector is between 80% and 90% of GDP. Also in this case, the SLM test supports the idea of a non-monotonic relationship between financial depth and economic growth (column 5 of Table 3).

2.2.1 Semi-parametric estimations

Next, we check whether our results are robust to using the same semi-parametric estimator that we used with the cross-country data. When we estimate the model of column 7, Table 5 by allowing credit to the private sector to take a general form, we find that the relationship between PC and GDP growth is concave and non-monotone. While at very low levels of of financial depth (PC<10% of GDP) the relationship between these two variables is fairly flat (a fact which is partly consistent with the findings of Rioja and Valev, 2004), at higher levels of financial development we find a curvature which is consistent with a quadratic relationship.

The semi-parametric estimator plotted by the solid black line in Figure 6 shows that GDP growth reaches a maximum when credit to the private sector is at 71% of GDP. This threshold is consistent with what we obtained in Table 5 (using the data for 1960-2010, the last three columns of Table 5 find thresholds that range between 69% and 90%). The figure also shows that the quadratic fit (the solid light line) obtained from Column 7 of Table 5 is a good approximation of the semi-parametric fit.

As in the case of the cross-country analysis, panel data suggest that there is a concave non-monotone relationship between credit to the private sector and GDP growth which is well approximated by a quadratic functional form.

3 Volatility, Crises, and Heterogeneity

The introduction mentions several reasons why financial depth may hit negative returns. The most plausible of these reasons is that rapid credit growth can increase macroeconomic volatility or lead to financial and banking crises (Kaminsky and Reinhart, 1999) which, in turn, may have a negative effect on growth. In fact, Russeau and Wachtel (2011) find that banking crises are the culprits of the vanishing effect. Such an explanation would also be consistent with the fact that the threshold for which we find that credit to the private sector starts having a negative marginal effect on growth is similar to the threshold for which Easterly et al. (2000) find that financial depth starts having a positive effect on macroeconomic volatility.

An alternative explanation has to do with the presence of heterogeneity in the relationship between financial depth and economic growth. According to this view, large financial sectors are growth promoting in the presence of a good institutional and regulatory framework, but could be damaging in countries that lack an appropriate regulatory infrastructure.

In this section, we check whether our results are driven by macroeconomic volatility, banking crises, or poor institutional and regulatory framework. We start by looking at the effect of macroeconomic volatility. We define volatility as the within-country standard deviation of annual output growth for each of our five-year periods and then create a dummy variable ($HVOL$) that takes a value of one for country-periods in which volatility is greater than the sample average of 3.5 and zero when volatility is below this threshold.

Next, we augment our baseline model with this measure of volatility and find that volatility is negatively correlated with growth (column 1 of Table 7). We thus establish that our data can reproduce the well-known finding of Ramey and Ramey (1995) that volatility is negatively correlated with output growth. We also find that the linear and quadratic terms of PC remain statistically significant and that their point estimates indicate that the marginal effect of financial depth becomes negative when credit to the private sector surpasses 74% of GDP.

To test for the presence of heterogeneous effects in the relationship between financial depth and economic growth, we now estimate the following model:

$$\begin{aligned} GR_{i,t} &= \beta_0 PC_{i,t-1} + \beta_1 PC^2_{i,t-1} + (b_0 PC_{i,t-1} + b_1 PC^2_{i,t-1} + \delta) * HVOL_{i,t} + \\ &\quad + X_{i,t-1}\Gamma + \alpha_i + \tau_t + \varepsilon_{i,t}. \end{aligned} \tag{4}$$

In this set up β_0 and β_1 measure the relationship between financial depth and economic growth in low-volatility country-periods and $(\beta_0 + b_0)$ and $(\beta_1 + b_1)$ capture the relationship between financial depth and economic growth in high-volatility country-periods.[17]

Column 2 of Table 7 reports the results. We start by noting that the coefficients of PC and PC^2 are statistically significant and those of the interacted variables are not statistically

[17] While in (4) we described our estimating equation by using the standard fixed effect approach, we are actually estimating with a system GMM in which the fixed effects are substituted by differencing.

significant and have the opposite sign with respect to the main effects. However, the point estimates of the interacted terms are smaller (in absolute value) than those of the main effects. As $\beta_0 > 0$, $(\beta_0 + b_0) > 0$, $\beta_1 < 0$, and $(\beta_1 + b_1) < 0$, the relationship between private credit and GDP growth is concave in both low and high-volatility country-periods, but possibly not statistically significant in the high-volatility subsample. The point estimates indicate that the threshold at which the marginal effect of private credit becomes negative is slightly smaller in the high volatility group.

A plot of the marginal effect of credit to the private sector obtained from the regression of column 2 shows that in low volatility country-periods financial depth has a positive and statistically significant effect on GDP growth when credit to the private sector is below 40% of GDP, becomes negative at 70% of GDP and negative and statistically significant at 110% of GDP (left panel of Figure 7). In the high-volatility group, instead, the effect of credit to the private sector is never statistically significant (right panel of Figure 7).

Our results are thus consistent with the idea that financial depth has no positive impact on output growth in period of high economic volatility. However, the results plotted in the left panel of Figure 7 confirm that our finding of a non-monotone relationship between financial depth and economic growth is not due to the fact that large financial sectors are associated with higher macroeconomic volatility.

Next, we repeat the experiment by substituting the high volatility dummy variable with a banking crisis dummy. In particular, we set $BKCR = 1$ in country-periods for which the Laeven and Valencia (2010) database signals the presence of a banking crisis and $BKCR$ $= 0$ in tranquil periods. The results are reported in the last two columns Table 7 (the sample starts in 1970 because we do not have data on banking crises for earlier periods). Column 3 yields the expected result that banking crises are negatively correlated with GDP growth, but also shows that controlling for banking crises does not affect our baseline result on the presence of a non-monotonic relationship between financial depth and GDP growth (it however increases to 105% of GDP the threshold at which the marginal effect of PC becomes negative). Next, we interact PC and PC^2 with $BKCR$ (column 4). Again, we find that the main effects are statistically significant and the interacted terms are insignificant, smaller (in absolute value) than the main effects, and with the opposite sign. The point estimates suggest that the marginal effect of financial depth becomes negative at 80% of GDP in tranquil periods and 110% of GDP in crisis periods.

The left panel of Figure 8 shows that in tranquil periods financial depth has a positive and statistically significant effect on GDP growth when credit to the private sector is below 60% of GDP, becomes negative at 80% of GDP and negative and statistically significant at 180% of GDP. The right panel shows that the effect of financial depth is never statistically significant during crisis period.[18]

While controlling for banking crisis raises the threshold above which credit to the private sector has a negative effect on GDP growth, it is interesting that the quadratic relationship is robust to concentrating on tranquil periods. The results of Table 7 suggest that macroeconomic volatility and banking crises are not the only explanation for our finding of a non-monotone relationship between financial depth and economic growth.

[18]Eichengreen et al. (2011) find the same result when they look at the effect of capital account and financial liberalization.

We now follow Demetriades and Law (2006) who found that financial depth does not affect growth in countries with poor institutions and look at how institutional quality and bank regulation and supervision affect the relationship between financial depth and economic growth.

To measure institutional quality we use the ICRG index of the quality of government (for details see Table 10) to create a low quality of government dummy variable ($LQOG$) that takes a value of zero in country periods in which the ICRG index is above 0.5 (the median value of the index is 0.51) and a value of one in country-periods in which the index is equal or smaller than 0.5.

Column 1 of Table 8 shows that the low quality of government dummy is positively correlated with GDP growth (we expect a negative correlation) but its effect is not statistically significant (probably because this variable has limited within-country variance and therefore its effect tends to be captured by the country fixed effects). We also find that the main effect of PC and PC^2 show the now familiar quadratic relationship and that their point estimate suggest that the marginal effect of financial depth becomes negative when credit to the private sector reaches 70% of GDP. As in the regressions of Table 7, the coefficients of the interactive terms are statistically insignificant, smaller (in absolute value) than the main effects, and with the opposite sign with respect to the main effects. The point estimates suggest that in countries with poor institutions the marginal effect of credit to the private sector becomes negative at 60% of GDP.

Panel A of Figure 9 shows that when institutional quality is high financial depth has a positive and statistically significant effect on GDP growth when credit to the private sector is below 20% of GDP, the effect becomes negative at 70% of GDP and negative and statistically significant at 95% of GDP. Like Demetriades and Law (2006), we find that when institutional quality is low, credit to the private sector is never statistically significant.

