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# Lazy Banks? Government Borrowing and Private Credit in Developing Countries

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# Lazy Banks?
# Government Borrowing and Private Credit in Developing Countries

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**Abstract**

When government borrows one dollar from domestic banking sector, how much does it reduce private credit in developing countries? There is surprisingly no reliable estimate in the literature on this. We provide robust estimates of the causal effect of government borrowing on private credit using panel data on 60 developing countries and instruments based on the structure of the political system. The point estimates indicate that a $1.00 more borrowing by government reduces private credit by about $1.40. We also estimate bounds on the crowding out effect under the assumption that the instruments are 'plausibly exogeneous'. The evidence is consistent with a 'lazy bank' model of bank behavior in developing countries.

Key Words: Government Borrowing, Private Credit, Domestic Banking Sector, Crowding Out, Private Investment, Lazy Banks

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# Introduction

This paper provides robust estimates of the causal effect of government borrowing from domestic banking sector on private credit in developing countries using panel data on 60 countries from 1975 to 2006. The idea that government borrowing may crowd out credit to the private sector is common in the policy discussions in and on developing countries. For example, a recent IMF report states that "(C)oncerns regarding the potential crowding out of private sector credit is an important reason why Fund supported programs limit domestic financing of the public sector" (IMF, 2005a, P.34).[2] It is surprising that there is little or no systematic evidence on the crowding out effect of government borrowing from the banking sector on private credit.[3] When government borrows one dollar more from the domestic banking sector, how much does it reduce the credit to private sector in a developing country? Or does it lead to more private credit (crowding in)? To the best of our knowledge, there is no reliable answer to these questions in the existing literature, and this paper is a step forward to filling this gap. The degree of crowding out depends on the nature of the endogeneous response of the banks to a higher government borrowing. There are alternative models of bank behavior in the literature. Some argue that the access to safe government assets allows the banks to take more risk and thus increase their lending to the private sector (risk diversification model). The alternative hypothesis is that it may create moral hazard and thus discourage the banks from lending to the risky private sector, and stifle their incentives to seek out new profitable investment opportunities in the private sector (lazy bank model).

The lack of evidence on this important and widely discussed policy issue reflects at least in part the difficulties in identification and estimation of the crowding out effect of government borrowing because of potential endogeneity and omitted variables bias. Government borrowing may be endogeneous with respect to private credit because of simultaneity arising from the choice of optimal lending portfolio by a bank. Another important concern, especially in the context of a cross-country panel data analysis, is the unobserved cross-country heterogeneity, as it is not possible to control for *all* the potential determinants of private credit which may also be

[2] In the context of Egypt an IMF document states that "..implementing a multi-year strategy of fiscal consolidation that lowers total government borrowing and places public debt on a firmly declining path would be crucial for achieving a robust response from private investment and growth" (IMF, 2005b).

[3] For a general discussion of crowding out/in of private credit in the context of low income countries, see Adam and Bevan (2004).

correlated with public credit.[4] We appeal to the recent literature on comparative politics and political economy of government finance for instruments that are reasonable on a priori theoretical grounds, and also satisfy the formal tests of instrument validity and relevance. We exploit the variations in the domestic borrowing by the government that arise from the differences in political structure across countries and over time for identifying the effects of government borrowing on private credit. In particular, we use a dummy for parliamentary system, an index for political polarization, and their interactions as identifying instruments.[5] The results from alternative specifications of the private credit function and a battery of estimators including 2SLS, GMM and CUE-GMM (Hansen et al, (1996)) provide us with robust estimates of the crowding out effects of government borrowing. The evidence suggests that there is strong negative effect of government borrowing on private credit. The point estimates from alternative specifications of the private credit function and alternative estimators fall within a tight range: $[-1.30, -1.60]$. A one dollar more borrowing by government thus leads to a more than one dollar crowding out of private credit.

To the best of our knowledge, there are no plausible theoretical reasons to expect that the political structure IVs used in this paper directly affect bank's lending decisions with regards to the private sector, and the instruments also satisfy the formal test of exogeneity comfortably. However, some readers might still be skeptic about the *exact* exclusion restrictions imposed in an IV approach. We thus provide supporting evidence from an alternative approach recently developed by Conley et. al. (2007) where the exclusion restrictions imposed on the IVs are weakened, and we allow for non-zero but low levels of influence of the political structure variables on private credit. This approach allows us to estimate bounds on the crowding out effect under the assumption that the exclusion restrictions are satisfied *approximately* instead of the more standard assumption that they are satisfied *exactly*. The evidence from the bounds analysis also supports the conclusion that a one dollar more government borrowing from the domestic banking sector reduces private credit by more than one dollar. The results presented here are important

[4] One might use the standard panel estimators such as Systems-GMM and rely on the structure of auto-correlation for identification using lagged values as instruments. However, there has been growing skepticism regarding lagged values as valid instruments. Moreover, the recent literature shows that weak instruments remain an important issue in the Systems-GMM approach (see, for example, Bun and Windmeijer (2007).)

[5] For an in-depth discussion of the identification strategy and plausibility of the exclusion restrictions, please see section (3) below.

for policy analysis, as they provide a critical link in understanding the effects of government borrowing on private investment in developing countries. The effects of government borrowing from domestic banks on private credit has become especially important for policy analysis in last couple of decades given the fact that the government borrowing from domestic banks has increased dramatically in the developing countries starting from late 1990s (for details, see PP. 5-6 below).[6]

By focusing on the volume of private credit, this paper sheds light on the "quantity channel" of crowding out of private investment in developing countries. The literature on crowding out in the context of developed countries focuses on the effects of government debt or deficit on the equilibrium interest rate (see, for example, Ardagna et. al. (2007), Blanchard (2007), Gale and Orszag (2004), Faini (2006), Friedman (2005), Evans (1987, 1985), Bradley (1986) ). This approach yields informative results when the banking sector is liberalized and the interest rates are determined as the outcome of a market equilibrium. The available evidence, however, shows that the link between government borrowing and equilibrium interest rate is very weak at best. Blanchard (2007) in his entry on 'crowding out' in Palgrave Dictionary of Economics concludes: "...the effect of government debt on interest rate; empirical evidence, from both across countries and from the last two centuries, shows surprisingly little relation between the two." There are a host of reasons to expect that this relation would be even weaker in developing countries. For example, the financial sector (especially the banking system) in most of the developing countries has historically been subject to extensive government interventions and the interest rates were often set administratively by the central bank. If the interest rates are not determined by the market clearing, then the "availability of credit" will be more important in understanding the effects of government borrowing on private investment. Although financial liberalization policies have been implemented in most of the developing countries in recent years, government interventions still remain significant in many countries. Even if the banking sector is fully liberalized,

[6]The recent literature on developing countries has focused on possible crowding out versus crowding in effects of different types of government expenditure, especially the effects of public investment on private investment (see, for example, Easterley and Rebelo (1993), Serven (1996) and Mitra (2006)). It has been emphasized that certain types of government expenditure like infrastructure investment may be complementary to private investment, and thus result in crowding in. Our goal in this paper is different, we abstract from the level and composition of government expenditure, and focus on the effects of government borrowing from domestic banking sector on the availability of credit to the private sector.

the effects of government borrowing on the private investment in the developing countries might still be mediated primarily through the credit availability given that the credit markets are less developed and credit rationing might be more important (Ghosh et. al. (2000), Ray (1998)).[7] The importance of credit constraint for private investment in developing countries is well-recognized in the literature (see, for example, Haramillo et. al. (1996), Banerjee (2004), Banerjee and Duflo (2004), Emran et. al. (2007), Shafik (1992), Rama (1993)).

