# Bank Account Debit (BAD) Taxes, Bank Lending and Industrial Growth: Evidence from Latin America

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**Abstract**

I examine the bank credit supply and industry growth effects stemming from the introduction of bank account debit (BAD) taxes using a sample of Latin American countries between 1986 and 2005. I exploit a key channel through which BAD taxes affect the supply of credit: their introduction creates a strong incentive to shift *away* from holding bank deposits and *into* using cash and other quasi-currencies. I find that this higher preference for cash results in a lower availability of deposits as a source of funding for banks, and that this in turn is directly related to a lower provision of bank credit to the private sector. Furthermore, using a differences-in-differences empirical strategy, I find that the implementation of BAD taxes ultimately affects economic growth at the industry level, mainly by reducing the growth prospects of industries that are more dependent on external finance or that have less tangible assets.

**Keywords:** Bank Account Debit Taxes, Bank Lending, Bank Deposits, Industry Growth

**JEL Classifications:** G21, G30, E44, H22

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# 1. Introduction

In this study I investigate whether the introduction of bank account debit (BAD) taxes has a negative impact on the provision of bank credit to the private sector, and if so, whether this ultimately affects output growth at the industry level.[1] Starting in the 1980s and over the next two decades, seven Latin American countries implemented, at different times and with time-varying statutory rates, a tax on debits from bank accounts. BAD taxes are levied on withdrawals from bank accounts, including check clearances, electronic transfers, ATM cash withdrawals, loan payments and most other transactions that involve debiting money from a bank account. For policymakers, they have the attractiveness of being easily and inexpensively collected. These taxes, however, can be avoided if payments are not made using bank accounts. As a result, their introduction creates a strong incentive for economic agents to shift *away* from holding bank deposits and *into* using cash and other quasi-currencies.

As the IMF (2010) highlights, the financial crisis of 2008 has spurred the debate on how the financial sector could make a "fair and substantial contribution" to compensate the costs associated with government interventions to repair it. Among several policy tools, financial transaction taxes have received increased interest as a means of raising fiscal revenues from the financial industry. The IMF points out however that "surprisingly, previous academic work and policy debates provide very little guidance in this critical subject". Although prior research indicates that BAD taxes have had important detrimental effects on the efficiency of banking systems in Latin America (e.g., Coelho, 2009; Baca-Campodónico et al., 2006; Kirilenko and Summers, 2003), these studies do not assess the impact on the aggregate provision of bank credit or, more importantly, the real effects stemming from the introduction of BAD taxes, which I investigate here.

This study is also related to the literature studying the link between finance and economic growth.[2] The task of tracing a causal link between the supply of bank credit and growth is fraught with endogeneity,

[1] The BAD acronym has been commonly used in the economic and tax policy literature. It was also common in Australia where the tax was in effect between 1983 and 2005.
[2] See, for example, Demirgüç-Kunt and Levine (2008) for a comprehensive survey of the finance-growth literature.

mainly due to the equilibrium nature between the supply and demand for capital. To overcome endogeneity concerns and show that financial development spurs growth, researchers have focused on pure cross-country analyses using instrumental variables (e.g. Levine, Loayza and Beck, 2000), natural experiments in a specific country (e.g. Jayaratne and Strahan, 1996) and testing industry-level mechanisms linking finance and growth (e.g. Rajan and Zingales, 1998). This paper contributes to this literature by providing evidence of a key channel linking finance to growth. Specifically, I find that a reduction in the availability of deposits as a source of bank funding impacts negatively the supply of bank credit, and that this ultimately has an effect on economic activity mainly by reducing the growth prospects of those industries that are more dependent on external finance or that have assets that are less tangible.

My empirical analysis proceeds in two stages. First, I investigate the impact of the introduction of bank debit taxes on the aggregate provision of bank credit to the private sector. I exploit a key channel through which bank debit taxes affect the availability of credit: their introduction creates a strong incentive to shift away from holding bank deposits and into using cash and other quasi-currencies. Thus, if financial markets are not perfect and banks cannot costlessly replace a reduction in deposits as a source of funding, the implementation of a BAD tax should lead to a lower availability of bank credit, independent of the demand for capital. This first step is related to Merrouche and Nier (2012), who find that payment system reforms in seven Eastern European countries between 1995 and 2005 were an important precondition for the credit boom later observed in those countries. Similar to them, I link a specific policy reform to financial intermediary development to credit creation using a natural experiment in a cross-country setting. However, Merrouche and Nier stop short of tracing any real aggregate or industry-level consequences of such reforms, which I examine here.

To this latter purpose, in the second stage of my analysis I build on the industry-level mechanisms developed by Rajan and Zingales (1998), Braun (2003) and Wurgler (2000) that link finance and economic growth. In their influential study, Rajan and Zingales circumvent many of the criticisms about omitted variable bias in cross-country analyses by interacting a country's financial development with an industry's inherent dependence on external financing. Specifically, I use a differences-in-differences empirical

strategy to test whether industries that rely more heavily on external financing, or that have less tangible assets, grow less rapidly following the implementation of bank account debit taxes.

My findings provide strong evidence that BAD taxes lead to a reduction in the availability of bank credit to the private sector, even after controlling for banking crises, business cycle effects and other set of controls commonly used in the literature. Specifically, I find that the ratio of bank credit to the private sector to GDP decreases by approximately 10% after the introduction of BAD taxes. This effect is economically significant, as it represents a reduction of close to one third of the average bank credit to GDP ratio in my sample of 30%. I find that the higher preference for using cash introduced by the tax results in a lower availability of deposits as a source of funding for banks, and that this in turn is directly related to a lower provision of bank credit to the private sector. These findings are consistent with the hypothesis that a shock to the supply of deposits directly affects banks' supply of credit, and that the substitution between different sources of funding is not a costless task for banks. Furthermore, these results suggest that the effects of BAD taxes on the provision of bank credit are largely the result of a shock to the supply of deposits, rather than changes in credit demand.

At the industry level, I find that the lower availability of bank credit affects *more* the growth prospects of industries that are more susceptible to financing frictions. That is, following the implementation of BAD taxes, industrial output growth is slower in those industries that are inherently more dependent on external financing, as well as those industries that have less tangible assets. Specifically, I find that following the introduction of BAD taxes, annual output growth is 3.6% slower for industries with high dependence on external financing relative to those sectors that are inherently low users of external financing. Similarly, industries with low asset tangibility grow 4.3% slower per year than industries with high asset tangibility in the years following the tax implementation. To put in context the economic significance of these results, these lower growth rates represent about one third of the 10.6% standard deviation of industrial output growth in my sample. To ensure that these differential growth rates are not the byproduct of changes in economic conditions (e.g. country specific fluctuations in the business cycle, or time specific shocks to a particular industry) I include country-year, country-industry and industry-year fixed effects in my industry-

level tests. Overall, the findings at this second stage are consistent with the hypothesis that banks play an important role supporting the growth of industries that are particularly susceptible to financing frictions.