Next, we use data from Barth et al. (2008) to build a set of time-invariant variables aimed at capturing cross-country differences in bank supervision and regulation (for details see Table 10). We start by using Barth et al.'s (2008) index of official bank supervision to build a time-invariant variable ($LOSI$) that takes a value of one in countries with weak official supervision of banks, a value of zero in countries with strong official supervision of banks and a value of 0.5 in countries with intermediate levels of official bank supervision.[19] When we interact $LOSI$ with PC and PC^2 and, we find that the only the quadratic main effect remains statistically significant. The main linear effect and the interacted effects are not statistically significant but are still consistent with a concave quadratic relationship between financial depth and economic growth (column 2 of Table 8). The point estimates suggest that in countries with strong official bank supervision the marginal effect of financial depth becomes negative when $PC > 87\%$ of GDP. In countries with low official banking supervision the threshold is higher (100% of GDP).

Panel B of Figure 9 shows that in the presence of strong bank supervision financial depth has a positive and statistically significant effect on GDP growth when credit to the private sector is below 55% of GDP, the effect becomes negative at 87% of GDP and negative and

[19] We did not create a dicotomous variable because, given the discrete nature of the original variable and the large number of observation in the mid-range of this distrbution, it was impossible to create two groups of comparable size.

statistically significant at 105% of GDP. In countries with weak official bank supervision the correlation between growth and credit to the private sector is never statistically significant. While Barth et al. (2008) find that official supervision does not have a positive effect on the performance and stability of the banking sector, we do find that official supervision affects the correlation between financial depth and economic growth.

As a second measure of bank regulation, we use Barth et al.'s (2008) capital regulatory index to build a time-invariant variable ($LKRI$) that takes a value of one in countries with low capital stringency and a value of zero in countries with high capital stringency. When we interact PC and PC^2 with $LKRI$ (column 3 of Table 8), we find results that are similar to those of column 2. The main effects and interacted effects are not statistically significant, but they still indicate a quadratic relationship. The point estimates indicate that the correlation between financial depth and economic growth becomes negative when $PC > 70\%$ of GDP in countries with strict capital requirements and when $PC > 139\%$ of GDP in countries with weak capital requirements. However, the correlation between financial depth and economic growth is never statistically significant in countries with low capital requirements (Panel C, Figure 9). In countries with strict capital requirements financial depth has a positive and statistically significant effect on GDP growth when credit to the private sector is below 25% of GDP, the effect becomes negative at 70% of GDP, and negative and statistically significant at 100% of GDP.

Finally, we look at the effect of private sector monitoring. In particular, we use the private monitoring index assembled by Barth et al. (2008) to build a variable ($LPMI$) that takes a value of one in countries with low private monitoring and a value of zero in countries with high private monitoring. According to Barth et al. (2008), this is the variable that has the strongest positive effect on bank performance and stability.

When we interact $LPMI$ with PC and PC^2 (Column 4 of Table 8), we find that the point estimates suggest that the marginal effect of financial depth becomes negative when credit to the private sector reaches 64% of GDP in countries with strong private monitoring of banks and when private credit reaches 77% of GDP in countries with weak private monitoring. We also find that the correlation between financial depth and economic growth is never statistically significant in countries with weak private monitoring (Panel D of Figure 9). However, we now find that, even though the coefficients of PC and PC^2 are statistically significant, the correlation between private credit and growth is never positive and statistically significant. The only statistically significant part of correlation plotted by the curve in the left graph of Panel D is when credit to the private sector is greater than 115% of GDP and the correlation between financial depth and economic growth is negative.

4 Industry-Level Data

An influential paper by Rajan and Zingales (1998) provides strong evidence of a causal relationship going from finance to growth by showing that industrial sectors that, for technological reasons, need more financial resources have a relative advantage in countries with large domestic financial markets. This approach provides a test of a specific mechanism through which financial depth matters (namely, by relaxing financing constraints) and has the advantage of addressing the reverse causality problem because it is plausible to assume that the growth of a specific industry will not affect financial depth in a country as a whole.

In this section, we use the Rajan and Zingales (1998) approach to examine whether industry-level data support our previous finding of a threshold above which finance starts having a negative effect on growth. As in the previous section, we follow the existing literature but allow for non-linearities in the relationship between financial and economic development. In particular, we estimate the following model:

$$VAGR_{i,j} = SHVA_{i,j}\alpha + EF_j \times (PC_i\beta + PC_i^2\gamma) + \lambda_j + \mu_i + \varepsilon_{i,j}, \tag{5}$$

where $VAGR_{i,j}$ is real value-added growth in industry j in country i over the 1990-2000 period; $SHVA_{i,j}$ is the initial share of value-added of industry j over total industrial value-added in country i; EF_j is the Rajan and Zingales (1998) index of external financial dependence for industry j in the 1990s; PC_i is credit to the private sector in country i in the 1990s; and λ_j and μ_i are a set of industry and country fixed effects. Because of standard convergence arguments, we expect $\alpha < 0$. A concave relationship between financial depth and industry growth would instead be consistent with $\beta > 0$ and $\gamma < 0$.

While Rajan and Zingales (1998) considered the 1980s, we focus on the 1990s. We choose a different period because, as argued earlier, financial systems grew substantially during the past two decades. In 1985 there were only three countries in which credit to the private sector was greater than 100% of GDP (Singapore, Switzerland, and Japan; at 99% of GDP, the US value was close to but below this threshold). By 1995 there were 14 countries in which credit to the private sector was larger than GDP.

We begin by setting $\gamma = 0$ and show that we can use our 1990s data to reproduce Rajan and Zingales's (1998) original result that industries that need more external financial resources have a relative advantage in countries with larger financial sectors (column 1 Table 9).[20] Next, we introduce the quadratic term and find that both interactive terms are statistically significant at the 5% level of confidence with $\beta > 0$ and $\gamma < 0$ (column 2 of Table 9). The point estimates suggest that financial depth starts having a negative effect on relative industry-level growth when credit to the private sector reaches 120% of GDP.[21] This threshold is surprisingly close to what we found in the country-level panel regressions of Table 5.

In Columns 3 and 4, we check whether our results are driven by the correlation between financial depth and GDP per capita. We find that controlling for the interaction between external dependence and GDP per capita does not change our results (Column 3). The same holds if we augment our model with the interaction between external dependence and the square of GDP per capita (Column 4). In Column 5, we a use a robust regression routine to check whether our results are driven by outliers and find results which are essentially identical to those of Column 2. If anything, we now find a lower turning point (110% of GDP instead of 120%).[22]

[20] We find an impact which is quantitatively smaller than that found by Rajan and Zingales (1998). In their estimations, the differential in growth between an industry at the 75th percentile level of external dependence with respect to an industry at the 25th percentile level when it is located in a country at the 75th percentile of credit to the private sector rather than in a country at the 25th percentile was about 1 percentage point. In our estimates, this differential in growth is approximatley 0.4 percentage points.

[21] We report the thresholds at which financial development starts having a negative effect on growth in the bottom panel of Table 9.

[22] In particular, we use Stata's rreg routine (see Yaffee, 2002).

Finally, we substitute the 1990s index of external dependence with Rajan and Zingales's (1998) original index for the 1980s. We do this to check whether our results are robust to using the index which is most commonly used in the literature on external financial dependence and growth, but also to allow for the possibility that US industries use technologies that are more advanced with respect to the technologies adopted by the average country in our sample.

When we use data for the 1980s, our results become stronger (β and γ become statistically significant at the one percent level) and still show that credit to the private sector starts having a negative effect on industry-level growth when it reaches 120% of GDP (Column 6 of Table 9).

5 Conclusions

In the summer of 2011, former FED chairman Alan Greenspan wrote an Op Ed that criticized regulatory reforms aimed at tightening capital standards in the US financial sector. He stated that such reforms may lead to the accumulation of "excess of buffers at the expense of our standards of living" (Greenspan, 2011).

The view that policies that lead to a reduction in total lending may have a negative effect on standards of living seems to be based on the assumption that larger financial sectors are always good for economic growth. This paper questions this assumption and shows that in countries with very large financial sectors there is no positive correlation between financial depth and economic growth. In particular, we find that there is a positive and robust correlation between financial depth and economic growth in countries with small and intermediate financial sectors, but we also show that there is a threshold (which we estimate to be at around 80-100% of GDP) above which finance starts having a negative effect on economic growth. We show that our results are robust to using different types of data and estimators.

We believe that our results have potentially important implications for financial regulation. Using arguments similar to those in Mr. Greenspan's Op Ed, the financial industry lobbied against Basel III capital requirements by suggesting that tighter capital regulation will have a negative effect on bank profits and lead to a contraction of lending with large negative consequences on future GDP growth (Institute for International Finance, 2010). While it is far from certain that higher capital ratios will reduce profitability (Admati et al., 2010), our analysis suggests that there are several countries for which smaller financial sectors would actually be desirable.

There are two possible reasons why large financial systems may have a negative effect on economic growth. The first has to do with economic volatility and the increased probability of large economic crashes (Minsky, 1974, and Kindleberger, 1978) and the second relates to the potential misallocation of resources, even in good times (Tobin, 1984).