The relationship between government borrowing and private credit is usually thought of as a negative one in the policy discussions and financial media. However, at least on a theoretical level, the relationship is not unambiguous. The popular discussion on crowding out is based on bank's balance sheet; if the government borrows one dollar more from the banking sector, the banks are left with one dollar less for the private sector. The banks, however, respond to a higher government borrowing by adjusting their loan portfolio optimally given the risk-return characteristics of different assets and liabilities. The "Ricardian Equivalence" theorem where private sector response offsets precisely the government actions may not hold, especially in the context of developing countries (Fielding (2007), Khalid (1996)). But one can argue that a higher government borrowing from banking sector may not have any significant effect on private credit or even crowd in private credit. For example, a common argument is that when the banks have excess liquidity, a higher lending to the government may not result in any significant reduction of credit to the private sector.[8] It has also been argued that government borrowing might actually induce the banks to undertake relatively more risky private lending, because the safe government assets in a bank's portfolio allow it to bear more risk (Kumhof and Tanner (2005)). Such endogeneous response by banks will tend to crowd in private credit and at least partially offset the traditional crowding out effect. This would in general result in a smaller than one crowding out coefficient in absolute value (partially offsetting the one to one balance sheet effect), and may even result in a positive coefficient on government borrowing if the risk diversification effect is strong enough. An alternative possibility is that access to safe government assets discourages

[7]For similar arguments emphasizing the importance of quantity channel in the context of developing countries, see, for example, Gochoco (1990). For a recent interesting analysis of the importance of quantity channel in crowding out private activities in England during 18th and 19th century, see Temin and Voth (2005).

[8]For example, in Bangladesh, the excess liquidity (i.e., liquidity in excess of statutory reserve requirements) in the banking sector is estimated to be 27.39 percent of total liquid assets over the period 1995-2000 (Majumder (2007)).

the banks from lending to risky private sector or stifle their incentives to seek out new profitable lending opportunities in the private sector. If the banking sector is populated by such "lazy banks," then a one dollar government borrowing may result in more than one dollar crowding out of private credit. The potential negative effect of government borrowing on bank's incentives (moral hazard) has been widely discussed in recent years in many developing countries. For example, in 2002, the central bank (RBI) governor in India termed the domestic banks "Lazy" as they were piling up government bonds while the lending to private sector declined substantially.[9] It is possible that different banks behave differently, and the net effect depends on the proportion of different types of banks in an economy. The estimated crowding out effects reported in this paper are more consistent with the "lazy bank" model of the endogeneous response of banking sector to government borrowing.

The rest of the paper is structured as follows. The first section provides a brief discussion of the recent trend in government borrowing in developing countries using the 60 countries sample. The next section discusses the data definitions and sources, and also spells out the specifications of private credit supply function used later for empirical analysis. Section 3 is devoted to a discussion of the econometric issues in estimating the crowding out effects with a cross-country panel data including unobserved heterogeneity and potential endogeneity of government borrowing. The next section (section (4)) reports the results of empirical analysis. The paper concludes with a summary of the empirical findings and their implications for developing countries.

# (1) Government Borrowing from Domestic Financial Sector in Developing Countries

Governments in developing countries face significant constraints on raising revenue as the set of policy instruments available is limited given the structure of the economy and low level of income (Fielding (2007), Sah and Stiglitz (1992)). A large informal sector makes it difficult to use income

[9]For recent discussion in the financial press in India see "Why our banks need to be less lazy" (December 22, 2008, Rediff.com). Similar concerns have been voiced in many African countries. For example, Mozambican prime minister Diogo "..admitted that the high interest rate bearing treasury bonds issued by the government in the past had contributed to 'laziness' among the banks. For it was the banks that snatched up the treasury bonds as soon as they became available, and then just sat back waiting for the 14.47 percent interest rate that they paid." (Mozambique: Prime minster criticises high interest rates, AllAfrica.com, December 29, 2008).

tax and indirect taxes like VAT and sales taxes (Bird (2006), Emran and Stiglitz, (2005, 2007), Munk (2006), De Paula and Schienkman (2007)). Due to trade liberalization over last couple of decades, the governments lost a historically reliable source of tax revenue from tariffs, and most of the low income developing countries failed to recover the lost revenue by introducing tax reform in the form of VAT (Baunsgaard and Keen (2005)). Another traditional source of government revenue under financial repression had been inflation tax. However, over last few decades, the reliance of governments in developing countries on inflation tax has gone down in a significant way so that macroeconomic stability can be maintained.[10] Facing such constraints on the set of policy instruments for raising revenue, the developing country governments have strong incentives to finance government expenditure through domestic and international borrowing. The access to international credit market may, however, be limited for most of the developing countries. The governments in many developing countries in recent years thus find themselves borrowing more from the domestic sources. Figure 1 plots the time series of average government borrowing from the banking sector as a percentage of GDP in the 60 developing countries in our sample. It is interesting that there has been a significant increase in the government borrowing from the domestic banking sector starting from the late 1990s. As noted before, the fact that there has recently been a significant increase in government's domestic borrowing in developing countries makes it more important to understand the possible effects on private credit and thus on private investment. Such a significant change in the government borrowing also makes it more likely that the data will be informative in estimating the crowding out effects of government borrowing on private credit. Figure 1 also shows the time series of the average private credit (as percentage of GDP) for the 60 developing countries in our sample. The simple time series plots seem to indicate that there is a positive correlation between government borrowing and private credit in this sample of developing countries; they move together over time. This is confirmed by a simple OLS regression of private credit on government borrowing and a constant which yields a coefficient of 0.89 ; thus giving an impression of *crowding in* effect rather than *crowding out*. However, as discussed earlier, this relationship is likely to be spurious, driven by omitted cross country heterogeneity, for example, in the level of financial intermediation.

[10] According to recent IMF estimates, the inflation tax was 1.4 percent of GDP in a sample of low income developing countries over the period 1999-2003. See IMF (2005a).

# (2) Data and the Estimating Equations

Our analysis is based on a cross-country panel data set consisting of 60 developing countries and 32 years (annual data for 1975-2006). The data sources include International Financial Statistics (IFS), World Development Indicators (WDI), Beck et. al. (2005) (for details on data sources, variables definitions, and list of countries in the sample, see appendices A and B). Our focus variables are private credit (defined as 'the claims on the private sector by deposit money banks and other financial institutions') and the borrowing by the government from the banking sector (defined as the 'claims on central government by the deposit money banks and other financial institutions') and both are measured as a percentage of GDP. The basic specification used for private credit in this paper is motivated by the recent work of Djankov et. al. (2007). Following Djankov et. al. (2007), the set of control variables includes $(i)$ log of GDP, $(ii)$ growth rate of per capita income, and $(iii)$ inflation. The log of GDP captures the idea that only a large enough economy is able to incur the fixed costs involved in setting up credit market institutions. We control for per capita income growth as rapidly growing economies are likely to have greater demand for and supply of credit.[11] Inflation is included because it may devalue the stock of outstanding debt. In addition to this set of basic control variables, we also include variables representing $(i)$ financial intermediation (intermediated savings) and $(ii)$ institutional quality. When the banking sector is more developed in a country, the household savings intermediated through the financial sector is also higher. The aggregate credit availability in an economy will thus be higher when the breadth and depth of the financial intermediation is higher. This might manifest itself as a *spurious positive relationship* between government borrowing and private credit (i.e., crowding in), both driven by the higher aggregate credit supply resulting from increasing financial deepening. To avoid such problems, we use a measure of total deposits (demand+time+saving) held by the deposit money banks and other financial institutions which represents the supply of funds to the financial sector from the household sector in a country. One might worry that by using the available bank deposits as a control, we may be over-estimating the crowding out effects of government borrowing as it does not allow for any possible countervailing effect through a higher

[11] We note here that the central results of this paper are not sensitive to the alternative definition of income growth, i.e., when we use the growth rate of GDP rather than growth rate of per capita GDP. The results from this alternative specification are omitted for the sake of brevity and are available from the authors.

interest rate (and thus higher savings and deposits) resulting from government borrowing. To address this concern, we use one period lagged value of the financial sector deposits, thus allowing for a positive response of deposits to a higher interest rate in the current period. Moreover, according to the available evidence, the endogeneous response of bank deposits to government borrowing is not likely to be important. The endogeneous response depends on two elasticity parameters: the response of equilibrium interest rate to government borrowing, and (ii) the response of savings and deposits to interest rate. As pointed out before, even for developed countries, the response of equilibrium interest rate to government borrowing is practically zero (for a review of the evidence, see Blanchard (2007)).[12] The available evidence clearly shows that the second link is also very weak, the interest rate elasticity of savings in developing countries is close to zero (see, for example, Bandiera et. al. 2000).[13] Thus, the endogeneous response of deposits is not likely to be an important concern for the results reported later.