I conduct several robustness tests to ensure that my results reflect the impact of the introduction of BAD taxes on the economic outcomes evaluated. First, I explicitly control for both fluctuations in the business cycle and for banking crises and find no evidence that they are the main drivers behind the reduction in the provision of bank credit or the differential effect on industrial growth. I also find no evidence that my results are the byproduct of a general increase in a country's tax collection, or that a "crowding-out" effect (where increased government spending crowds out private investment) is driving the results. I perform a falsification test to address the potential concern for trends *prior* to the tax implementation driving the results and find that they are robust to this alternative explanation. Furthermore, I perform a falsification test at the industry-level to examine if the differential growth rates following the tax introduction are also observed when I sort industries by asset turnover. This industry characteristic, unlike an industry's dependence on external finance or its tangibility, should not lead to differential growth rates based on financing frictions. Instead, if the tax impacts output growth directly and not through a financing channel, then those sectors that have a higher asset turnover should be affected more by a tax on financial transactions. Consistent with the financing frictions hypothesis, I find that there are no systematic differences in output growth when sorting industries by their asset turnover. In all, my evidence suggests that the introduction of bank debit taxes, by lowering the availability of bank credit to the private sector, has a significant negative spillover effects on industry-level growth.

## 2. Related literature and relative contribution

### 2.1. BAD taxes and financial intermediation

Previous research shows that bank account debit taxes adversely affect financial intermediation. By decreasing the real returns obtained on bank deposits, economic agents with excess savings have an incentive to shift away from depositing their money into the financial system. In addition, from a borrower's perspective, the all-in cost of debt also increases when a tax on bank debits is implemented, as the tax is

also levied on loan payments. Accordingly, one of the most commonly documented forms of disintermediation stemming from the tax is the substitution away from bank accounts and into cash, as the use of physical currency is naturally exempt from it (Albuquerque, 2001; Coelho et al., 2001; Lozano and Ramos, 2000; and Baca-Campodónico et al., 2006). Substitution to other quasi-currencies has also been documented: in Argentina, provincial governments' tax-exempt notes were commonly used (Baca-Campodónico et al., 2006). In Colombia, firms used transferable notes as means of payment (Arbelaez et al., 2005). Multiple re-endorsements of checks and transferring bank accounts offshore have been other responses to these taxes. The latter was a central factor in the elimination of the tax in Australia (Galindo and Majnoni, 2006). In this paper I conjecture that a shift from bank accounts to holding cash or other quasi-currencies lowers the availability of funds for financial institutions, and may result in an increase in their cost of funding and/or in a lower availability of credit.

A limited number of studies examine the effects of BAD taxes on the efficiency of banking systems in Latin America. Coelho et al. (2001) examine the fiscal revenue effects and the changes in economic behavior resulting from the introduction of bank debit taxes in Latin America. They argue that their introduction has resulted in negative allocational effects, and document ample anecdotal evidence that BAD taxes have resulted in financial disintermediation. Baca-Campodónico et al. (2006) also use cross-country data from Latin America and document that revenues tend to decline over time for a given tax rate, which they interpret as indirect evidence of financial disintermediation. Kirilenko and Summers (2003) estimate that bank debit taxes resulted in a disintermediation of up to 28% in Venezuela, 41% in Colombia and 47% in Ecuador. Overall, the evidence from these studies suggests that the introduction of BAD taxes has led to non-negligible financial disintermediation. None of these studies however, have assessed the impact on the aggregate provision of bank credit or the real effects resulting from the introduction of BAD taxes. Thus, one key contribution of this paper is to further our understanding of the financial and real consequences of taxing bank account transactions.

From a theoretical perspective, researchers have also argued that BAD taxes introduce larger distortions when compared to other levies at the same fiscal revenue levels (e.g. relative to value-added and

income taxes). Albuquerque (2006) uses a dynamic general equilibrium model to study the economic effects of BAD taxes. He finds that the gross fiscal revenue from these taxes may be illusory due to higher interest payments on government debt, and that the deadweight losses are relatively high when compared to the small revenues typically observed in Latin America. Albuquerque argues that it is difficult to generate large fiscal revenues with a BAD tax relative to income or sales taxes, which is consistent with the "disappointing Latin American revenue collection experiments" documented by most researchers. Both Albuquerque (2006) and Kirilenko and Perry (2004) argue that income and sales taxes may generate similar relative deadweight loses, although at much higher revenue levels.

### 2.2. Financial development and economic growth

A large body of literature examines the relationship between financial development and economic growth. Goldsmith (1969) was among the first to perform a cross-country investigation of the relationship between financial development and economic activity, motivating it as "one of the most important problems in the field of finance, if not the single most important one." Limited by the unavailability of comparable data on cross-country financial measures, Goldsmith was only able to provide evidence of a positive correlation between finance and growth for a sample of 35 countries. King and Levine (1993) build on Goldsmith's work and find that various measures of financial depth are individually good predictors of future economic growth, even after controlling for other potentially confounding factors related to economic activity. Still, King and Levine do not directly address the issue of causality as there could be other omitted variables that drive both the development of the financial system and future economic growth.

Nevertheless, the influential work of King and Levine spurred numerous studies that aim at providing stronger evidence on the direction of causality. For instance, Levine (1998) and Levine, Loayza and Beck (2000) attempt to address the omitted variables and reverse causality concerns by using a country's legal origin as an instrumental variable for financial development. Overall, these studies find a strong relationship between the instrumented component of financial intermediary development and long-run economic growth. The use of these instrumental variable estimators, however, does not control for the potential

endogeneity of all the other included and omitted explanatory variables, which can still bias the estimated coefficient when regressing economic growth on financial development.

In addition to the use of cross-country data, evidence on the direction of causality has also been strengthened by studies that use natural experiments. Most of these studies generally focus in changes within an individual country. Jayaratne and Strahan (1996) for instance examine the deregulation of the banking system in the United States and provide evidence that state-level per capita growth rates increase significantly following banks' branch reforms. They find that the higher level of economic growth after deregulation is mostly supported by improvements in the quality rather than the quantity of lending.