Rajan (2005) and de la Torre et al. (2011) provide numerous insights on the dangers of excessive financial development, but they mostly focus on the finance-crisis nexus. The discussion of the "Dark Side" of financial development by de la Torre et al. (2011) is particularly illuminating (pun intended). They point out that the "Too much finance" result may be consistent with positive but decreasing returns of financial depth which, at some point, become smaller than the cost of instability brought about by the dark side. While this may be true, it is important to note that our results are robust to restricting the analysis to tranquil periods. This suggests that volatility and banking crises are only part of the story. Of course, it would be possible that in the presence of decreasing returns to financial development the marginal cost of maintaining financial stability becomes higher than the marginal return of financial development (de la Torre et al., 2011, make this point). In this case, however, the explanation for our "Too Much Finance" result would not be one of financial crises and volatility (which do not necessarily happen in equilibrium) but one of misallocation of resources.

Another possible explanation for our result has to do with the fact that the relationship between financial depth and economic growth could depend upon the manner through which finance is provided. In the discussions that followed the recent crisis it has been argued that derivative instruments and the "originate and distribute" model, which by providing hedging opportunities and allocating risk to those better equipped to take it were meant to increase the resilience of the banking system, actually reduced credit quality and increased financial fragility (UNCTAD, 2008). Perhaps a test that separates traditional bank lending from non-bank lending could reveal whether these types of financial flows have differing effects on economic growth.

It is also plausible that the relationship between financial depth and economic growth depends on whether lending is used to finance investment in productive assets of to feed speculative bubbles. Using data that for 45 countries for the period 1994-2005, Beck et al. (2009) show that enterprise credit is positively associated with economic growth but that there is no correlation between growth and household credit. It is possible that a dataset that includes more countries and time periods would show that it is the rapid expansion of household credit that leads to the negative effect of financial development that we document in this paper.

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Table 1: **Cross-Country OLS Regressions**

This table reports the results of a set of cross-country OLS regressions in which average real per capita GDP growth over different time periods is regressed over the log of initial GDP per capita ($LGDP$), the log of total credit to the private sector over GDP (LPC), the level of credit to the private sector over GDP (PC), the square of the level of the level of credit to the private sector over GDP (PC^2), the log of average years of education ($LEDU$), the log of government consumption over GDP (LGC), the log of trade openness ($LOPEN$), and the log of inflation ($LINF$).

	(1)	(2)	(3)	(4)	(5)	(6)
LGDP(t-1)	-0.560***	-0.548***	-0.541***	-0.556***	-0.627***	-0.626***
	(0.210)	(0.205)	(0.194)	(0.182)	(0.193)	(0.185)
LPC	0.743**		0.646*		0.701**	
	(0.354)		(0.327)		(0.316)	
PC		5.815**		6.170***		5.759***
		(2.354)		(2.066)		(1.875)
PC2		-3.503**		-3.753***		-3.275***
		(1.538)		(1.312)		(1.130)
LEDU	1.447***	1.488***	1.421***	1.427***	1.321**	1.332**
	(0.444)	(0.427)	(0.465)	(0.431)	(0.538)	
LINF	-0.304**	-0.351***	-0.256*	-0.296**	-0.125	
	(0.129)	(0.124)	(0.131)	(0.127)	(0.144)	(0.143)
LOPEN	0.0457	-0.107	0.0252	-0.165	0.114	-0.0331
	(0.287)	(0.286)	(0.285)	(0.276)	(0.270)	(0.268)
LGC	-0.210	-0.490	-0.424	-0.806	-0.383	-0.796
	(0.568)	(0.557)	(0.538)	(0.510)	(0.515)	(0.521)
Cons.	5.650***	4.624**	5.953***	5.614***	5.928***	5.342***
	(2.064)	(1.810)	(2.002)	(1.752)	(1.886)	(1.711)
N. Obs.	66	66	66	66	63	63
R2	0.435	0.458	0.412	0.465	0.347	0.398
Period	1970-00		1970-05		1970-10	
dGR/dPC=0		0.83		0.82		0.88

Robust standard errors in parentheses

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

Table 2: **Cross-Country OLS Regressions**

This table reports the results of a set of cross-country OLS regressions in which average real per capita GDP growth over different time periods is regressed over the log of initial GDP per capita ($LGDP$), the log of total credit to the private sector over GDP (LPC), the level of credit to the private sector over GDP (PC), the square of the level of the level of credit to the private sector over GDP (PC^2), the log of average years of education ($LEDU$), the log of government consumption over GDP (LGC), the log of trade openness ($LOPEN$), and the log of inflation ($LINF$).

	(1)	(2)	(3)	(4)
LGDP(t-1)	-0.780***	-0.806***	-0.306*	-0.327*
	(0.211)	(0.197)	(0.174)	(0.170)
LPC	0.759**		0.429	
	(0.303)		(0.259)	
PC		5.262***		3.924***
		(1.947)		(1.343)
PC2		-2.633**		-2.028***
		(1.137)		(0.673)
LEDU	2.010***	1.975***	1.043**	0.993**
	(0.517)	(0.539)	(0.423)	(0.422)
LINF	-0.244*	-0.239	0.185	0.206*
	(0.141)	(0.164)	(0.118)	(0.122)
LOPEN	-0.193	-0.233	0.261	0.186
	(0.330)	(0.345)	(0.260)	(0.253)
LGC	-0.782	-0.951*	-1.097**	-1.234***
	(0.494)	(0.531)	(0.423)	(0.438)
Cons.	8.269***	6.777***	4.272**	3.593**
	(2.338)	(1.985)	(1.920)	(1.675)
N. Obs.	86	86	97	97
R2	00.394	0.420	0.243	0.284
Period	1980-10		1990-10	
dGR/dPC=0		1.00		0.97

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

Table 3: **Tests for U-shape**

This table reports the results of the Sasabuchi-Lind-Mehlum test for inverse U-shaped relationship. The first two columns are based on the estimates of columns 2 and 6 of Table 1, the third column is based on the estimates of column 4 of Table 2, the fourth column is based on column 4 of Table 5, and the fifth column is based on the estimates of column 4 of Table 6.

	(1)	(2)	(3)	(4)	(5)
Slope at PC_{min}	5.50***	5.48***	3.79***	3.61**	7.20***
	(2.22)	(1.78)	(1.30)	(1.73)	(2.01)
Slope at PC_{max}	-4.33***	-3.19***	-2.61***	-7.27***	-16.63***
	(2.32)	(1.41)	(0.97)	(2.38)	(4.53)
SLM test for inverse U shape	1.87	2.26	2.69	2.10	3.60
p-value	0.03	0.01	0.01	0.02	0.00
Fieller 90% confidence interval	[0.65; 1.24]	[0.73; 1.11]	[0.77; 1.16]	[0.18; 1.18]	[0.68; 0.97]

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

Table 4: **Panel Estimations**

This table reports the results of a set of panel regressions aimed at estimating the effect of credit to the private sector on economic growth. All regressions consist of 5-year non-overlapping growth spells and are estimated using System GMM with all available lags used as instrument. The set of controls include time fixed effects and the lags of: log initial GDP per capita ($LGDP$); the log of credit to the private sector (LPC); the level of credit to the private sector (PC); the log of average years of education ($LEDU$); the log of government consumption over GDP (LGC); the log of trade openness ($LOPEN$); and the log of inflation ($LINF$). The bottom panel of the table reports the standard system GMM specification tests.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
LGDP(t-1)	-0.748*	-0.315	-0.820**	-0.914***	-0.688*	-0.828**	-0.800**	-0.770**
	(0.408)	(0.305)	(0.346)	(0.317)	(0.376)	(0.417)	(0.330)	(0.340)
LPC(t-1)	1.882***	0.637*	0.479	0.353				
	(0.547)	(0.368)	(0.373)	(0.389)				
PC(t-1)					5.429***	3.652***	1.063	0.072
					(1.570)	(1.239)	(0.745)	(0.747)
LEDU(t-1)	1.340*	1.714**	2.803***	2.810***	1.343*	2.008***	2.780***	2.833***
	(0.785)	(0.732)	(0.624)	(0.541)	(0.753)	(0.716)	(0.652)	(0.635)
LGC(t-1)	-2.833***	-1.888**	-1.978***	-1.920***	-3.208***	-2.625***	-1.722***	-1.744***
	(0.798)	(0.772)	(0.562)	(0.613)	(0.789)	(0.727)	(0.581)	(0.564)
LOPEN(t-1)	1.006	0.689	1.138**	1.618***	1.590**	1.615***	1.444***	1.666***
	(0.655)	(0.738)	(0.510)	(0.569)	(0.738)	(0.595)	(0.540)	(0.543)
LINF(t-1)	-0.056	0.050	-0.269*	-0.178	0.075	-0.014	-0.262	-0.229
	(0.177)	(0.201)	(0.160)	(0.184)	(0.192)	(0.178)	(0.176)	(0.184)
Cons.	9.914***	3.209	3.389	0.890	2.956	2.257	0.264	-1.292
	(3.659)	(3.243)	(3.279)	(3.665)	(3.283)	(3.195)	(3.062)	(3.212)
N. Obs.	549	675	798	917	549	675	798	917
N. Cy.	107	127	131	133	107	127	131	133
AR1	-3.81	-4.35	-5.04	-5.41	-3.76	-4.44	-4.99	-5.36
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AR2	-0.35	-0.85	-0.83	-1.68	-0.44	-1.12	-0.87	-1.71
p-value	0.730	0.397	0.407	0.0932	0.657	0.265	0.385	0.0879
OID	90.23	102.1	113.6	121.5	85.70	96.23	115.0	126.8
p-value	0.95	0.78	1	1	0.98	1	1	1
Period	1960-95	1960-00	1960-05	1960-10	1960-95	1960-00	1960-05	1960-10