Given that an adequate control for the financial sector deepening is critical for identifying the causal effects of government borrowing on private credit, we also report results using M3 as a percentage of GDP as an alternative indicator of financial deepening. We control for institutional quality in the regressions as the efficacy of the contract enforcement institutions, and, in general, rule of law can be an important determinant of private credit. For example, debt contracts are more prevalent in a country with more efficient legal system (La Porta et. al. (1997)). We use alternative indicators of institutional quality in an economy: (i) an index of 'civil liberties' that combines four components including rule of law, and personal autonomy and individual rights, (ii) 'law and order' which has two components: the 'law' sub-component is an assessment of the strength and impartiality of the legal system, while the 'order' sub-component is an assessment of popular observance of the law.

The above discussion leads us to the following specifications of the private credit from the

[12]The effects of government borrowing on the real interest rate in our panel data set is statistically insignificant in OLS regressions once country fixed effect is included (the P-value is 0.73).

[13]Also, when one is interested in understanding if the behavior of banking sector is better characterized as lazy or not, it is appropriate to control for the aggregate deposits, even if the interest rate elasticity of savings and deposits is not negligible.

banking sector:

$$C_{it} = \alpha_0 + \beta_1 G_{it} + \beta_2 Y_{it} + \beta_3 y^g_{it} + \beta_4 P_{it} + \beta_5 F_{i(t-1)} + \beta_6 I_{it} + \beta_7 R_{it} + \epsilon_{it} \tag{1}$$

where $C$ is private credit as a percentage of GDP, $G$ is government borrowing as a percentage of GDP, $Y$ and $y^g$ are log of GDP and growth rate of per capita GDP respectively, and $P$ denotes inflation rate, $F$ the level of financial intermediation, $I$ the institutional quality, and $R$ is the lending interest rate. The subscripts $i$ and $t$ are country and time index respectively. The above equation (1) form the basis of our empirical analysis. The focus is on the parameter $\beta_1$ and crowding out of private credit by government borrowing implies that $\beta_1 < 0$. If the risk diversification effect dominates then we expect that $|\beta_1| < 1$ when $\beta_1 < 0$, and in extreme case it can be positive, i.e., $\beta_1 > 0$. If the banks behavior is better characterized by the "lazy bank" view, then one expects that $|\beta_1| > 1$ with $\beta_1 < 0$. In exceptional case, it is possible that the risk diversification effect approximately cancels out the lazy bank effect in the aggregate. and we have $\beta_1 \simeq -1$.

In the empirical implementation, we also perform additional robustness checks: (i) include real interest rate in place of inflation rate and interest rate as separate variables, (ii) add creditor rights as a control variable.

# (3) Empirical Strategy

For identification and estimation of the crowding out effect, we need to address the omitted variables bias arising from cross-country unobserved heterogeneity, and possible endogeneity resulting from bank's optimal portfolio choice. We can take into account the cross-country and intertemporal heterogeneity by including country and time fixed effects. The country fixed effects sweep off the time-invariant characteristics that may vary across countries and may be important determinants of private credit. The time dummies control for any common shocks in a given period across the countries that might affect both private credit and government borrowing. But this still leaves out the time-varying individual country specific factors, and thus might result in omitted variables bias. There can also be endogeneity because of simultaneity, as the credit allocation to the private and public sectors are jointly determined by the optimization of the banks

given the regulatory constraints. However, in many developing countries the banks lack independence, and in many cases may have to give priority to the demand of the government. It may thus not be unreasonable to assume that credit to the private sector is often determined as a residual. This implies that the extent of simultaneity arising from the optimization of banks will be less of a concern in our data set. This, however, does not imply that we can treat government borrowing as exogeneous because of the omitted heterogeneity. To address the potential endogeneity bias in estimating the crowding out effects of government borrowing we use instrumental variables motivated by the recent literature on political economy of government finance, and also use the recent approach developed by Conley et. al. (2007) to estimate bounds under the assumption that the exclusion restrictions are satisfied only approximately.

Two political structure variables (an index of government polarization and a dummy for parliamentary system of government) discussed in the recent literature on political economy of government finance along with their interactions are used as instruments. To the best of our knowledge, there is no reasonable theory that posits a direct influence of the political structure based IVs used here on the lending decisions of banks with regards to the private sector. Thus the instruments are plausible on a priori theoretical grounds. As we discuss below, they also satisfy the standard tests of instrument exogeneity comfortably (see below and Table 1).

**Instruments Based on the Structure of the Political System**

We use the variations in government borrowing that results from the differences in the political system for identifying the effects of government borrowing on private credit. The instruments are: (*i*) a dummy for parliamentary system as opposed to presidential system of government and (*ii*) a measure of polarization based on differences in the economic policy orientation and (*iii*) interaction of parliamentary dummy with polarization.

The first IV is a dummy variable that takes on the value 1 if a country has parliamentary system of government and 0 otherwise. The recent literature on comparative politics emphasizes the many different implications of parliamentary versus presidential system of government (Persson and Tabellini (2000)). A parliamentary system is in general considered more polarized and fragmented than the presidential system and thus may be subject to more distributive conflicts. The fiscal

decision making is also less concentrated in a parliamentary system. A less concentrated fiscal decision making coupled with a heightened distributive politics is expected to result in higher government expenditure. However, the parliamentary system is also likely to raise more revenue. In parliamentary regimes, the stable majority of incumbent legislators as well as the majority of voters back both higher spending and higher taxes, as they become the "residual claimants" on additional revenue; they can keep the benefits of spending within the majority, putting part of the costs on the excluded minority. In presidential regimes, on the other hand, no such residual claimants on revenue exist, and the majority of taxpayers and legislators therefore resist high spending, as the benefit would be directed towards different minorities. Thus the net effect of the parliamentary dummy on deficit and borrowing can be either positive or negative depending on whether the revenue effect is strong enough. However, since we use an index of political polarization as an additional Instrument (see below), the parliamentary dummy is more likely to pick up the revenue effect in the first stage regression and thus may have a negative influence on the government borrowing. To the best of our knowledge, there is no plausible theoretical reasons to expect that the banking sector's lending decisions with regards to the private sector is directly influenced by whether a country has presidential or parliamentary system of government.

A central insight from the recent literature on political economy of government finance is that a more fragmented and polarized government and political system leads to higher government expenditure and deficits as a result of distributive conflicts (for recent reviews of the literature, see Eslava (2006), Persson and Tabellini (2000), Alesina and Drazen (1991)). A higher expenditure and deficit is expected to be positively correlated with government borrowing from all sources including domestic banking sector. The index of political polarization used is due to Beck et. al. (2001) and it is defined as the maximum difference of orientation between the chief executive's party and the three largest government parties plus the largest opposition party, and it ranges from 0 (chief executive's party has absolute majority in the legislature) to 2. The difference is calculated on the basis of party orientation with respect to economic policy based on the criteria whether they are right winged or left winged. A greater polarization is expected to lead to higher spending and borrowing by the government. Note that the'polarization index' is a measure of

conflict of preference within the governing coalition[14] and also between the government parties and the opposition parties. There is a large theoretical and empirical literature that shows that such polarization in the political system leads to higher expenditure and deficit due to common pool effects. A higher deficit in turn can result in higher government borrowing from the domestic banks. The third and the last IV we use is the interaction of the parliamentary dummy with the polarization index. This allows for the possibility that the effects of polarization may depend on the nature of the political system; higher polarization is likely to have stronger effect under a parliamentary system (i.e., the interaction term should affect government borrowing positively). The evidence presented later shows that the interaction term has significant explanatory power in the first stage and improves the explanatory power of the set of instruments.

One might argue that we need to condition on the policy orientation of the ruling party to make sure that the polarization index satisfies the exclusion restriction. To alleviate such concerns, we include the policy orientation of the party in power (left or right wing) in all of the regressions. The tests of exogeneity, however, support the exclusion restrictions on the political structure based IVs with or without policy orientation of the governing party as a control.[15]

**Estimating Bounds Under the Assumption of "Plausibly Exogeneous" Instruments**

As discussed above, we are not aware of any *a priori* reasons to expect that the political structure variables used as instruments would have *direct* influences on the lending decisions of the banks with regards to the private sector, especially since the policy orientation of the party in power is controlled for in the regressions. For example, we are not aware of any reasonable theory which posits a direct link between the parliamentary versus presidential system and the lending decisions of banks with regards to the private sector in a country. Consistent with this, the formal tests of exogeneity reported later lend strong support to the exclusion restrictions (the P-value for Hansen's J statistic is 0.22). However, there might still be uneasiness among some readers about the *exact* nature of the exclusion restrictions employed in an IV framework, as

[14]The conflict of preference among the governing parties is also called fractionalization in the literature.