Rajan and Zingales (1998), to circumvent some of the prevailing endogeneity concerns in most cross-country analysis, focus on one of the theoretical mechanisms through which financial development affects economic growth: that financial markets and institutions help firms overcome problems of moral hazard and adverse selection, and therefore reduce firms' cost of external financing. Rajan and Zingales argue that industries with certain technological characteristics are naturally heavy users of external finance and should benefit disproportionately more from greater financial development. Using data on a panel of 42 countries and 36 manufacturing industries, they find that sectors that are more dependent on external finance develop at a relatively faster pace in countries that have more developed financial markets. Although their work provides a valuable tool to improve the identification of causality, a potential explanation for their results is that as technological advances occur, industries involving maturing technologies typically migrate from developed to developing countries. That is, their findings could be stemming from the fact that countries with similar levels of economic development grow in similar industries. Fisman and Love (2003) for instance argue that the Rajan and Zingales' dependence on external finance interaction may be picking up the alternative explanation that more economically developed countries, which generally have more developed financial systems, grow in similar industries as those growing in the U.S.

Several papers have built on Rajan and Zingales' industry-level methodology. Braun (2003) shows that industries that are poorly endowed in tangible assets grow disproportionately slower in countries where the financial system is less developed. Braun argues that asset tangibility can also be viewed as a

predetermined industry characteristic that increases an industry's ability to obtain external financing when firms have imperfect access to credit. Wurgler (2000) uses data from 65 countries to test whether more developed financial systems are better at allocating capital in those industries that are growing more rapidly. Wurgler finds that the elasticity of industry-level investment to value added is higher in more financially developed countries, which supports the proposition that financial development improves the allocation of capital.

The first part of my empirical strategy is related to the study by Merrouche and Nier (2012), who link a specific shock to financial intermediary development to credit creation using a natural experiment. Merrouche and Nier examine payment system reforms in seven Eastern European countries between 1995 and 2005 and find that these changes were an important precondition for the credit boom observed in their sample countries. They document that payment system reforms led to a "shift away from cash and towards demand deposits as a medium of exchange and that this in turn enabled an expansion of credit". I argue that the introduction of BAD taxes in Latin America has a similar but opposing effect: their implementation affects financial intermediation by causing a shift *into* cash and *away* from demand deposits, which in turn limits credit creation. However, Merrouche and Nier do not trace any real aggregate or industry-level effects of such reforms, which I do examine here.

To this latter purpose, in the second part of my empirical strategy I build on the industry-level mechanisms introduced by Rajan and Zingales (1998), Braun (2003) and Wurgler (2000) that link finance and growth. In this study, I am able to implement industry-level tests for my sample of countries using a shock to the supply of bank credit for identification. Thus, an important contribution of this paper is the particular setting that I exploit for identification: a natural experiment in which a common policy reform is implemented in different countries at different times, which allows me to trace a shock to financial intermediary development through aggregate credit creation and onto industrial output growth.

## 3. The introduction of BAD taxes in Latin America

Seven Latin American countries: Argentina, Brazil, Bolivia, Colombia, Ecuador, Peru and Venezuela, have implemented taxes on debits from bank accounts at one time or another since the 1980s.[3] All seven countries have experienced changes in the statutory tax rate through time. In addition, four countries (Argentina, Brazil, Peru and Venezuela) have experimented with bank debit taxes in two or more distinct episodes. Table 1 summarizes the rates and revenues from the tax in each country. It shows that there is considerable variation both across countries and through time in the statutory rates and in the fiscal revenues from the tax. Appendix A summarizes the implementation and general characteristics of the bank debit tax in each country. Although in all cases the tax is levied on debits from bank accounts, the list of taxable transactions and exemptions varies from country to country. Notably, in Argentina between 2001 and 2004 and in Ecuador between 1999 and 2000 the tax was extended to also include bank credits. In these two countries, to compensate for this broader tax base, part of the BAD tax was partially creditable against the income tax.[4] In terms of exemptions, government agencies and some non-profit organizations are generally exempt from the tax. Also, certain transactions such as those with the central bank and in the interbank market have been typically exempt from the tax.[5]

BAD taxes have been a particularly attractive source of revenue for policymakers, as their collection is relatively efficient and inexpensive. They also offer the appeal of a large base, so that relatively high tax revenues can be raised with a fairly low rate. Their prevalence in Latin America relative to other taxes is in

[3] Other countries have also experimented with similar forms of bank-transactions taxes. In the U.S. a two cent tax on bank checks was imposed at the end of the nineteenth century during the Spanish-American war, and then also from June 1932 through December 1934. Lastrapes and Selgin (1997) document how the Hoover administration adopted the tax in the early 1930s when "faced with a dramatic collapse in income tax revenues", despite recognizing its potential negative effects on the banking system. As a result, Lastrapes and Selgin estimate that the monetary contraction of the 1930s was 15% higher than it would have been without the tax.

[4] Following previous literature, I take this broader base into account in my empirical tests by multiplying by two the statutory tax rate, and also by using the ratio of BAD tax fiscal revenues to GDP as an alternative proxy to measure the effect of these taxes.

[5] As a brief but noteworthy exception, a preferential rate of 0.012% was originally applied to interbank transactions when the tax was first introduced in Colombia in 1999 at a standard rate of 0.2%, However, in March 1999 this preferential treatment was declared unconstitutional by the Constitutional Court. Lozano and Ramos (2000) document that this resulted in a quick and sharp reduction in interbank transactions. In August 1999, and following the virtual disappearance of the interbank market, interbank transactions were made exempt from the tax.

part explained by the fact that countries in this region tend to have revenues from income taxes and value added taxes that are significantly below those obtained in more developed countries for similar statutory rates. For example, taxes on income, profits and capital gains corresponded, on average, to 11.4% of GDP in OECD countries between 1990 and 2005.[6] In contrast, the average revenue from these same taxes is only of 3.9% of GDP in my sample of countries during the same period. This underpins the importance of BAD taxes as a fiscal policy tool and helps explain their popularity in Latin America. Bank debit taxes have also been used, particularly in Brazil and Ecuador, as an instrument to reduce tax evasion by taxing the informal economy and by allowing for the cross-checking of information on income taxes and financial transactions.

In contrast to this fiscally oriented nature that has led to the introduction of BAD taxes, financial transaction taxes have long been proposed by economists that considered them to be an important tool to reduce macroeconomic instability. Keynes (1936) argued that "the introduction of a substantial government transfer tax on all transactions might prove the most serviceable reform available, with a view to mitigating the predominance of speculation over enterprise in the United States." Tobin (1978) proposed a tax on foreign exchange transactions to reduce the negative effects associated with short term speculative external flows into an economy.