Robust (Windmeijer) standard errors in parenthesis

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

Table 5: **Panel Estimations**

This table reports the results of a set of panel regressions aimed at estimating the effect of credit to the private sector on economic growth. All regressions consist of 5-year non-overlapping growth spells and are estimated using System GMM with all available lags used as instrument. The set of controls include time fixed effects and the lags of: log initial GDP per capita ($LGDP$); the level of credit to the private sector (PC) and its square (PC^2); the log of average years of education ($LEDU$); the log of government consumption over GDP (LGC); the log of trade openness ($LOPEN$); and the log of inflation ($LINF$). The bottom panel of the table reports the standard system GMM specification tests.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LGDP(t-1)	-0.713*	-0.751*	-0.767**	-0.728**	-0.579	-0.746**	-0.372
	(0.385)	(0.401)	(0.342)	(0.310)	(0.364)	(0.346)	(0.290)
PC(t-1)	8.724***	5.427***	3.646**	3.628**	5.074**	3.655*	2.944
	(2.778)	(2.069)	(1.853)	(1.726)	(2.063)	(2.042)	(1.978)
PC2(t-1)	-3.026*	-1.975*	-1.774*	-2.021***	-3.666***	-2.264*	-2.081**
	(1.641)	(1.137)	(1.013)	(0.729)	(1.288)	(1.222)	(0.979)
LEDU(t-1)	0.982	1.659**	2.529***	2.270***	2.044***	2.488***	1.754***
	(0.758)	(0.692)	(0.652)	(0.615)	(0.671)	(0.683)	(0.605)
LGC(t-1)	-2.757***	-2.057***	-1.720***	-1.461**	-1.605**	-1.410**	-1.860***
	(0.652)	(0.712)	(0.547)	(0.742)	(0.719)	(0.686)	(0.595)
LOPEN(t-1)	1.781***	1.649***	1.235***	1.087**	1.566***	1.201***	1.563***
	(0.593)	(0.612)	(0.478)	(0.511)	(0.469)	(0.465)	(0.523)
LINF(t-1)	0.010	-0.024	-0.211	-0.273	-0.119	-0.174	-0.209
	(0.218)	(0.172)	(0.160)	(0.210)	(0.191)	(0.178)	(0.182)
Cons.	1.750	0.743	0.930	0.920	-1.830	-0.302	-1.473
	(3.121)	(3.211)	(2.613)	(3.539)	(3.246)	(2.781)	(2.923)
N. Obs.	549	675	798	917	859	879	905
N. Cy.	107	127	131	133	127	129	133
AR1	-3.75	-4.38	-4.97	-5.39	-5.21	-5.29	-5.77
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AR2	-0.36	-1.04	-0.80	-1.61	-1.22	-1.44	-1.36
p-value	0.717	0.298	0.421	0.108	0.221	0.149	0.175
OID	86.93	97.47	116.6	118.8	116.5	121.4	119.2
p-value	0.99	1	1	1	1	1	1
Period	1960-95	1960-00	1960-05	1960-10	1960-10[a]	1960-10[b]	1960-10[c]
dGR/dPC=0	1.44	1.37	1.03	0.90	0.69	0.81	0.71

[a]: Excludes all the countries where PC was ever larger than 1.65

[b]: Excludes USA, IRL, ESP and ISL

[c]: One percent Winsorization of the dependent variable

Robust (Windmeijer) standard errors in parentheses

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

Table 6: **Panel Estimations: 10-year Growth Episodes**

This table reports the results of a set of panel regressions aimed at estimating the effect of credit to the private sector on economic growth. All regressions consist of 10-year non-overlapping growth spells and are estimated using System GMM with all available lags used as instrument. The set of controls include time fixed effects and the lags of: log initial GDP per capita ($LGDP$); the level of credit to the private sector (PC) and its square (PC^2); the log of average years of education ($LEDU$); the log of government consumption over GDP (LGC); the log of trade openness ($LOPEN$); and the log of inflation ($LINF$). The bottom panel of the table reports the standard system GMM specification tests.

	(1)	(2)	(3)	(4)
LGDP(t-1)	-0.024	-0.323	-0.169	-0.333
	(0.477)	(0.405)	(0.474)	(0.344)
PC(t-1)	2.832*	0.540	6.965**	7.270***
	(1.653)	(0.991)	(2.821)	(2.016)
PC2(t-1)			-3.912**	-4.430***
			(1.663)	(1.181)
LEDU(t-1)	1.044	2.226**	1.217	1.571*
	(1.018)	(0.988)	(1.201)	(0.811)
LGC(t-1)	-2.375**	-3.159***	-1.398	-2.443**
	(1.119)	(1.087)	(1.094)	(1.026)
LOPEN(t-1)	0.504	1.295	-0.300	0.319
	(0.935)	(0.805)	(0.769)	(0.585)
LINF(t-1)	-0.163	-0.957**	-0.401	-0.582
	(0.368)	(0.400)	(0.384)	(0.365)
Cons.	2.303	4.034	3.947	5.644*
	(3.507)	(4.441)	(2.836)	(3.035)
N. Obs.	360	479	360	479
N. Cy.	127	133	127	133
AR1	-3.30	-3.11	-3.14	-3.50
p-value	0.00	0.00	0.00	0.00
AR2	1.17	-0.01	0.71	-1.02
p-value	0.244	0.991	0.476	0.306
OID	30.96	64.49	30.44	56.77
p-value	0.155	0.0561	0.342	0.446
Period	1960-00	1960-10	1960-00	1960-10
dGR/dPC=0			0.89	0.82

Robust (Windmeijer) standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: **Volatility and Banking Crises**

System GMM estimations of 5-year non-overlapping growth spells with all available lags used as instrument. The set of controls include lags of the level of credit to the private sector (PC) and its square (PC^2); a dummy variable that takes a value of one for high volatility periods ($HVOL$); a dummy variable that takes a value of one in country-periods with banking crises ($BKCR$); and the interaction between PC and PC^2 and each of $HVOL$ and $BKCR$. The remaining controls are the same as those of Table 5.

	(1)	(2)	(3)	(4)
LGDP(t-1)	-0.356	-0.347	-0.693**	-0.548*
	(0.268)	(0.268)	(0.325)	(0.280)
PC(t-1)	2.925*	2.999**	3.334*	3.957**
	(1.640)	(1.453)	(1.734)	(1.859)
PC2(t-1)	-1.982**	-2.104**	-1.577*	-2.431**
	(0.806)	(0.886)	(0.812)	(1.073)
HVOL	-1.326***	-1.076**		
	(0.288)	(0.529)		
PC(t-1)*HVOL		-1.399		
		(2.062)		
PC2(t-1)*HVOL		0.868		
		(1.323)		
BKCR(t)			-1.898***	-2.134**
			(0.448)	(0.837)
PC(t-1)*BKCR(t)				-0.013
				(2.855)
PC2(t-1)*BKCR(t)				0.689
				(1.534)
LEDU(t-1)	1.570**	1.726***	2.155***	1.871***
	(0.626)	(0.567)	(0.643)	(0.592)
LGC(t-1)	-1.734***	-1.570***	-1.709***	-1.843***
	(0.644)	(0.553)	(0.639)	(0.597)
LOPEN(t-1)	1.323***	1.041***	1.008**	0.999**
	(0.418)	(0.399)	(0.467)	(0.477)
LINF(t-1)	-0.133	-0.032	-0.010	-0.032
	(0.187)	(0.144)	(0.173)	(0.166)
Cons.	-0.074	0.070	1.604	1.590
	(2.609)	(2.265)	(2.497)	(2.317)
N. Obs.	917	917	872	872
N. Cy.	133	133	133	133
AR1	-5.12	-5.11	-4.95	-4.87
p-value	0.00	0.00	0.00	0.00
AR2	-1.34	-1.27	-1.02	-1.18
p-value	0.180	0.203	0.307	0.236
OID	119.5	122.7	126.3	122.4
p-value	1	1	1	1
Period	1960-2010	1960-2010	1970-2010	1970-2010
dGR/dPC=0	0.74	0.71	1.06	0.81
dGR/dPC=0 (HV or BC)		0.65		1.13

Robust (Windmeijer) standard errors in parentheses

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

Table 8: **Institutional Quality and Bank Regulation and Supervision**

This table reports system GMM estimations similar to those of Table 7 but with PC and PC^2 interacted with a dummy variable that takes a value of one in country-periods with low quality of government ($LQOG$) and a set of time-invariant variables that take a value of one in countries with low official banking supervision ($LOSI$), low capital requirements ($LKRI$), and low private monitoring of banks ($LPMI$).