[15]Although it is important to control for the policy orientation of the ruling party on a priori theoretical considerations for the validity of polarization as an IV, the empirical results show that it has no explanatory power in the private credit equation.

emphasized recently by Conley et. al. (2007). In the context of our model, identification within the IV framework implies $H_0 : \theta_1 = \theta_2 = \theta_3 = 0$ in the following specification of the private credit function:

$$\begin{aligned} C_{it} &= \alpha_0 + \beta_1 G_{it} + \beta_2 Y_{it} + \beta_3 y^g_{it} + \beta_4 P_{it} + \beta_5 F_{i(t-1)} + \beta_6 I_{it} + \beta_7 R_{it} \\ &\quad + \theta_1 Parl + \theta_2 Pol + \theta_3 (Parl * Pol)) + \varepsilon_{it} \end{aligned} \tag{2}$$

where $Parl$ is the dummy for parliamentary system of government and $Pol$ is the polarization index. Some readers might be more comfortable with the claim that the exclusion restrictions are satisfied approximately, rather than exactly. Thus it is more credible that $\theta_1 = \theta_2 = \theta_3 \simeq 0$. Under this approximate exclusion restrictions, the instruments are "plausibly exogeneous" in the terminology of Conley et. al. (2007). Conley et al (2007) develop a set of approaches under this weaker exogeneity condition, and show that one can estimate bounds on the causal effect of an endogeneous variable. Although it does not provide point estimates, it can be extremely valuable as sensitivity analysis.

We implement a simple and intuitive approach to modeling "plausible exogeneity" of the instruments as developed in Conley et. al. (2007); it specifies a support of possible values for $\theta_k \in [-\delta, +\delta]$ $k = 1, 2, 3$ and $\delta > 0$. Under this assumption, we estimate the lower and upper bounds for the estimate of the parameter of interest $\beta_1$. We report results for a number of alternative values of $\delta$.

# (4) Empirical Results

**The IV Estimates**

Table 1 reports the results of estimating equation (1) using different estimators. The first column reports the simple OLS estimate of the effects of government borrowing and the estimated coefficient implies that the crowding out of private credit by government borrowing is one to one, i.e., a one dollar increase in government borrowing reduces the availability of private credit by approximately one dollar.[16] The OLS estimate thus gives an impression that the risk diversification effect of government assets in the banks' portfolio is approximately canceled out by the moral

[16]Note that the credit variables used in the regression are expressed as percentage of GDP following the literature.

hazard effect of the lazy banks. As discussed earlier, the simple OLS estimates are likely to be biased as they ignore unobserved cross-country heterogeneity and time specific shocks common to all the countries in addition to possible simultaneity bias arising from bank's optimal portfolio choice.

The other columns in Table 1 (columns 2-4) show the estimated crowding out effect from alternative estimators when we include country and time fixed effects and use the three instruments discussed above to address the potential endogeneity bias. As an additional layer of caution, the regressions in columns 2-4 use one period lagged values of all the control variables.[17] We report the IV estimates from a number of alternative estimators: 2SLS, efficient two-step GMM and Continuously Updated GMM of Hansen et al. (1996) (CUE-GMM). The political structure based IVs satisfy the exclusion restrictions comfortably; the P-value for Hansen's J statistic is 0.22. The IVs have reasonable strength in explaining variations in government borrowing; the first stage F statistic for the null of joint exclusion of the three instruments is 9.08. The estimated coefficients of the excluded instruments in the first stage regression (see lower panel of Table 1) show that the parliamentary dummy has a statistically significant negative effect[18] on government borrowing while the effect of polarization index is not statistically significant at 10 percent level. However, consistent with the discussion in section (3) above, the interaction of parliamentary dummy with polarization has a statistically significant and numerically strong positive effect on government borrowing.[19] The first stage F statistic (9.08) is close to the Bound et. al. (1995) rule of 10 for one endogeneous variable. To alleviate any concern about weak instruments, we report results from CUE-GMM.[20]

This implies that the crowding out coefficient can be interpreted in alternative ways, both in terms of a change in credit as percentage of GDP and also as a change in one dollar. So the OLS estimates can also be interpreted as saying that a one percent increase in government borrowing relative to GDP leads to a one percent decrease in the private credit relative to GDP. We couch the discussion in terms of a one dollar increase in government borrowing as it is easier to interpret.

[17]The estimates from regressions where contemporaneous values of the controls are used are very similar and thus are not reported.

[18]As discussed before, since we already control for the effects of fragmentation and polarization through polarization index and the interaction term, the parliamentary dummy captures only the higher revenue effect discussed in the literature.

[19]If we rely on the ex-post evidence that polarization index itself is not statistically significant in the first stage, and use only the interaction and the parliamentary dummy as the instruments, the estimated crowding out effect is virtually identical to the results reported in Table 1. We retain polarization index on the basis of a priori theoretical reasoning.

[20]We report results from CUE-GMM instead of Fuller LIML as there is convincing evidence of heteroskedasticity

The estimated crowding out effect of government borrowing in columns 2-4 in Table 1 are very similar; the estimates from 2SLS and CUE-GMM are virtually identical while the estimate from two-step efficient GMM is slightly lower. The fact that the 2SLS and CUE-GMM estimates are almost identical suggests that we do not need to worry about the strength of the IVs (Wooldridge and Imbens, 2008). The estimates imply that a \$1.00 increase in government borrowing from the domestic banking sector reduces private credit approximately by \$1.34. In case of the CUE-GMM results, the Kleibergen-Papp F test statistic for weak identification is 9.08 and the 10 percent Stock-Yogo critical values for maximal relative size is 6.46.[21]

**Robustness Checks**

In this section we report a battery of robustness checks to see if the central conclusions that (i) there is a statistically significant negative effect of government borrowing on private credit, and (ii) the crowding out is more than one to one hold up to additional scrutiny. The results are reported in table 2. All of the regressions reported in Table 2 use the political structure IVs along with country and time fixed effects and the control variables are lagged one period. The estimator is CUE-GMM. The results from alternative estimators are very similar and thus are omitted for the sake of brevity.

As discussed before it is extremely important to control for the evolution of cross country heterogeneity in the level of financial deepening over time for identification of the crowding out effect of government borrowing. In Table 1, we thus use a measure of aggregate supply of funds from the household sector to the banking sector as a control for the changes in the aggregate liquidity due to financial deepening. Column 1 in Table 2 reports the estimated crowding out effect when we use a common indicator of financial deepening in the literature $M_3/GDP$. Interestingly, the estimated crowding out effect is numerically larger ($-1.53$) than the estimates in Table 1 (about $-1.34$). The evidence in favor of a lazy bank model of bank response to a higher government borrowing is thus stronger according to this specification.

The second column in Table 2 reports the results from a specification that includes creditor

in the private credit regressions. The results from Fuller LIML or LIML very similar to the CUE-GMM estimates reported in Table 1.

[21] We use the Stock-Yogo critical values even though they are derived for the iid errors case following the suggestion of Baum et al. (2007).

rights as an additional control in the main specification used in Table 1. Because of the data limitations on creditor rights, the number of observations used to estimate this specification is much smaller. The estimated crowding out coefficient ($-1.33$) is, however, very close to the estimates in reported earlier in Table 1.

The next column in Table 2 shows the estimated crowding out effect when we use an alternative indicator of institutional quality. The indicator of institutional quality used for the main results in Table 1 is the civil liberties index constructed by Freedom House. Here we use an indicator of "law and order" from International Country Risk Guide. Again, the number of observations is smaller due to data unavailability. The estimated crowding out effect ($-1.60$) is larger (in aboslute value) compared to the estimates in Table 1.