As the discussion above highlights, the introduction of bank debit taxes in Latin America has been in part motivated by governments' needs to raise fiscal revenues. Consequently, the introduction of BAD taxes is not necessarily unconditionally exogenous to economic circumstances, and in the empirical setting I examine it may be correlated with the need to increase tax revenues during difficult economic times. I take various steps to reduce concerns that my results are driven by other factors and not the tax policy change per se. First, I explicitly control in all tests for the effect of banking crises using data from Laeven and Valencia (2012). Similarly, I control for the effect of fluctuations in the business cycle by including GDP growth and two of its lagged values, and in one of my robustness checks I test whether pre-BAD tax trends are driving the results. If banking crises and/or changes in the business cycle and *not* BAD taxes are

[6] OECD (2010).

the main drivers in my regressions, then statistical significance should be found in the formers and not in the latter. Finally, I exploit for identification not only the initial introduction of the taxes but also the variation through time in each country's statutory tax rates.

While this paper highlights the effects of the introduction of bank debits taxes in my sample of countries, structural changes to the banking system have also occurred along other dimensions. Latin American countries have undertaken various reforms to their regulatory and supervisory framework over the last decades. To reduce concerns that financial reforms and not the introduction of BAD taxes are driving the results, I explore the timing and degree of these advances using Abiad et al.'s (2008) Financial Reform Index. This index records financial policy changes along seven different dimensions: credit controls and reserve requirements, interest rate controls, entry barriers, state ownership, policies on securities markets, banking regulations, and restrictions on the capital account. The index is normalized to be between 0 and 1, where higher values indicate that financial sector policies are more liberalized and less restrictive to the functioning of the financial system. Figure 2 plots the Financial Reform Index for each country in my sample, along with the BAD taxes implementation periods. Consistent with the evidence from Figure 2, Abiad et al. point out that financial reforms across the world tend to be clustered by regions: countries within certain regions have tended to liberalize their financial sectors at roughly the same time, and in roughly the same way. In the particular case of Latin America, Abiad et al. indicate that "with the exception of early reforms in Argentina and Chile in the 1970s, most of the reforms in Latin America occurred in the late 1980s and early 1990s." This argument, coupled with the evidence from Figure 2, suggests that although important changes to the financial system did take place during my sample period, overall all sample countries advanced in the same direction by gradually liberalizing their financial sectors through the 1980s and 1990s. More generally, the fact that reforms to the financial system are clustered within regions also suggests that focusing on a sample of countries in the same continent may better provide independent variation to identify the effects of BAD taxes on the supply of credit and on industry growth. Furthermore, to address this formally, I include Abiad et al.'s Financial Reform Index as an additional control in my empirical tests.

## 4. Empirical strategy and results

The main hypothesis I test in this paper is whether the introduction of bank account debit taxes, by reducing the supply of bank credit, affects more the growth prospects of industries that are more dependent on external finance or that have assets that are less tangible. This involves a dual hypothesis, first on the effect of BAD taxes on the provision of bank credit to the private sector, and second on the differential effect of a lower availability of bank credit on the growth of industries that are more susceptible to financing frictions. Thus, I proceed in two steps in my empirical analysis. First I develop and apply the empirical tests to identify the effect of BAD taxes on the aggregate provision of bank credit, as well as the key channel through which these taxes affect the supply of credit. Then, I describe the industry-level empirical approach I implement to explore the effects on output growth stemming from the introduction of BAD taxes.

### 4.1. The effect of BAD taxes on the supply of bank credit

The most useful feature of the bank debit tax experience in Latin America from a researcher's perspective is that different countries introduced the tax at different times and at time-varying tax rates over two decades starting in the 1980s. I exploit both the time series and cross-country variations in their implementation to alleviate the omitted variables difficulties typically associated with country-level regressions. I first implement the following model to estimate the direct effect of the introduction of BAD taxes on a country's aggregate provision of bank credit:

$$Bank\ Credit/GDP_{i,t} = \beta_0 + \beta_1 BAD\ Tax_{i,t} + \beta_2 X_{i,t} + CountryFE_i + YearFE_t + \varepsilon_{i,t} \qquad (1)$$

for country *i* and year *t*, where $Bank\ Credit/GDP_{i,t}$ is the ratio of bank credit to the private sector over GDP. The causal effect of interest in specification (1) is $\beta_1$: the coefficient on $BAD\ Tax_{i,t}$. If the introduction of BAD taxes reduces the supply of bank credit conditional on the vector of control variables $X_{i,t}$, the coefficient $\beta_1$ should be negative. The set of control variables, $X_{i,t}$, follows the literature on the determinants of financial development.[7] Specifically, I control for the potential effect from banking crises

[7] See for instance Merrouche and Nier (2012) and Cottarelli et al. (2005).

by introducing a banking crisis indicator for each country.[8] I include the ratio of total government expenditures to GDP to capture the potential for increases in public spending crowding-out credit to the private sector. To account for the potential of net capital inflows positively affecting financial development, I include the current account balance over GDP. I control for fluctuations in the business cycle by including a country's annual GDP growth at year *t* as well as two of its lags. I also control for the effect of inflation on credit and I allow for this effect to be non-linear by including a high-inflation dummy that takes the value of one when inflation is above the 75th percentile in my sample of countries.[9] I incorporate Abiad et al.'s Financial Reform Index to control for other policy changes that could affect the financial system. Finally, all regressions include a full set of country fixed effects and year fixed effects. One advantage of my empirical design is that by focusing on a set of countries in the same region and whose economies are closely related, the inclusion of time fixed effects accounts for any common shocks that affect the whole region (e.g. region wide business cycle effects or economic crises that are common to all countries).

I also estimate an extended version of specification (1) by including a difference-in-difference (DID) term that allows the effect on credit to be more pronounced in countries that have more developed banking systems previous to the implementation of the tax. The effect of BAD taxes on credit should be bigger where their introduction represents a broader constraint. Thus, I estimate the following model:

$$Bank\ Credit/GDP_{i,t} = \beta_0 + \beta_1 BAD\ Tax_{i,t} + \beta_2 (Initial\ Bank\ Credit/GDP_i * BAD\ Tax_{i,t})$$
$$+\beta_3 X_{i,t} + CountryFE_i + YearFE_t + \varepsilon_{i,t} \quad (2)$$

The additional effect of interest in this specification is $\beta_2$: the coefficient on the interaction between a country's initial level of financial development and the BAD tax measure. For completeness, I explore in specifications (1) and (2) the effects on the aggregate provision of bank credit using three alternative

[8] Banking crises data are taken from Laeven and Valencia (2012).