	(1)	(2)	(3)	(4)
LGDP(t-1)	-0.416	-0.710**	-0.422	-0.607*
	(0.365)	(0.349)	(0.295)	(0.322)
PC(t-1)	3.443*	4.006	1.946	2.306
	(1.835)	(2.601)	(2.976)	(2.102)
PC2(t-1)	-2.459***	-2.306*	-1.934	-1.810*
	(0.852)	(1.323)	(1.580)	(1.058)
LQOG(t-1)	0.386			
	(0.919)			
PC(t-1)*LQOG(t-1)	-1.982			
	(3.476)			
PC2(t-1)*LQOG(t-1)	1.249			
	(2.725)			
LOSI		-0.629		
		(1.113)		
PC(t-1)*LOSI		-1.091		
		(3.648)		
PC2(t-1)*LOSI		0.843		
		(2.279)		
LKRI			-1.735	
			(1.153)	
PC(t-1)*LKRI			1.735	
			(4.362)	
PC2(t-1)*LKRI			0.0697	
			(2.384)	
LPMI				-1.482
				(1.517)
PC(t-1)*LPMI				1.300
				(2.672)
PC2(t-1)*LPMI				-0.525
				(1.231)
LEDU(t-1)	1.716***	1.930***	1.472**	1.881***
	(0.508)	(0.615)	(0.613)	(0.656)
LGC(t-1)	-1.203**	-1.527**	-1.784***	-1.387**
	(0.603)	(0.682)	(0.533)	(0.688)
LOPEN(t-1)	0.940**	1.338***	1.133***	1.045*
	(0.463)	(0.475)	(0.435)	(0.545)
LINF(t-1)	-0.355*	-0.150	-0.147	-0.293
	(0.199)	(0.174)	(0.158)	(0.207)
Cons.	0.275	0.750	2.113	2.010
	(2.770)	(2.867)	(2.416)	(4.332)
N. Obs	819	917	828	917
N. Cy	115	133	116	133
AR1	-4.82	-5.41	-4.89	-5.34
p-value	0.00	0.00	0.00	0.00
AR2	-1.47	-1.46	-1.45	-1.54
p-value	0.142	0.145	0.148	0.123
OID	95.83	121.9	99.6	111.9
P-value	1	1	1	1
Period		1960-2010		1960-2010
dGR/dPC=0	0.70	0.87	0.70	0.64
dGR/dPC=0 INT	0.60	1.00	1.39	0.77

Table 9: **Rajan and Zingales Estimations**

This table reports the results of a set of regressions in which the dependent variable is real industry-level value added growth over the period 1990-2000. The set of controls include the initial share of industry's i value added over total value added ($SHVA$); the interaction between the Rajan and Zingales index of external financial dependence measured for the 1990s and total credit to the private sector ($EF \times PC$); the interaction between the Rajan and Zingales index of external financial dependence and the square of total credit to the private sector ($EF \times PC^2$); the interaction between the Rajan and Zingales index of external financial dependence and the square of total credit to the private sector ($EF \times PC2$); the interaction between the Rajan and Zingales index of external financial dependence and GDP per capita ($EF \times Y$); the interaction between the Rajan and Zingales index of external financial dependence and the square of GDP per capita ($EF \times Y^2$); the interaction between the Rajan and Zingales index of external financial dependence measured for the 1980s and total credit to the private sector ($OEF \times PC$); and the interaction between the Rajan and Zingales index of external financial dependence measured for the 1980s and the square of total credit to the private sector ($OEF \times PC^2$). All regressions include country and industry fixed effects. The regression of column (5) is estimated using Stata's robust regression routine. The bottom panel of the table reports the threshold at which the marginal effect of credit to the private sector becomes negative.

	(1)	(2)	(3)	(4)	(5)	(6)
$SHVA_{t-1}$	-2.069**	-2.059**	-2.063**	-2.061**	-0.645	-2.217**
	(0.879)	(0.877)	(0.879)	(0.878)	(0.425)	(0.893)
EF×PC	0.0180*	0.0742**	0.0696**	0.0654*	0.0508**	
	(0.0106)	(0.029)	(0.0336)	(0.0337)	(0.0236)	
EF×PC^2		-0.0300**	-0.0284**	-0.0265*	-0.0227*	
		(0.0129)	(0.0139)	(0.014)	(0.0119)	
EF×Y			0.000945	0.0309		
			(0.00398)	(0.0376)		
EF×Y^2				-0.00181		
				(0.00227)		
OEF×PC						0.169***
						(0.0452)
OEF×PC^2						-0.0694***
						(0.02)
Constant	0.0648***	0.0681***	0.0691***	0.0869***	0.0508***	0.0510**
	(0.0248)	(0.0248)	(0.0253)	(0.0334)	(0.0171)	(0.0248)
PC thresh.		1.237	1.225	1.234	1.119	1.218
N. Obs.	1252	1252	1252	1252	1252	1252
R-squared	0.336	0.338	0.338	0.338	0.433	0.343

Robust standard errors in parentheses

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

Table 10: **Data Description and Sources**

Variable	Description and Sources
Growth	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2000 U.S. dollars. Source: World Bank World Development Indicators (WDI) 2011.
PC	Claims on private sector by deposit money banks and other financial institutions divided by GDP. Source: Beck et al. (November 2010 update) and Beck et al. (2000) when Beck et al. (2010) has missing data (LPC and PC^2 are the log and the square of PC).
EDUC	Average years of schooling of males and females above 25 years of age (the regressions use the inverse hyperbolic sine transformation $LEDUC = \ln(EDUC + \sqrt{EDUC^2 + 1})$). Source: Barro and Lee (2010)
GC	General government final consumption expenditure as a percentage of GDP (the regressions use the log of this variable). Source: WDI, 2011.
OPEN	Trade openness (calculated as exports plus imports divided by GDP) (the regressions use the log of this variable). Source: WDI 2011.
INFL	Inflation as measured by the consumer price index (annual %). We drop all observations for which inflation is less than -10% and then set to zero all the observations for which inflation takes on negative value and apply the inverse hyperbolic sine transformation ($LINFL = \ln(INFL + \sqrt{INFL^2 + 1})$). Source: WDI 2011.
HVOL	Dummy variable that takes a value of one in country-periods for which the standard deviation of annual GDP growth (measured in constant US dollars) is greater than 3.5 %. Source: own calculations based on WDI 2011.
BKCR	Dummy variable that takes a value of one if a given country-period there was at least on banking crisis. Source: Laeven and Valencia (2010).
LQOG	Dummy variable that takes a value of one if the continuous quality of government index is smaller than 0.5. Source: The quality of government database maintained by the QOG Institute of the University of Gothenburg (www.qog.pol.gu.se). We use the icrg-qog variable which is the mean value of the ICRG variables "Corruption", "Law and Order' and "Bureaucracy Quality", scaled 0-1. The data only go back to 1984. For early periods we set the LQOG variable to be equal to its 1984 value.
LOSI	Time-invariant variable that takes a value of 1 if the Barth et al. (2008) index of official bank supervision rescaled on the 0-1 range is smaller than 0.32, takes a value of 0.5 if the index of official bank supervision if greater that 0.32 and smaller than 0.58, and takes a value of 0 if the index of official bank supervision is greater than 0.58. Missing values were imputed using a linear projection of the log of income per capita, the quality of government index, an index of rule of law, trade openness, financial depth, and an index of bank concentration. Source: own elaborations based on data from Barth et al. (2008) downloaded from Ross Levine's webpage (www.econ.brown.edu/fac/Ross-Levine/Publication/2007-better-worse-data.zip).
LKRI	Time-invariant variable that takes a value of 1 if the Barth et al. (2008) capital regulatory index rescaled on the 0-1 range is smaller than 0.42, takes a value of 0.5 if the index of official bank supervision if greater that 0.26 and smaller than 0.62, and takes a value of 0 if the index of official bank supervision is greater than 0.62. Missing values were imputed using the same linear projection used for LOSI Source: same as LOSI.
LPMI	Time-invariant variable that takes a value of 1 if the Barth et al. (2008) private monitoring index rescaled on the 0-1 range is smaller than 0.35, takes a value of 0.5 if the index of official bank supervision if greater that 0.26 and smaller than 0.5, and takes a value of 0 if the index of official bank supervision is greater than 0.62. Missing values were imputed using the same linear projection used for LOSI Source: same as LOSI.
VAGR	Real value added growth in industry i, country, c, over the period 1990-2000. Source: own computations based on UNIDO Industrial Statistics Database, 2006; Revisions 2 and 3. The CPI data used to deflate value added are from the IMF International Finance Statistics.
SHVA	Share of sector i's value added in total manufacturing value-added of country c in 1990. Source: own computations based on UNIDO data (see VAGR).
EF*PC	Index of External Financial Dependence for the US manufacturing sector in the 1990s interacted with credit to the private sector in the 1990s. Source: the index of external financial dependence is from Eichengreen et al. (2011), for credit to the private sector see PC.
EF*Y	Index of External Financial Dependence for the US manufacturing sector in the 1990s interacted with GDP per capita. Sources: see above.
OEF*PC	Index of External Financial Dependence for the US manufacturing sector in the 1980s interacted with credit to the private sector in the 1990s. Source: the index of external financial dependence is from Rajan and Zingales (1998); for credit to the private sector see PC.