The last column in Table 2 reports the estimated crowding out effect when we use real interest rate as a control instead of using nominal interest rate and inflation separately. The estimate is slightly smaller (in absolute value) but similar to the two-step efficient GMM estimate in Table 1 and also to the estimate with creditor rights in column 2 on Table 2. The results in Table 2 thus provide strong evidence that the estimated crowding out effects reported in Table 1 are very robust.

The point estimates presented in Tables 1 and 2 provide credible evidence that there is strong negative effect of government borrowing from the domestic banking sector on the volume of private credit in developing countries. All of the point estimates are greater than one in absolute value implying that the crowding out is more than one to one. Here we report the results from formal tests of the hypothesis that the crowding out effect is more than one to one using alternative specifications in Tables 1 and 2. The results from a series of one-sided tests are reported in Table 3. The evidence is consistent with the conclusion that it is most likely that the crowding out effect is more than one to one. The null hypothesis that $\beta_1 < -1$ (i.e., more than one to one crowding out effect) cannot be rejected in any of the specifications with the lowest P-value equal to 0.75. In contrast, the null that $\beta_1 > -1$ is rejected at 5 percent level for the specification with law and order as a control for institutional quality and at 10 percent in the specification with M3/GDP as a control for financial deepening. To be sure, there is some evidence that indicates that it is possible to have slightly lower than one in absolute value (such as 0.90) crowding out

coefficient, but it is not a very likely possibility according to the evidence presented in Table 3.

**Estimated Bounds Under Approximate Exclusion Restrictions**

In this section, we report estimated bounds on the crowding out effect of government borrowing using the approach due to Conley et. al. (2007). As discussed before, the exact exclusion restrictions are relaxed and we model plausible exogeneity of the instruments by assuming that the coefficients on the instruments in the private credit function belong to an interval, i.e., $\theta_k \in [-\delta, +\delta]$ $\forall k$ with $\delta > 0$. The estimated bounds are reported for 90 and 95 percent confidence intervals in Table 4 with $\delta = 0.0001, 0.001, 0.01, 0.10$.

The estimates show that the estimated bounds do not vary significantly with the value of $\delta$. The estimates imply that the crowding out effect can be much higher (up to $-2.65$) under weaker exclusion restrictions. However, the important point is that the estimates support the central conclusions of the paper that (i) there is a statistically significant negative effect of government borrowing on private credit and (ii) a one dollar increase in government borrowing from the domestic banks reduces private credit by more than one dollar. The bounds for 90 percent confidence interval does not contain any estimate that indicates less than one to one crowding out effect. The bounds for 95 percent confidence interval include $-.91$ as a possible estimate, but the probability of obtaining a lower than one to one crowding out effect is very low; the evidence clearly indicates that the estimated crowding out effect is most likely to be higher than one in absolute value.

# Conclusions

The possible crowding out of private credit by government borrowing from the domestic banking sector and its negative effects on private investment are widely discussed in the policy literature, especially in the context of developing countries. However, there is little or no credible evidence on the magnitude of such crowding out effects of government borrowing on private credit in developing countries.[22]

[22]We are not aware of any studies that provide estimates of crowding out of private credit that can be used as a benchmark for our estimates. From a regression of private lending on domestic debt without any additional control variables for 27 countries, Christensen (2005) find that a one percent increase in domestic debt relative to

It is important to understand the efficiency costs of financing government expenditure through domestic borrowing as part of designing an appropriate fiscal system. This paper provides estimates of the magnitude of the crowding out effect of government borrowing on private credit using a panel data set on 60 developing countries for 32 years. To address the potential endogeneity of government borrowing, we use instruments motivated by the recent literature on comparative politics and the political economy of government finance. The instruments are plausible on a priori theoretical grounds and also satisfy the formal test of exogeneity comfortably.

The evidence shows that there is a significant crowding out effect of government borrowing from the domestic banks on private credit. Averaging over the different point estimates from alternative specifications and estimators, we find that when government borrowing increases by one dollar, it reduces credit to the private sector by about one dollar and forty cents. The conclusion that government borrowing from the domestic banks leads to a more than one to one crowding out of private credit is robust; it holds up to a battery of sensitivity checks including the recent bounds approach developed by Conley et. al. (2007) that relaxes the exact exclusion restrictions used in the IV framework. The evidence presented here is important for understanding the effects of government borrowing on private investment. Private investment in developing countries critically depends on the availability of bank credit especially given that the capital market is not well developed. Thus crowding out of bank credit may have significant adverse effects on private investment and consequently on economic growth in developing countries.

broad money reduces private lending (relative to broad money) by 0.15 percent. Temin and Voth (2005) report an estimated crowding out coefficient of -.20 to -0.34 for 18th and 19th century England. There are a number of recent studies that analyze the effects of domestic debt, but their focus is on growth (see, for example, Abbas and Christensen (2007)).

# References

(1) Abbas, A and J. Cristensen (2007): "The Role of Domestic Debt markets in Economic Growth: An Empirical Investigation for Low-income Countries and Emerging Markets", IMF Working paper, WP/07/127.

(2) Adams, C., and Bevan, D., (2004). Fiscal Policy Design in Low Income Developing Countries, in T. Addison and A. Roe, eds. Fiscal Policy for Development, Palgrave MacMillan, New York.pp. 46-71.

(3) Agenor, P., and Montiel, P., (1999). Development Macroeconomics, 2nd Edition, Princeton University Press.

(4) Alesina, A., and Drazen, A., (1991). Why Are Stabilizations Delayed?, American Economic Review Economic Activity, Vol. 81, Iss. 5, pp. 1170-88.

(5) Ardagana, S., Caselli, F., and Lane, T., (2007). Fiscal Discipline and the Cost of Public Debt Service: Some Estimates for OECD Countries, The B.E. Journal of Macroeconomics. Vol. 7, Iss. 1, Art. 28.

(6) Bandiera, O., Caprio, G., Honohan, P., and Schiantarelli, F., (2000). Does Financial Reform Raise or Reduce Savings?, The Review of Economics and Statistics, Vol. 80, Iss. 2, pp. 239-263.

(6) Banerjee, A., (2004). Contracting Constraints, Credit Markets, and Economic Development, in M. Dewatripoint, L. Hansen and S. Turnovsky, eds. Advances in Economics and Econometrics: Theory and Applications, Eight World Congress of the Econometric Society, Volume III. Cambridge University Press, pp. 1-46.

(7) Banerjee, A., and Duflo, E., (2004). Do Firms Want to Borrow More? Testing Credit Constraints Using a Directed Lending Program, MIT, Department of Economics, Mimeo.

(8) Baunsgaard, T and M. Keen (2005): Tax Revenue and/or trade Liberalization, Working Paper, IMF.

(9) Bawn, K. and Rosenbluth, F., (2006). Short versus Long Coalitions: Electoral Accountability and the Size of the Public Sector. American Journal of Political Science, Vol. 50, Iss. 2, pp. 251-265.

(10) Beck, T., Clarke, G., Groff, A., Keefer, P., and Walsh, P., (2001). New Tools in Compar-

ative Political Economy: The Database of Political Institutions, World Bank Economic Review Vol. 15, Iss. 1, pp. 165-176.

(11) Blanchard, O., (2007).Crowding Out, Entry in The New Palgrave Dictionary of Economics, Second Edition, Edited by S. Durlauf and L. Blume.

(12) Blundell, R., and Bond, S., (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models, Journal of Econometrics, Vol. 87, Iss.1, pp 115-143.

(13) Bird, R., and Gendron, P., (2006). Is VAT the Best Way to Impose a General Consumption Tax in Developing Countries?, Working Paper No. 602, International Tax Program, Institute of International Business, University of Toronto.

(14) Bradley, M., (1986). Government Spending or Deficit Financing: Which Causes Crowding Out?, Journal of Economics and Business, Vol. 38, issue 3, pages 203-214.

(15) Bun, M., and Windmeijer, F., (2007).The Weak Instrument Problem of the System GMM Estimator in Dynamic Panel Data Models, CeMMAP working paper CWP08/07, UCL.

(16) Cebula, R., (1985). New Evidence on Financial Crowding Out, Public Choice, Vol. 46, pp. 305-309.

(17) Christensen, J (2005): "Domestic Debt Markets in Sub-Saharan Africa", IMF Staff Papers, Vo. 52, No.3.