[9] This closely follows Boyd et al. (2001), Cottarelli et al. (2005) and Merrouche and Nier (2012). Merrouche and Nier point out that previous evidence suggests that inflation should have a negative effect on credit for inflation rates above the "high inflation" threshold. For inflation rates below the threshold, increases in inflation are expected to have little or no impact on credit creation.

measures of $BAD\ Tax_{i,t}$: i) the BAD tax statutory rate, ii) the fiscal revenues from the BAD tax scaled by GDP, and iii) a dummy variable that takes the value of one when a country has a BAD tax in place. Although these three measures are closely related, they measure the effect of the tax in distinct ways. Using the statutory tax rate is arguably the best measure to proxy for the effect of the tax on financial intermediation; its variation across countries and through time potentially accounts for varying degrees of financial disintermediation. A disadvantage nonetheless is that, since the tax base is not necessarily the same in all countries, the same rate across different countries may not reflect the same level of disintermediation. The second measure (total revenues from the BAD tax over GDP) captures the direct economic effect of the tax, making it the most comparable BAD tax measure between countries and across time. It incorporates any differences in the bank debits tax scheme across countries. However, it has the disadvantage of not taking into account the possibility that lower tax revenues are associated with higher disintermediation stemming from the tax. That is, revenues may decline because economic agents are increasingly avoiding and evading the tax by using alternative payment systems. Finally, I also use a dummy variable for the presence of a BAD tax. Using a dummy variable implies that the effect of the tax implementation creates a similar distortion, irrespective of the tax rate.

To estimate models (1) and (2) I use annual data from 1986 to 2005 for ten Latin American countries: the seven countries that have had BAD taxes at one time or another, and three other Latin American countries (Chile, Paraguay and Uruguay) which I use as controls to attain greater efficiency in the measurement of the effect of interest and of all other regressors.[10] This twenty-year period covers most the before and after years around the introduction of bank debit taxes in Latin America.[11] Table 1 shows the BAD tax statutory rates, the implementation period and the BAD tax fiscal revenues scaled by GDP for each country and year. Appendix B contains the details and sources used to construct all variables. Summary statistics for all country-level variables are reported in Table 2, Panel A. The average tax rate for all

[10] I also estimate and report the results only including the seven countries that have experienced with BAD taxes.
[11] I do not include two tax episodes in Argentina, one in 1976 and another in 1983, because of data unavailability.

countries and years in the sample is 0.49%, while the average revenues collected annually from the tax average 1.05%.

#### 4.1.1. The effect of BAD taxes on the supply of bank credit: Results

The results of estimating equation 1 are reported in Table 3 for each of the three BAD tax measures and for the full sample of countries, and the sample of only BAD tax countries. To reduce the influence of outliers on the regression results I winsorize variables at the 1st and 99th percentiles of their respective distributions.[12] Finally, I adjust standard errors by clustering by both country and year. The evidence from the regressions in all three columns suggests that the introduction of BAD taxes is followed by a statistically significant decrease in the amount of bank credit provided to the private sector, scaled by GDP. The coefficient on *BAD tax rate* in column 1 implies that the effect of the introduction of a BAD tax at the average statutory rate of 0.49% results in a reduction of the bank credit to the private sector over GDP ratio of 0.49% * (-21.7) = -10.3%. Similar results and statistical significance are obtained in columns (2) and (3) when using the two other alternative BAD tax measures. In columns (4) to (6) I estimate the regressions using only the sample of countries where the tax has been implemented. For instance, the results in column (4) indicate a reduction in aggregate bank credit to the private sector of 6.3% following the introduction of a BAD tax at the average statutory rate of 0.49%. These magnitudes are not only statistically but also economically significant, specifically when compared with the sample average ratio of bank credit to the private sector over GDP of 30%.

Table 4 shows the estimation results of the DID model in equation (2). This specification allows the size of the credit effect to be more pronounced for countries that have more developed banking systems prior to the introduction of the tax. I measure the *Initial credit to the private sector / GDP* five years prior to the introduction of the tax, using the average of the last five years prior to that date. I find that the negative effect on bank credit is larger when the banking system is more developed to start with. The results in Table 4, column (1) suggest that for a BAD tax rate of 0.49%, a country with an initial level of financial

[12] The results are essentially unchanged when I run the regressions without winsorizing.

development in the top 75th percentile five years prior to the tax introduction has a reduction in the ratio of bank credit to GDP of 17.0%. In contrast, a country that has an initial level of financial development that is only at the 25th percentile experiences a statistically smaller reduction of 9.1%.

Taken as a whole, the results from Tables 3 and 4 provide evidence that the introduction of BAD taxes reduces the provision of bank credit to the private sector after accounting for country fixed effects and year fixed effects, changes in the business cycle, and other time varying control variables.

#### 4.1.2. From BAD taxes to the supply of bank credit: The currency vs. deposits channel

In previous sections I have highlighted one key channel through which BAD taxes potentially affect the supply of bank credit. Specifically, I hypothesize that their introduction leads to an increase in the preference for holding currency relative to demand deposits, which lowers the availability of deposits as a source of funding for banks. If replacing a shortfall of deposits is not a costless task, this change in behavior ultimately reduces banks' aggregate supply of credit. Identifying this particular channel is fundamental to strengthen the argument that the introduction of BAD taxes leads to a reduction in the supply of credit that is mostly independent of the demand for financing. To test this channel I estimate two related regressions analogous to model (1), where now the outcome variables being evaluated are: i) the ratio of currency outside the banking system to banks' demand deposits and ii) the ratio of bank deposits to GPD. Table 5 shows that the introduction of bank debit taxes is followed by a significant increase in the use of cash relative to bank deposits. The evidence from Table 5 is consistent with Diamond and Rajan's (2006) theory of intermediation where monetary disturbances, such as shifts in the demand for cash relative to deposits, can affect the amount of credit provided by the banking system.

### 4.2. The effect of BAD Taxes on Industry Growth

In the second stage of my empirical analysis I examine the effect of the introduction of BAD taxes on industry-level output growth. I focus my analysis on the interaction between the BAD tax rate and each of two inherent industry specific characteristics that are expected to lead to different economic outcomes on the face of an adverse shock to the supply of bank credit. First, I use a measure for dependence on external finance similar to the one introduced by Rajan and Zingales (1998). Industries that are more

dependent on external finance should disproportionally be affected by an adverse shock to the development of financial intermediaries. I use as a second measure an industry's asset tangibility, as in Braun (2003). Assets that are more tangible are able to sustain more external financing by mitigating contractibility problems; higher asset tangibility increases the value that can be recovered by creditors in case of default. Both an industry's dependence on external finance and its asset tangibility can be viewed as predetermined industry characteristics that affect an industry's ability to obtain external financing when firms have imperfect access to credit. The underlying assumption when using these industry-inherent characteristics is that they are determined by technological reasons. Rajan and Zingales point out that in countries with well-developed financial institutions, the actual use of external finance would "primarily reflect the demand for external finance". This is particularly true for large firms in a very well-developed financial system like the U.S., which is the base country to compute both an industry's inherent dependence on external finance and its asset tangibility.