Table 11: **Summary Statistics**

	N.Obs	Mean	Std. Dev.	Min	Max
		Cross-sectional			
GROWTH	69	1.58	1.34	-4.20	4.53
LGDP	69	8.43	1.57	5.05	10.94
PC	69	0.46	0.34	0.04	1.37
LEDU	69	1.67	0.59	-0.30	2.50
LGC	69	2.68	0.30	1.94	3.46
LINF	69	2.40	1.03	1.03	5.84
LOPEN	69	4.09	0.50	3.02	5.36
		Panel			
GROWTH	917	2.02	2.77	-21.00	13.86
LGDP	917	7.80	1.55	4.61	10.89
PC	917	0.40	0.37	0.01	2.70
LEDU	917	2.28	0.67	0.27	3.27
LGC	917	2.65	0.39	1.17	3.83
LINF	917	2.50	1.21	-3.56	6.91
LOPEN	917	4.12	0.60	2.05	6.08
		Industry-level Data			
VA Growth	1,252	0.041	0.115	-0.476	1.05
Ext. Dep. '90s	36	0.014	0.566	-1.14	2.43
Ext. Dep. '80s	36	0.319	0.406	-0.451	1.491

Figure 1: **Marginal Effect Using Cross-Country Data.** This figure plots the marginal effect of credit to the private sector on growth obtained from the regression of Table 1, column 6.

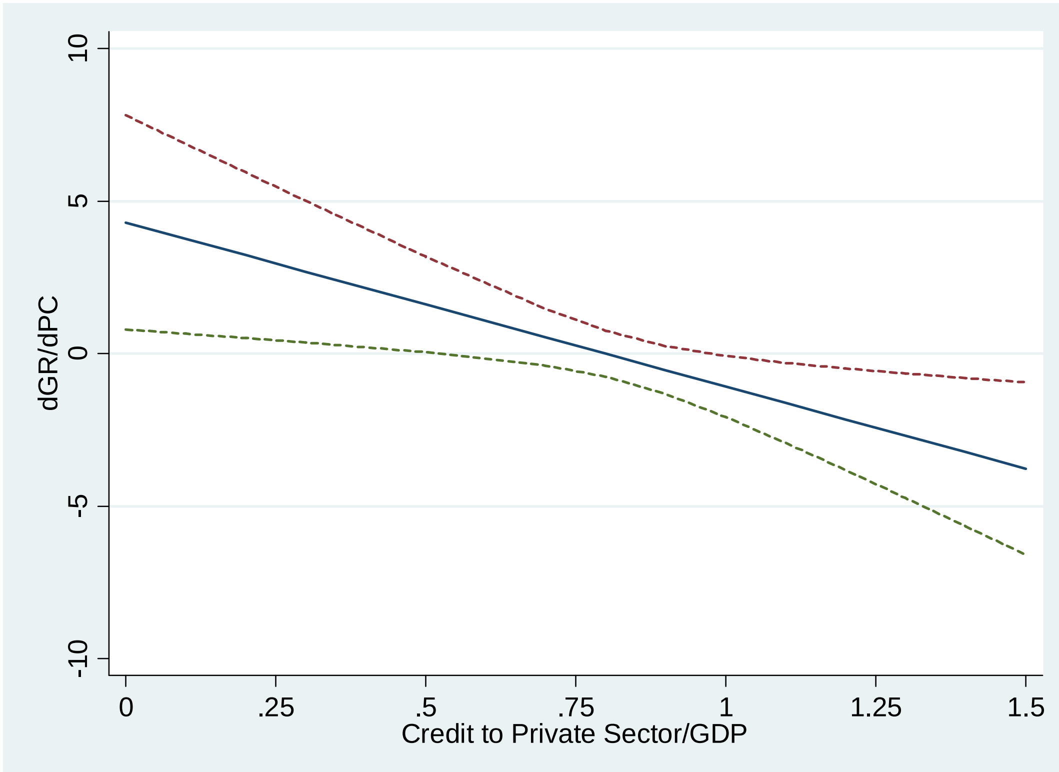

Figure 2: **Semi-Parametric Regressions**. The solid black lines plot the relationship between credit to the private sector obtained by allowing credit to the private to take a generic functional form. The dotted lines are 90% confidence intervals and the light solid lines plot the quadratic fits of columns 6 and 7 of Table 1. The left panel of the figure is based on the model of column 6 of Table 1 and the right panel is based on the model of column 7 of Table 1 .

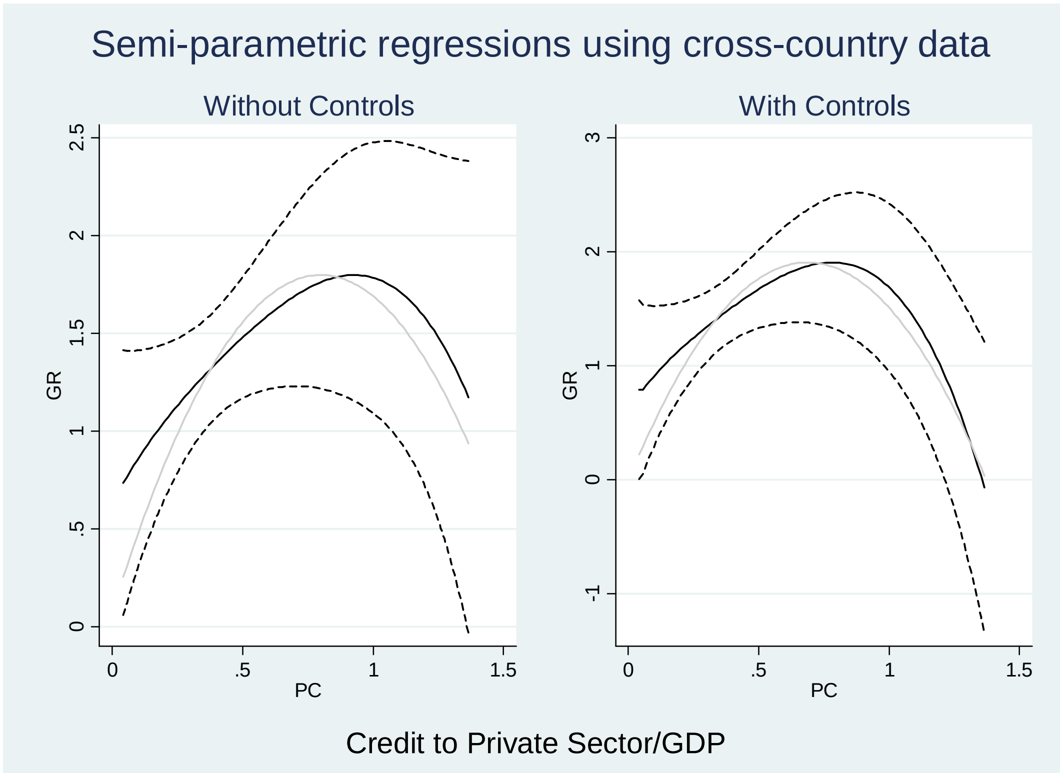

Figure 3: **Credit to the Private Sector**. This figure plots the evolution of credit to the private sector over GDP (PC) for the sample of countries included in the regressions of Table 4. The left panel plots the mean and median values of PC. The right panel plots the share of observations for which PC>90% (solid line) and PC>120% (dashed line).