(18) Djankov, S., McLiesh, C., and Shleifer, A., (2007). Private Credit in 129 Countries, Journal of Financial Economics, Vol. 84, Iss. 2, pp. 299-329.

(18) Easterly, W., and Rebelo, S., (1993). Fiscal policy and economic growth: An empirical investigation, Journal of Monetary Economics, Vol. 32(3), pp. 417-458.

(19) Emran, M. S., Shilpi, F., and Alam, I., (2007). Economic Liberalization and Price Response of Aggregate Private Investment: Time Series Evidence from India, Canadian Journal of Economics, Vol. 40 Iss. 3, pp. 914-934.

(20) Emran, M. S., and Stiglitz, J. E, (2005). On Selective Indirect Tax Reform in Developing Countries, Journal of Public Economics, Vol. 89, Iss. 4, pp. 599-623.

(21) Emran, M. S., and Stiglitz, J. E, (2007). Equity and Efficiency in Tax Reforms in Developing Countries, Working Paper, Columbia University and George Washington University.

(22) Eslava, M., (2006). The Political Economy of Fiscal Policy: Survey. Inter-American

Development Bank, Working Paper 583.

(23) Evans, P., (1985). Do Large Deficits Produce High Interest Rates?, American Economic Review, Vol. 75, Iss. 1, pp. 68-87.

(24) Evans, P., (1987). Do Budget Deficits raise Nominal Interest Rates? Evidence from Six Countries, Journal of Monetary Economics, Vol. 20, Iss. 2, pp. 281-300.

(25) Faini, R. (2006). Fiscal policy and interest rates in Europe, Economic Policy, Vol. 21, Iss. 47, pp. 443-489.

(26) Fielding, D., (1999). Manufacturing Investment in South Africa: A Time Series Model, Journal of Development Economics, Vol. 58, Iss. 2, pp.405-428.

(27) Fielding, D., (2007). Monetary and Fiscal Policy in Developing Countries, Entry in The New Palgrave Dictionary of Economics, Second Edition, Edited by S. Durlauf and L. Blume.

(28) Friedman B., (2006). Deficits and Debt in the Short and Long Run, The Macroeconomics of Fiscal Policy, edited by R. Kopcke, G. Tootell, and R. Triest, Cambridge, MA, MIT Press.

(29) Gale, W., and Orszag, P., (2004). Budget Deficits, National Saving, and Interest Rates, Brooking Papers on Economic Activity, Vol. 2, Iss. 2004-2, pp. 101-210.

(30) Ghosh, P., Mookherjee, D. and Ray, D., (2000). Credit Rationing in Developing Countries: An Overview of the Theory, Chapter 11 in Readings in the Theory of Economic Development, edited by D. Mookherjee and D. Ray, London: Blackwell.

(31) Gochoco, M., (1990). Financing Decisions and the 'Crowding out' effect: The Case of the Philippines, Economic Letters, Vol. 32, Iss. 4, pp. 331-333.

(32) Guncavdi, O., Bleaney, M., and Mckay, A., (1998). Financial Liberalization and Private Investment: Evidence from Turkey, Journal of Development Economics, Vol. 57, Iss.2,pp. 443-455.

(33) Haramillo, F., Schiantarelli, F., and Weiss, A., (1996). Capital Market Imperfections before and after Financial Liberalization: An Euler Equation Approach to Panel Data for Ecuadorian Firms, Journal of Development Economics, Vol. 51, Iss. 2, pp. 367-386.

(34) IMF (2005a).Monetary and Fiscal Policy Design Issues in Low Income Developing Countries.Policy Development and Review Department and Fiscal Affairs Department.

(35) IMF (2005b): IMF Executive Borad 2005 Article IV Consultation with Arab Republic of

Egypt.

(35) Khalid, A., (1996). Ricardian Equivalence: Empirical Evidence from Developing Economies, Journal of Development Economics, Vol. 51, Iss. 2, pp. 413-432.

(36) Kontopoulos, Y., and Perotti, R., (1999). Government Fragmentation and Fiscal Policy Outcomes: Evidence from the OECD Countries, in J. Poterba and J. von Hagen, eds., Fiscal institutions and Fiscal performance, Chicago: University of Chicago Press, pp. 81-102.

(37) Kumhof, M., and Evan Tanner, E., (2005). Government Debt: A Key Role in Financial Intermediation, IMF Working Paper 05/57.

(38) La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R., (1997). Legal Determinants of External Finance, Journal of Finance, Vol. 52, Iss. 3, pp. 1131–1150.

(39) Majumder, A., (2007). Does Public Borrowing Crowd-out Private Investment? The Bangladesh Evidence, Bangladesh Bank Working Paper, WP 0708.

(40) Mitra, P., (2006). Has Government Investment Crowded Out Private Investment in India?, The American Economic Review, Vol. 96, Iss. 2, pp. 337-341.

(41) Munk, K., (2006). On the Rationale for the Use of Border Taxes in Developing Countries, Department of Economics Working Paper No. 2006-12, University of Aarhus.

(42) Paula de, A., and Scheinkman, J., (2007). The Informal Sector, PIER Working Paper 07-033, Penn Institute for Economic Research, University of Pennsylvania.

(43) Rama, M., (1993). Empirical Investment Equations in Developing Countries. In Striving for Growth after Adjustment: The Role of Capital Formation, ed. L. Serven and A. Solimano. Washington, D.C. The World Bank.

(44) Ray, D. (1998). Development Economics, Princeton University Press.

(45) Sah, R., and Stiglitz, J., (1992). Peasants versus City-dwellers: Taxation and the Burden of Economic Development, Clarendon Press, Oxford.

(46) Serven, L., (2003). Real Exchange Rate Uncertainty and Private Investment in LDCs, The Review of Economics and Statistics, Vol. 85, Iss. 1. pp. 212-218.

(47) Serven, L., (1996). Does Public Capital Crowd Out Private Capital? Evidence from India, Policy Research Working Paper No. 1613, The World Bank.

(48) Shafik, N., (1992). Modelling Private Investment in Egypt, Journal of Development

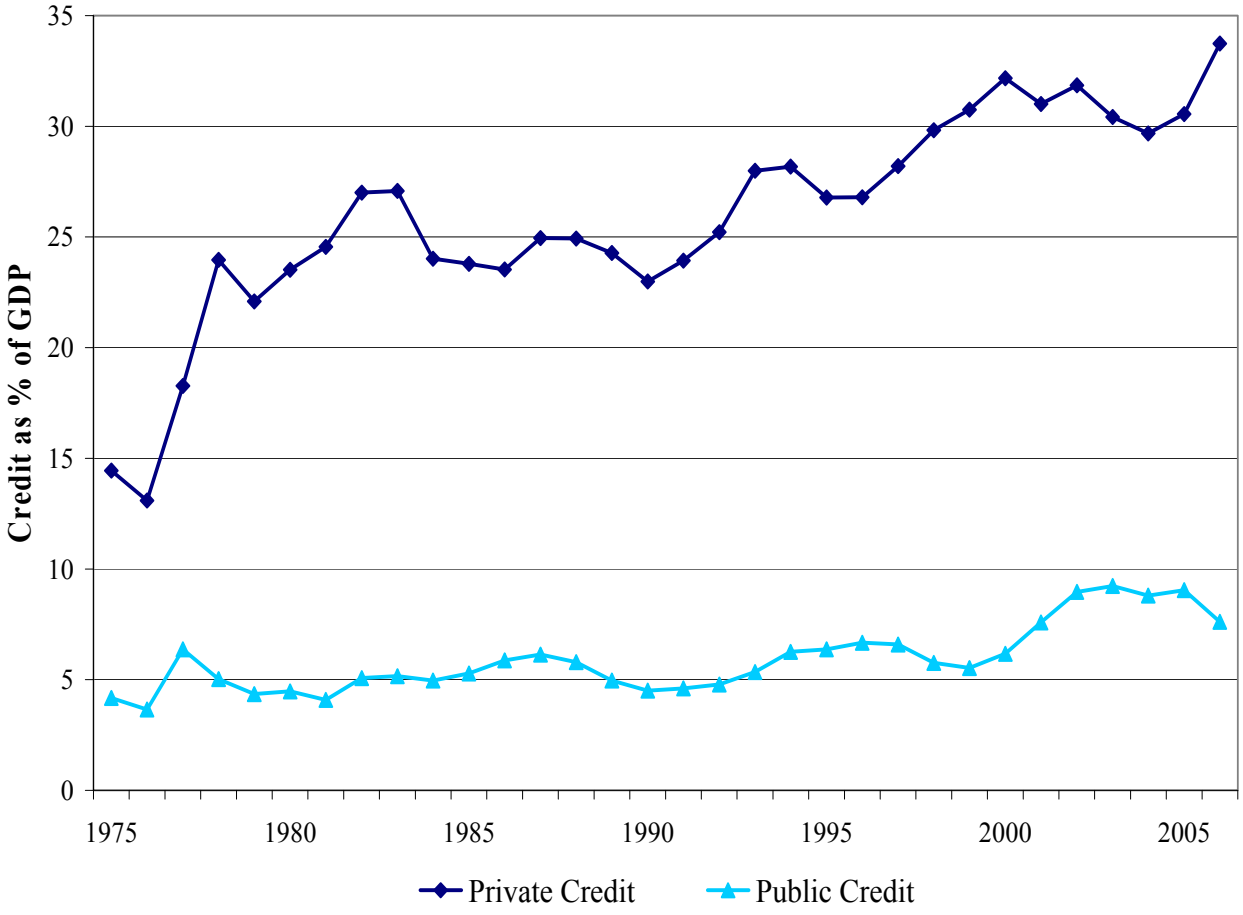
Economics, Vol. 39, Iss. 2, pp263-277.