I hypothesize that financial intermediaries help firms overcome moral hazard and adverse selection problems, which ultimately reduce borrowers' cost of external finance. The testable implication of this argument is that industries that are more susceptible to distortions in the supply of credit, proxied by the two aforementioned industry characteristics, should grow disproportionately slower following the introduction of BAD taxes. To test this hypothesis I first estimate the following baseline differences-in-differences (DID) model:

$$OutputGrowth_{i,j,s} = \beta_1 dumBADTax_{i,s} + \beta_2 dumInd_j + \beta_3 (dumBADTax_{i,s} * \beta_2 dumInd_j) + \varepsilon_{i,j,t} \quad (3)$$

for country *i*, industry *j* and pre or post period *s*. The outcome of interest is industry's *j* real annual output growth in country *i* and in period *s*. For this baseline DID framework I collapse the time series information five years before and five years after the BAD tax introduction into one "pre" and one "post"-BAD tax period ($dumBADTax_{i,s}$ = 0, 1). I define the industry characteristic $dumInd._j$ in two alternative ways: i) using a dummy variable that takes the value of one for industries with high dependence on external finance, and ii) using a dummy that takes the value of one for industries with low asset tangibility. Thus,

the primary coefficient of interest in is that of the DID interaction term $dumBAD\ Tax_{i,t} * dumInd._j$. If industries with a high dependence on external finance (or with low asset tangibility) are affected more from a shock to the supply of bank credit, then I expect the coefficient $\beta_3$ to be negative. As Bertrand and Mullainathan (2004) highlight, collapsing the data into two periods as I do in model (3) has the advantage of addressing any potential serial correlation in the time series dimension of the data when estimating standard errors. The disadvantage however of this basic setting is that it does not allow to explicitly account for the potential effect of fluctuations in the business cycle at the country level, or for industry specific shocks through time, or even for industry characteristics specific to each country that might be affecting the results.

Thus, I also develop a more general DID model that explicitly accounts for these potential alternative factors. I estimate the following generalized DID model, where I exploit for identification both the time series and cross-country variations in the implementation of the taxes:

$$Output\ Growth_{i,j,t} = \beta_1(BAD\ Tax_{i,t} * dumInd._j) + \beta_2(BankCrisis_{i,t} * dumInd._j)$$
$$+ Country\ \&\ IndustryFE_{i,j} + Industry\ \&\ YearFE_{j,t} + Country\ \&\ YearFE_{i,t} + \varepsilon_{i,j,t} \quad (4)$$

for country *i*, industry *j* and year *t*. In this model, the country-year fixed effects control for business cycle effects in each country *i* at time *t*. Similarly, the industry-year fixed effects control for shocks that affect a specific industry in a given year. This approach, which reduces the likelihood that the estimate of $Output\ Growth_{i,j,t}$ is biased by a correlation between country-specific or industry-specific cycles and BAD taxes, comes at a high cost in terms of lost degrees of freedom. At this level, only additional explanatory variables that vary both with industry, country and time need to be included (e.g. the direct effect of the tax is captured away by the added level of country-year fixed effects). The primary coefficient of interest in model (4) is that on the interaction term $BAD\ Tax_{i,t} * dumInd._j$: if industries with a high

dependence on external finance (or with low asset tangibility) are affected more from a shock to the supply of bank credit, the coefficient $\beta_1$ should be negative.[13]

Before proceeding, I point out that this specification has one important advantage over many cross-country empirical studies that examine the link between financial development and growth. That benefit is that identification of a supply of credit effect on industry growth is centered on within-country differences between industries based on an interaction between an industry characteristic and a country-level shock to the supply of bank credit, using a sample of countries with a similar level of financial development.

The industrial output data are from the United Nations Industrial Development Organization's (UNIDO) Industrial Statistics Database (INDSTAT), which provides annual observations for 23 manufacturing industries at the 2-digit ISIC level. This is the most disaggregated and comprehensive data on growth that is comparable across countries. Both an industry's dependence on external finance and its inherent asset tangibility are calculated using U.S. firm level data over the 1980 to 1989 time period, which closely matches the beginning of my sample.[14] Once I calculate these two industry measures I group industries into high or low dependence on external finance (for which *High DEF dummy* = 1) and into low or high asset tangibility (for which *Low tangibility dummy* = 1). I calculate an industry's annual real output using UNIDO's output data in local currency and deflating nominal values with wholesale price indices. When wholesale inflation is not available I use consumer prices to deflate variables. I exclude from my final sample industries that in a specific country are classified as a combination of two or more other industries, as this could lead to incorrect inferences when matching the industry data with the measures of

[13] In this specification I use standard errors clustered in both country-industry and time as described in Thompson (2011) and Cameron, Gelbach and Miller (2011). To estimate the double-clustered standard errors I use the Stata code "cluster2.ado" downloaded from Mitchell Petersen's website: http://www.kellogg.northwestern.edu/faculty/petersen/htm/papers/se/se_programming.htm.

[14] I use Compustat data for U.S. firms in these 23 industries to compute the two industry specific proxies. Industries are identified in Compustat using SIC codes, which I then match to their equivalent ISIC codes. To construct an industry's dependence on external finance measure, I sum over the 10 year period the difference between capital expenditures and operating cash flow and then divide this sum by the sum of capital expenditures. I define an industry's dependence on external finance as the median value for all firms in an industry. As Rajan and Zingales point out, by summing over several years for each firm and then taking the median value for all firms within an industry, the measure is less susceptible to being driven by short term economic fluctuations and outliers. Similarly, I construct an industry's tangibility by calculating the median value for all firms in an industry of the ratio between fixed assets and total assets over the same ten year period.

dependence on external finance and asset tangibility.[15] Finally, I merge the industry-level annual data with the measures of dependence on external finance and asset tangibility obtained using U.S. firm-level data, and with the country-level data used in the previous section. The final merged industry-level sample consists of an unbalanced panel for ten countries and 23 manufacturing industries between 1986 and 2005, which incorporates most of the before and after BAD tax periods in Latin America. Table 2, Panel B summarizes the sample statistics for the industry-level variables used in the empirical tests.