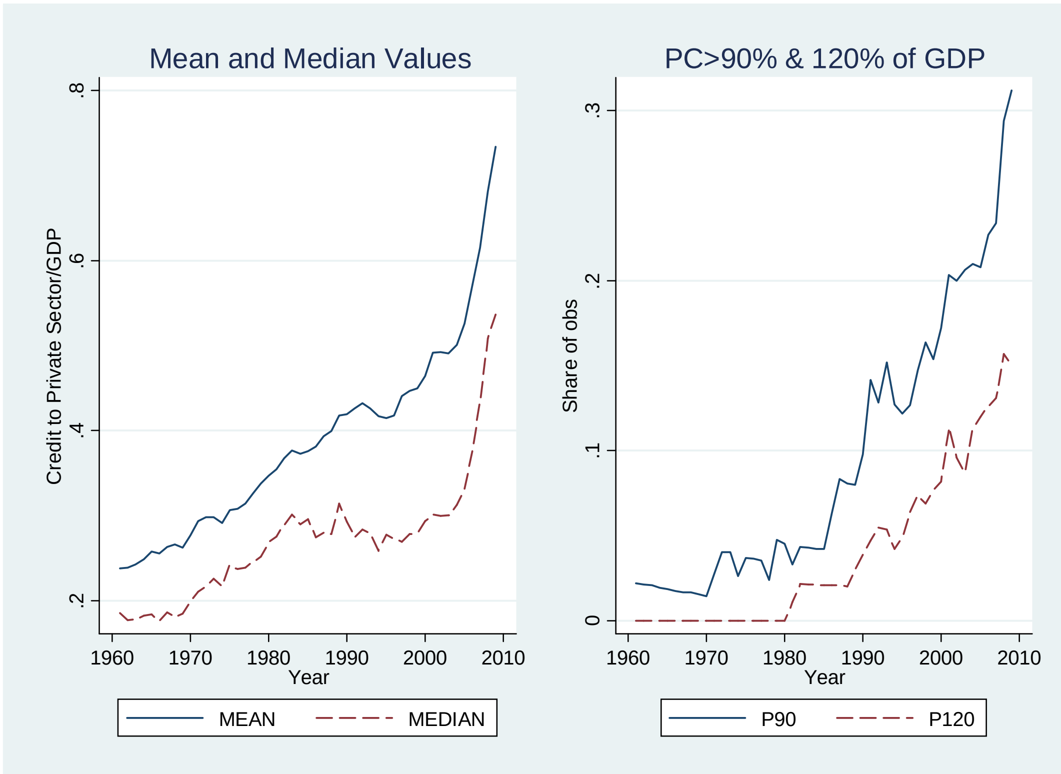

Figure 4: **Marginal Effect Using Panel Data.** This figure plots the marginal effect of credit to the private sector on growth obtained from the regression of Table 5, column 4.

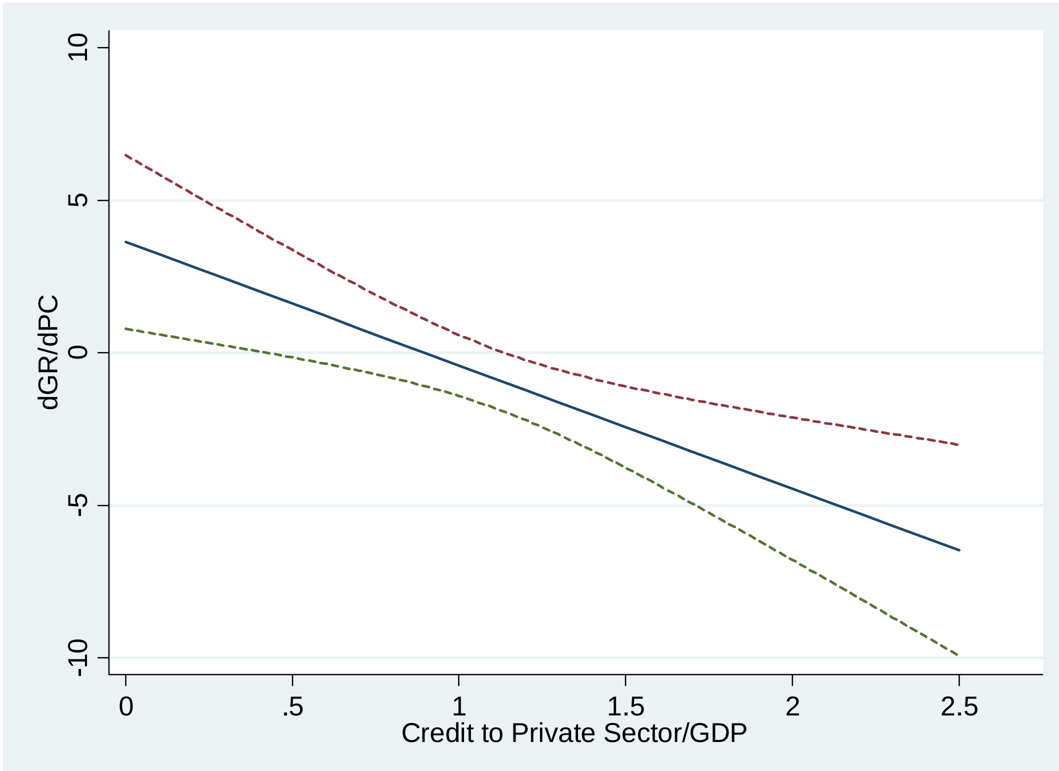

Figure 5: **Countries with Large Financial Sectors (2006)**. This figure plots the 2006 level of credit to the private sector over GDP (PC) for all countries that in 2006 had values of PC>90%. The vertical line is at PC=110%.

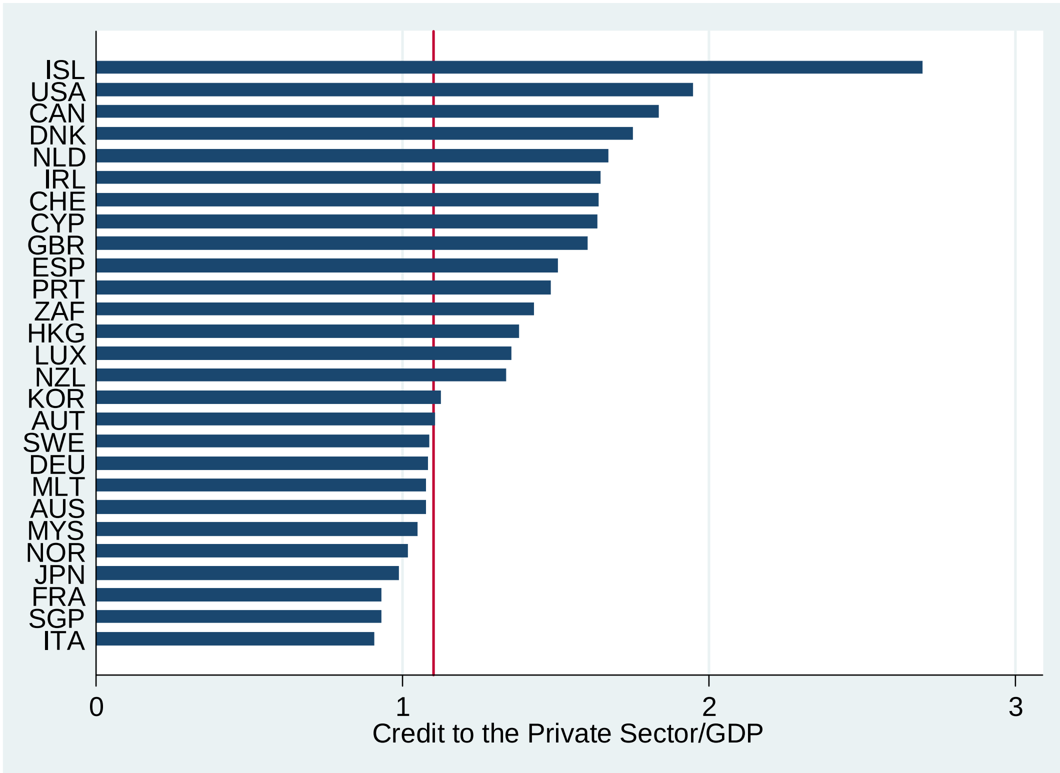

Figure 6: **Semi-Parametric Regressions using Panel Data**. The solid black lines plot the relationship between credit to the private sector obtained by allowing credit to the private to take a generic functional form and using the model of Column 7, Table 5. The dotted lines are 95% confidence intervals and the light solid lines plot the quadratic fits of column 7 of Table 5.