(49) Smith, R., and van Egteren, H., (2005). Inflation, Investment Financing, and Economic Activity: The Role of Internal Financing, European Economic Review, Vol. 49, Iss. 5, pp. 1283-1303.

(50) Stock, J., Wright, J and Yogo, M., (2002). A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments, Journal of Business and Economic Statistics, Vol. 20, Iss. 4, pp. 518-529.

(51) Temin, P. and Voth, H., (2005). Credit Rationing and Crowding Out during the Industrial Revolution: Evidence from Hoare's Bank, 1702-1862. Explorations in Economic History.

**Figure 1: Private and Public Credit as % of GDP in 60 Countries from 1975 to 2006**



# Table 1: Crowding out Effect of Government Borrowing

**The dependent variable is Private Credit as percentage of GDP.**

| | OLS | 2SLS | Efficient Two Step GMM | CUE-GMM |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| **Government Borrowing as % of GDP** | **-1.028** | **-1.343** | **-1.310** | **-1.346** |
| | [15.44] | [3.86] | [3.84] | [3.95] |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| **Log GDP** | **0.771** | **9.71** | **9.725** | **9.616** |
| | [7.39] | [5.03] | [5.19] | [5.12] |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| **GDP per capita Growth** | **-0.241** | **-0.103** | **-0.100** | **-0.101** |
| | [3.41] | [1.94] | [1.89] | [1.90] |
| | (0.00) | (0.05) | (0.06) | (0.06) |
| **Financial Sector Deposits as % of GDP** | **0.907** | **0.814** | **0.814** | **0.817** |
| | [41.34] | [15.73] | [15.90] | [15.94] |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| **Civil Liberties** | **-1.755** | **1.066** | **1.008** | **1.045** |
| | [7.43] | [2.46] | [2.38] | [2.46] |
| | (0.00) | (0.01) | (0.02) | (0.01) |
| **Nominal Interest Rate** | **0.031** | **-0.078** | **-0.084** | **-0.086** |
| | [0.82] | [1.57] | [1.74] | [1.77] |
| | (0.41) | (0.12) | (0.08) | (0.08) |
| **Inflation** | **-0.106** | **-0.048** | **-0.045** | **-0.045** |
| | [4.06] | [2.13] | [1.99] | [1.98] |
| | (0.00) | (0.03) | (0.05) | (0.05) |
| **Orientation** | **-1.811** | **-0.779** | **-0.702** | **-0.729** |
| | [3.05] | [1.03] | [0.93] | [0.97] |
| | (0.00) | (0.31) | (0.35) | (0.33) |
| **Number of Observations** | 1140 | 1140 | 1140 | 1140 |
| **Number of Countries** | 60 | 60 | 60 | 60 |
| **Kleibergen-Paap F statistic** | | 9.08 | 9.08 | 9.08 |
| **P value of Hansen J statistic** | | 0.22 | 0.22 | 0.22 |
| **First Stage Results: OLS with Country and Time Fixed Effects** | | | | |
| **Parliamentary Dummy** | | **-1.227** | | |
| | | [2.18] | | |
| | | (0.05) | | |
| **Polarization** | | **0.232** | | |
| | | [1.02] | | |
| | | (0.31) | | |
| **Parliamentary*Polarization** | | **1.624** | | |
| | | [3.67] | | |
| | | (0.00) | | |
| **Number of Observations** | | 1140 | | |
| **F Statistic** | | 9.08 | | |

- Data sources and definitions can be found in the appendix A.
- P-values are in parenthesis and t statistics are in brackets (standard errors are robust to heteroskedasticity).
- One period lag of control variables is used in all estimators except OLS.
- Instruments used: Parliamentary dummy, polarization and interaction of parliamentary dummy and polarization.

# Table 2: Robustness Checks

**The dependent variable is Private Credit as a percentage of GDP. All estimates are from generalized method of moments-continuously updated estimator.**

| | M3 as % of GDP | Creditor Rights | Law and Order | Real Interest Rate |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| **Government Borrowing as % of GDP** | **-1.528** | **-1.328** | **-1.604** | **-1.313** |
| | [3.94] | [2.72] | [4.56] | [3.90] |
| | (0.00) | (0.01) | (0.00) | (0.00) |
| **Log GDP** | **6.451** | **8.009** | **15.664** | **10.969** |
| | [3.10] | [3.81] | [4.59] | [6.31] |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| **GDP per capita Growth** | **-0.127** | **-0.149** | **-0.122** | **-0.088** |
| | [2.18] | [2.07] | [1.21] | [1.71] |
| | (0.03) | (0.04) | (0.23) | (0.09) |
| **Financial Sector Deposits as % of GDP** | | **0.751** | **0.761** | **0.831** |
| | | [10.20] | [13.32] | [15.84] |
| | | (0.00) | (0.00) | (0.00) |
| **Civil Liberties** | **1.335** | **1.268** | | **0.993** |
| | [2.75] | [2.11] | | [2.48] |
| | (0.01) | (0.04) | | (0.01) |
| **Nominal Interest Rate** | **-0.122** | **-0.11** | **-0.097** | |
| | [2.37] | [2.15] | [1.47] | |
| | (0.02) | (0.03) | (0.14) | |
| **Inflation** | **-0.079** | **-0.051** | **-0.043** | |
| | [3.16] | [2.00] | [1.20] | |
| | (0.00) | (0.05) | (0.23) | |
| **Orientation** | **-1.495** | **1.569** | **-1.053** | **-0.474** |
| | [1.69] | [1.72] | [0.87] | [0.65] |
| | (0.09) | (0.09) | (0.38) | (0.52) |
| **M3 as % of GDP** | **0.745** | | | |
| | [13.81] | | | |
| | (0.00) | | | |
| **Creditor Rights** | | **1.646** | | |
| | | [0.63] | | |
| | | (0.53) | | |
| **Law and Order** | | | **0.01** | |
| | | | [0.14] | |
| | | | (0.89) | |
| **Real Interest Rate** | | | | **0.009** |
| | | | | [0.37] |
| | | | | (0.71) |
| **Number of Observations** | 1140 | 721 | 561 | 1159 |
| **Number of Countries** | 60 | 41 | 34 | 60 |
| **Kleibergen-Paap F statistic** | 8.54 | 3.49 | 9.23 | 9.25 |
| **P value of Hansen J statistic** | 0.36 | 0.29 | 0.75 | 0.16 |

- Data sources and definitions can be found in the appendix A.
- P-values are in parenthesis and t statistics are in brackets (standard errors are robust to heteroskedasticity).
- One period lag of control variables is used.
- Instruments used: Parliamentary dummy, polarization and interaction of parliamentary dummy and polarization.