**4.2.1 The effect of BAD Taxes on Industry Growth: Results**

After providing empirical support to the proposition that this particular tax policy has an effect on the supply of bank credit to the private sector, I investigate whether this traces to the real economy by studying the effects on industry-level growth. To this purpose I first report in Table 6 the results for the DID model (3). Panels A and B show that following the introduction of BAD taxes, both *High DEF* and *Low Tangibility* industries grow at a slower pace than industries that are inherently low dependents on external finance or that have high asset tangibility. The evidence from this basic framework indicates that the differential growth rate in the post relative to the pre period is approximately -10% between treatment (*High DEF* or *Low tangibility*) industries and their respective control groups.

To explicitly address any concerns that the results from the baseline DID regression may be due to country-specific fluctuations in the business cycle or to industry-specific shocks in a given year, I estimate the generalized DID framework developed in model (4) and report the results in Table 7. The estimated coefficient for the interaction term *BAD tax rate * High DEF dummy* in column (1) indicates that, following the introduction of a BAD tax at the average 0.49% statutory rate, an industry with a high dependence on external finance industry grows at a rate that is 3.6% slower than a low dependence industry (-7.32 * 0.49% * 1 = -3.6%). When I instead focus on the interaction term *BAD tax rate * Low tangibility dummy* in column (2) I find that industries that are inherently endowed with assets that are less tangible grow 4.3% less rapidly than industries with a high tangibility of assets following the introduction of these taxes (-8.75 * 0.49% *

[15] I winsorize real annual output growth at the 1% and 99% levels.

1 = -4.3%). To put in context the economic significance of these results, these differentially lower growth rates represent about one third of the 10.6% standard deviation of output growth for all industry-years in my sample. These industry-level findings are consistent with the hypothesis that a shock to the supply of bank credit affects more firms in those industries that are more susceptible to financing frictions.

#### 4.2.2 The effect of BAD taxes on the efficiency of capital allocation

In this last empirical subsection I explore one important channel through which a shock to the supply of bank credit can affect industry growth. The starting point is the proposition that a fundamental role of a banking system is to allocate capital efficiently. As Wurgler (2000) points out, an implication of this hypothesis is that better intermediaries facilitate the allocation of capital into those industries that are growing faster, relative to those that are slowing down. Wurgler provides evidence that countries with more developed financial systems both increase investment more in their growing industries and decrease it more in their declining industries. The emphasis of Wurgler's study is on cross-country variation in measures of financial development that are time invariant, and not on the effects of changes in financial development using within-country data. My goal here is to build on Wurgler's methodology to examine whether the implementation of BAD taxes reduces the efficiency of capital allocation, measured as the elasticity of investment to output growth. Thus, I test whether the introduction of BAD taxes, as a negative shock to the banking system, results in a lower sensitivity of investment growth to output growth. I estimate the following regression:

$$ln\left(\frac{Investment_{i,j,t}}{Invesstment_{i,j,t-1}}\right) = \beta_1 ln\left(\frac{Output_{i,j,t}}{Outpu_{i,j,t-1}}\right) + \beta_2 BAD\ Tax_{i,t} + \beta_3\left[ln\left(\frac{Output_{i,j,t}}{Outpu_{i,j,t-1}}\right) * BAD\ Tax_{i,t}\right] + Country\ \&\ IndustryFE_{i,j} \quad (5)$$

In specification (5) I extend Wurlgler's model by including the two terms on the right hand side of the equation that include the *BAD tax*. In particular, the main coefficient of interest is $\beta_3$, which allows me to evaluate whether the elasticity of investment to output changes following the introduction of bank debit

taxes. If the implementation of bank debit taxes reduces the efficiency with which capital is allocated, I expect the coefficient $\beta_3$ in model (5) to be negative. I use industry-level gross fixed capital formation data from UNIDO's dataset to calculate a proxy for investment. Although gross fixed capital formation does not exactly proxy for net investment (e.g. it does not take into account depreciation), it is the most comparable proxy for investment that is available at the industry-level for several countries. Performing this final examination can potentially help explain whether one channel through which a negative shock to the development of the banking system affects industrial output growth is by reducing the efficiency with which funds are invested in the economy. I estimate equation (5) in Table 8. Since output growth should be positively correlated with Tobin's Q (which cannot be measured directly at the industry level), the results from Table 8 indicate that the implementation of BAD taxes, as an adverse shock to the banking system, lower an industry's ability to take better advantage of its investment opportunities. This is consistent with the tax on bank debits reducing the efficiency of the allocational function performed by the banking system.

# 5. Robustness tests

## 5.1. Is the reduction in bank credit the byproduct of a general increase in taxes?

One alternative explanation to the results in this paper is that it may not necessarily be the introduction of a BAD tax that leads to a reduction in bank credit, but that its implementation is just a reflection of a general increase in a country's taxes. To evaluate this alternative argument, in Table 9 I estimate an extended version of model (1) where I include two measures of the annual tax revenues collected in each country: i) total tax revenue over GDP in columns 1 to 3, and ii) total income and capital gains tax revenue over GDP in columns 4 to 6.[16] In none of the regressions the coefficients on these added tax revenue measures are statistically significant, suggesting that the reduction of bank credit is mostly due to the specific introduction of BAD taxes, and not necessarily because all taxes or income taxes are rising.

[16] I do not include these variables in the main regressions in tables 3 and 4 as they are only available starting in 1990.

### 5.2. Is the differential effect on industrial output due to changes in the business cycle?

In the main regressions of this paper I account for fluctuations in the business cycle by including as controls lagged values of GDP growth (in the bank credit regressions) or country-year fixed effect (in the industry growth regressions). In this subsection I further explore the potential concern that changes in the business cycle and *not* the implementation of BAD taxes are driving not the direct but the differential effects in the industry growth regressions. In Table 10 I show the estimation results of a regression similar to that of model (4) shown in Table 7, but now including the interaction of the first two lags of GDP growth with each of the two industry-specific measures of exposure to financing frictions (*High DEF dummy* and *High tangibility dummy*). Results for the interacted coefficients of these two industry characteristics with *GDP Growth, Lag 1* and *GDP Growth, Lag 2* in Table 10 provide little support to the alternative explanation that the differential industry growth rates are stemming from fluctuations in the business cycle. That is, evidence from these extended regressions is consistent with the main results shown in Table 7, indicating that the implementation of BAD taxes reduces the growth prospects of those industries that are more dependent on external financing, or that have assets that are less tangible.