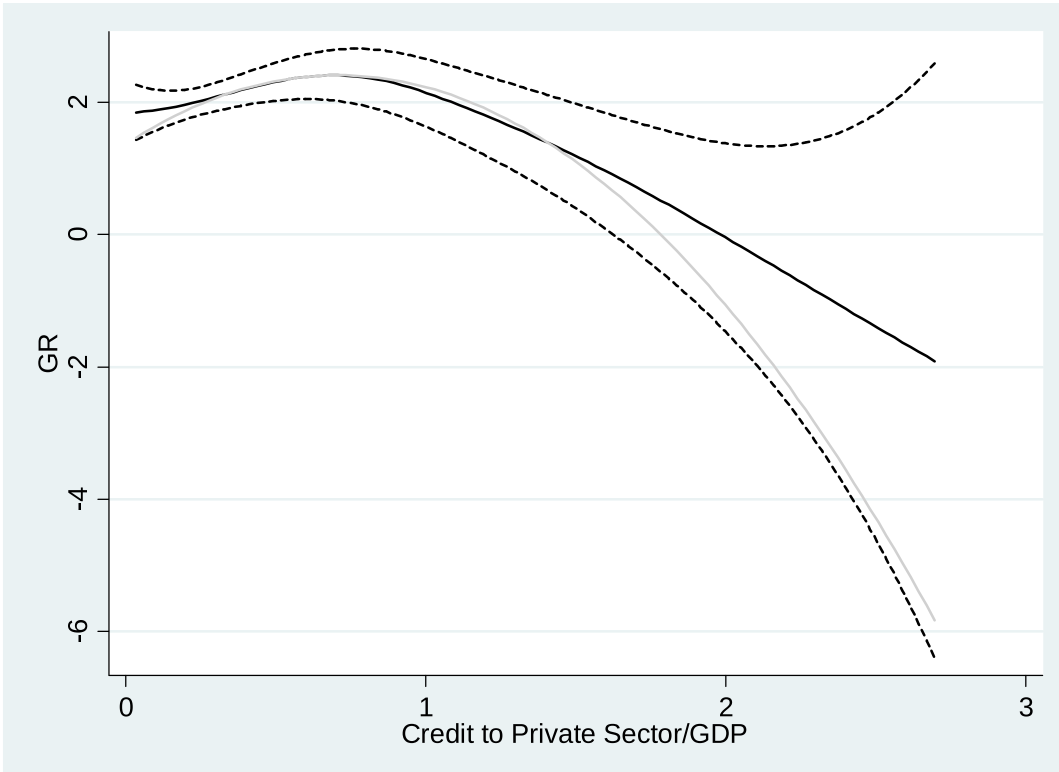

Figure 7: **The Marginal Effect of Credit to the Private Sector with High and Low Output Volatility**. This figure plots the marginal effect obtained from the regression of column 2 Table 7. The left panel is based on the coefficients of PC and PC^2. and the right panel is based on the coefficients of $PC + HVOL * PC$ and $PC^2 + HVOL * PC^2$.

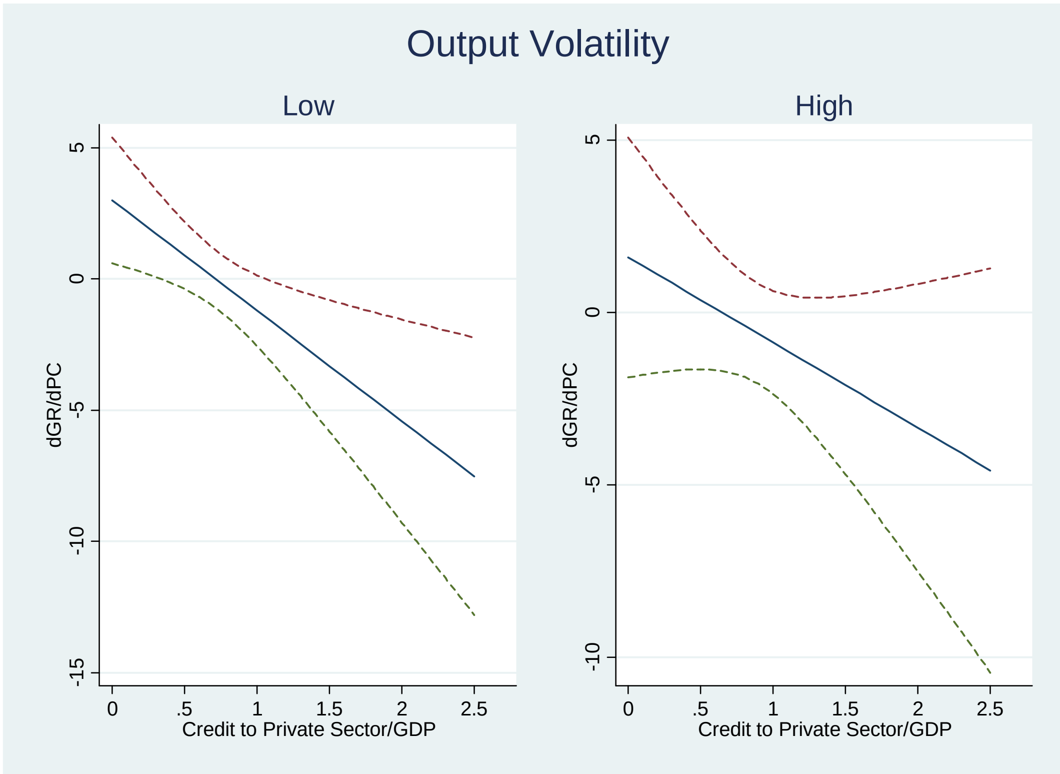

Figure 8: **The Marginal Effect of Credit to the Private Sector during Tranquil and Crisis Periods**. This figure plots the marginal effect obtained from the regression of column 4 Table 7. The left panel is based on the coefficients of PC and PC^2. and the right panel is based on the coefficients of $PC + BKCR * PC$ and $PC^2 + BKCR * PC^2$.

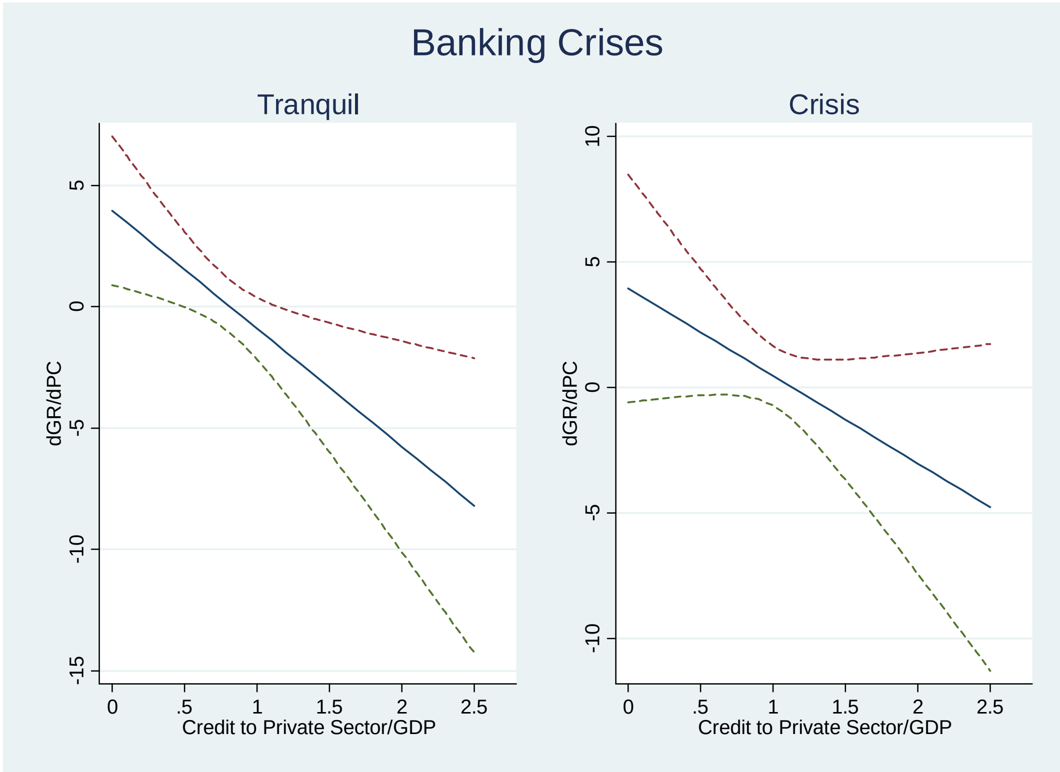

Figure 9: **Heterogeneity in the the Marginal Effect of Credit to the Private Sector: the role of institutions, regulation, and supervision.** Panel A uses the regressions of column 1 Table 8 to plot the marginal effect of credit to the private sector in country-periods with high quality of government (left graph) and low quality of government (right graph). Panel B uses the regressions of column 2 and shows the marginal effect of credit to the private sector in countries with high official bank supervision (left graph) and official bank supervision (right graph). Panel C uses the regressions of column 3 and shows the marginal effect of credit to the private sector in countries with high capital requirements (left graph) and low capital requirements (right graph). Panel D uses the regressions of column 4 and shows the marginal effect of credit to the private sector in countries with high private monitoring of banks (left graph) and low private monitoring of banks (right graph).