# Table3: One Tailed Test for Crowding Out Coefficient

**The dependent variable is Private Credit as a percentage of GDP. All estimates are from generalized method of moments-continuously updated estimator.**

| Null Hypothesis | Main Specification | M3 as % of GDP | Creditor Rights | Law and Order | Real Interest Rate |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| $\beta 1 <= -1$ | 0.845 | 0.913 | 0.750 | 0.957 | 0.824 |
| $\beta 1 >= -1$ | 0.155 | 0.087 | 0.250 | 0.043 | 0.176 |
| $\beta 1 <= -0.95$ | 0.877 | 0.932 | 0.781 | 0.968 | 0.860 |
| $\beta 1 >= -0.95$ | 0.123 | 0.068 | 0.219 | 0.032 | 0.140 |
| $\beta 1 <= -0.90$ | 0.904 | 0.947 | 0.810 | 0.977 | 0.890 |
| $\beta 1 >= -0.90$ | 0.096 | 0.053 | 0.190 | 0.023 | 0.110 |

- Data sources and definitions can be found in the appendix A.
- P-values are reported for each test.
- Tests in column 1 refer to the specification in column 4, Table1.
- Tests in column 2, 3 4 and 5 refer to specifications in columns 1, 2 3 and 4, Table 2.

# Table4: Bounds for Crowding Out Effect

**The dependent variable is Private Credit as a percentage of GDP.**

| Support for possible values of θ | 90% Confidence Level | | 95% Confidence Level | |
|---|---|---|---|---|
| | Lower | Upper | Lower | Upper |
| $\delta \in [-0.0001, 0.0001]$ | -2.4887151 | -1.0582083 | -2.6174835 | -0.93142569 |
| $\delta \in [-0.001, 0.001]$ | -2.4889952 | -1.0579818 | -2.617769 | -0.93120394 |
| $\delta \in [-0.01, 0.01]$ | -2.4917959 | -1.0557166 | -2.6206248 | -0.92898642 |
| $\delta \in [-0.1, 0.1]$ | -2.5198546 | -1.0330114 | -2.6492433 | -0.90674689 |

- Data sources and definitions can be found in the appendix A.
- Bounds are based on 2SLS estimation for specification in column 2, Table 1.

# Appendix A

**Definition and sources of variables used in regression analysis.**

| Variable | Definition | Source |
|---|---|---|
| Private Credit | Deposit money banks and other financial institutions claims on the private sector as a percentage of GDP | Raw data are from the electronic version of the IMF's International Financial Statistics. Claims on Private Sector by deposit money banks and other financial institutions (IFS lines 22d and 42d); GDP in local currency (IFS line 99B..ZF) |
| Government Borrowing | Deposit money banks and other financial institutions claims on central government as a percentage of GDP | Raw data are from the electronic version of the IMF's International Financial Statistics. Claims on Central Government by deposit money banks and other financial institutions (IFS lines 22a and 42a); GDP in local currency (IFS line 99B..ZF) |
| Log GDP | Logarithm of Gross Domestic Product. | Raw data are from the electronic version of the IMF's International Financial Statistics. GDP in local currency (IFS line 99B..ZF) |
| GDP per capita Growth | Annual percentage growth rate of GDP per capita based on constant local currency. | World Bank's World Development Indicators. |
| Deposits Financial Sector | Demand, time and saving deposits in deposit money banks and other financial institutions as a percentage of GDP | Raw data are from the electronic version of the IMF's International Financial Statistics. Financial system deposits (IFS lines 24, 25, and 45); GDP in local currency (IFS line 99B..ZF) |
| Civil Liberties | This index consists of four subcategories: Freedom of expression and belief, associational and organizational rights, rule of law and personal autonomy and individual rights. The index varies from 1 to 7 and lower values represent higher degree of freedom. | Freedom House. |
| Interest Rate | Lending rate which meets the short and medium term financing needs of the private sector. Real interest rate is the lending rate - inflation rate. | Raw data are from the electronic version of the IMF's International Financial Statistics. Interest: Lending Rate (period average) (IFS line 60P..ZF or if not available 60L..ZF ) |
| Inflation | Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a fixed basket of goods and services that may be fixed or changed at specified intervals, such as yearly. | World Bank's World Development Indicators. |
| Orientation | Orientation of chief executive's party. This variable is 1 if party is considered left-wing and 0 otherwise. | Database of Political Institutions, Beck et al. |
| M3 | Sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travelers checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents as a percentage of GDP. | World Bank's World Development Indicators. |

# Appendix A (continued)

**Definition and sources of variables used in regression analysis.**

| Variable | Definition | Source |
|---|---|---|
| Creditor Rights | The index ranges from 0 (weak creditor rights) to 4 (strong creditor rights). A score of one is assigned when each of the following rights of secured lenders is defined in laws and regulations: First, there are restrictions, such as creditor consent or minimum dividends, for a debtor to file for reorganization. Second, secured creditors are able to seize their collateral after the reorganization petition is approved. Third, secured creditors are paid first out of the proceeds of liquidating a bankrupt firm. Finally, if management does not retain administration of its property pending the resolution of the reorganization. | Data is from "Private Credit in 129 Countries", Djankov, Simeon, Caralee McLiesh and Andrei Shleifer, Journal of Financial Economics, 2007 |
| Law and Order | Law and order are assessed separately, with each sub-component comprising zero to three points. The law sub-component is an assessment of the strength and impartiality of the legal system, while the Order subcomponent is an assessment of popular observance of the law. The index varies from 0 to 6 and higher values represent better law and order situation. | International Country Risk Guide. |
| Parliamentary Dummy | This variable equals 1 if a country has parliamentary government and 0 otherwise. | Database of Political Institutions, Beck et al. |
| Polarization | Maximum difference between the chief executive's party and the three largest government parties and the largest opposition party. This variable varies from 0 to 2. | Database of Political Institutions, Beck et al. |
| Parliamentary*Polarization | Interaction between parliamentary dummy and polarization. | Database of Political Institutions, Beck et al. |

# Appendix B

## Sample of countries used in regression analysis

| Africa | Asia & Pacific | Europe | Middle East | Latin America |
|---|---|---|---|---|
| Burkina Faso | Fiji | Latvia | Egypt, Arab Republic | Argentina |
| Cameroon | India | Moldova | Jordan | Barbados |
| Cape Verde | Nepal | Poland | Morocco | Belize |
| Central African Republic | Papua New Guinea | | Syrian Arab Republic | Bolivia |
| Chad | Philippines | | | Chile |
| Congo, Republic | Sri Lanka | | | Colombia |
| Cote d'Ivoire | | | | Costa Rica |
| Gabon | | | | Dominican Republic |
| Gambia, The | | | | El Salvador |
| Kenya | | | | Grenada |
| Lesotho | | | | Guatemala |
| Madagascar | | | | Guyana |
| Malawi | | | | Haiti |
| Mauritania | | | | Honduras |
| Mauritius | | | | Jamaica |
| Niger | | | | Panama |
| Nigeria | | | | Paraguay |
| Rwanda | | | | Peru |
| Senegal | | | | St. Lucia |
| Sierra Leone | | | | Trinidad and Tobago |
| Swaziland | | | | Uruguay |
| Togo | | | | Venezuela |
| Uganda | | | | |
| Zambia | | | | |
| Zimbabwe | | | | |

# Appendix C

**Summary statistics of variables used in regression analysis**

| Variable | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|
| Private Credit | 27.11 | 18.08 | 2.10 | 100.30 |
| Government Credit | 6.22 | 5.87 | 0.01 | 33.25 |
| Log of GDP | 20.56 | 3.22 | 11.61 | 27.37 |
| GDP per capita Growth | 1.34 | 4.36 | -15.13 | 16.24 |
| Deposits Financial Sector | 32.06 | 19.91 | 2.76 | 106.84 |
| Civil Liberties | 3.84 | 1.57 | 1 | 7 |
| Inflation | 10.69 | 11.20 | -3.70 | 76.38 |
| Interest Rate | 8.26 | 10.13 | -38.69 | 44.55 |
| Parliamentary | 0.25 | 0.43 | 0 | 1 |
| Polarization | 0.24 | 0.59 | 0 | 2 |
| Parliamentary*Polarization | 0.05 | 0.28 | 0 | 2 |
| Orientation | 0.25 | 0.43 | 0 | 1 |