### 5.3. Is the differential effect on industrial output due to a crowding-out effect?

It also may be possible that a crowding-out effect, where the need to finance increased government spending crowds-out private investment, leads to industries that are more susceptible to frictions in the supply of credit to grow at a slower pace. Although in the country-level bank credit regressions I control for the direct effect of government spending, I further explore if this the "crowding-out" effect drives the differential growth effects found in the industry-level tests. Regressions shown in Table 10 include the interaction between the ratio of government expenditure to GDP with each of the two industry-level measures of exposure to financing frictions. I find that the coefficient on the interaction term *High DEF dummy* * *Gov. expenditure/GDP* is not statistically significant. I obtain similar results in columns (2) and (3) where again the interaction coefficients with *Gov. expenditure/GDP* are also not statistically significant. These results provide little support to the alternative that a crowding-out effect drives industry-level results.

### 5.4. Does the growth difference between High and Low DEF industries predict the introduction of BAD taxes?

Previous tests indicate that fluctuations in the business cycle have little power in explaining the differential growth rates between industries that are more susceptible to financing frictions. Even if the incidence of BAD taxes is correlated with the business cycle, the key assumption of my industry growth identification strategy is that the introduction of BAD taxes is *not* explained by systematic differences in output growth between High DEF and Low DEF industries. I explore the validity of this assumption by estimating the predictive power of lagged values of the growth difference between High DEF and Low DEF industries in each country on the implementation of BAD taxes. Table 11, panel A shows the estimation results of probit regressions where the dependent variable is a dummy variable indicating the presence of a BAD tax in country *i* in time *t*. The regression in column 1 includes as explanatory variables the first two lagged values of the average growth difference between High DEF and Low DEF industries. In columns 2 and 3 I also include two lagged values of GDP growth and two lagged values of a banking crisis dummy as predictors. Results from these regressions indicate that the growth difference between High DEF and Low DEF industries has no significant statistical power in predicting the implementation of BAD taxes, which provides strong support to the implementation of my identification strategy. The only variable that is found to have statistical significance in predicting the implementation of the tax is the first lagged value of GDP growth in column 3. In panel B I estimate the marginal effects of the probit regression in column 3 for different values of the regressors: I calculate the marginal effects at percentiles 20, 40, 60 and 80 for the growth variables, and for the Banking crisis dummy I estimate them at 0 and 1. The results in panel B further show that differences in growth rates between High DEF and Low DEF industries have no power in predicting the incidence of BAD taxes.

### 5.5. Falsification test: Pre-BAD tax introduction trends

A related potential concern in both the bank credit and the industry growth regressions is whether results are driven by preexisting trends, or whether they are anticipated. To test directly if the reduction of

bank credit identified in Table 3 and the differential growth effects in Table 7 begin *prior* to the implementation of the taxes, I include a false BAD tax variable for the two years preceding the actual introduction of the tax and re-estimate the regressions. The results are reported in Panels A and B in Table 12. None of the interaction coefficients with the *False BAD tax* variables are statistically significant, which further support the notion that the differential growth effects identified in this paper do not occur prior to the implementation of the bank account debit taxes. Furthermore, since BAD taxes are introduced in different years in different countries, alternative interpretations of the differential growth effects would need to address changes in industrial output that coincide with BAD tax episodes in different countries at different points in time.

### 5.6. Falsification test: The effect of BAD taxes on an industry characteristic that does *not* proxy for financial frictions

I perform a falsification test at the industry-level to examine if the differential output growth rates following the introduction of BAD taxes are also observed when I sort industries by asset turnover. This industry characteristic, unlike an industry's dependence on external finance or its tangibility, should *not* lead to differential growth outcomes based on financing frictions. Instead, if the BAD tax impacts industry growth directly and not through a financing channel, then those industries that have a higher asset turnover should be affected more by a tax on financial transactions. I follow the same methodology that I implement to calculate both the measure of dependence on external finance and of asset tangibility.[17] Finally, I estimate a regression similar to model (4) but instead of interacting the BAD tax rate with one of the industry level proxies that should matter if financing frictions are important, I focus on the interaction coefficient on: *BAD tax rate * High asset turnover dummy*. In Table 13 I report the results from this falsification test and find that, consistent with the financing frictions hypothesis, there are no systematic differences in output growth when sorting industries by their asset turnover.

[17] That is, I use annual U.S. data from Compustat, group firms into industries and calculate the median industry asset turnover for a 10-year period. I then create an indicator variable that takes the value of one for industries with high asset turnover and zero otherwise.

## 6. Conclusions

This paper focuses on the bank credit supply and industry growth effects stemming from the introduction of BAD taxes in seven Latin American countries. I first find that their introduction is followed by a reduction in the aggregate provision of bank credit to the private sector. Furthermore, I identify that a key channel through which BAD taxes affect the provision of bank credit is by creating a strong incentive to hold cash and reduce the use of bank deposits. I also provide evidence that this reduction in the availability of bank credit ultimately affects economic growth, mainly by reducing the growth prospects of industries that are more susceptible to distortions in the supply of credit. I find no evidence that these credit and industry growth effects are the result of changes in the demand for credit. I also show that alternative explanations such as banking crises, fluctuations in the business cycle, increases in total taxes, or a crowding-out effect are not driving my results. These results provide evidence on the detrimental effects on the financial system and the real economy resulting from the taxation of bank account transactions, which have received renewed interest from policymakers following the financial crisis of 2008.

My findings also add to the literature that examines the link between financial development and growth by identifying a simple but fundamental channel through which financial intermediaries promote economic growth. Specifically, a more developed banking system is able to better pool deposits and provide credit to fund growth opportunities in the private sector, which disproportionally improves the growth prospects of industries that are more susceptible to financing frictions and fluctuations in the supply of credit. The efficient functioning of the banking system appears to be particularly important in this sample of emerging economies where capital markets still plays a limited role in providing financing to the private sector. Although my tests are based on reduced-form regressions, the findings in this paper provide evidence on the relatively large distortionary effects on financial intermediation resulting from the implementation of taxes on bank account debits.

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## Figure 1. Sample countries

This figure maps the sample of countries used in the empirical analyses.

**Figure 2. Financial Reform Index and BAD taxes**

The Financial Reform Index from Abiad et al (2008) is plotted in solid lines for each country. Vertical bars highlight periods where bank account debits taxes were implemented. The Financial Reform Index records financial policy changes along seven different dimensions: credit controls and reserve requirements, interest rate controls, entry barriers, state ownership, policies on securities markets, banking regulations, and restrictions on the capital account. Liberalization scores for each category are then combined in an index that is normalized between zero and one.

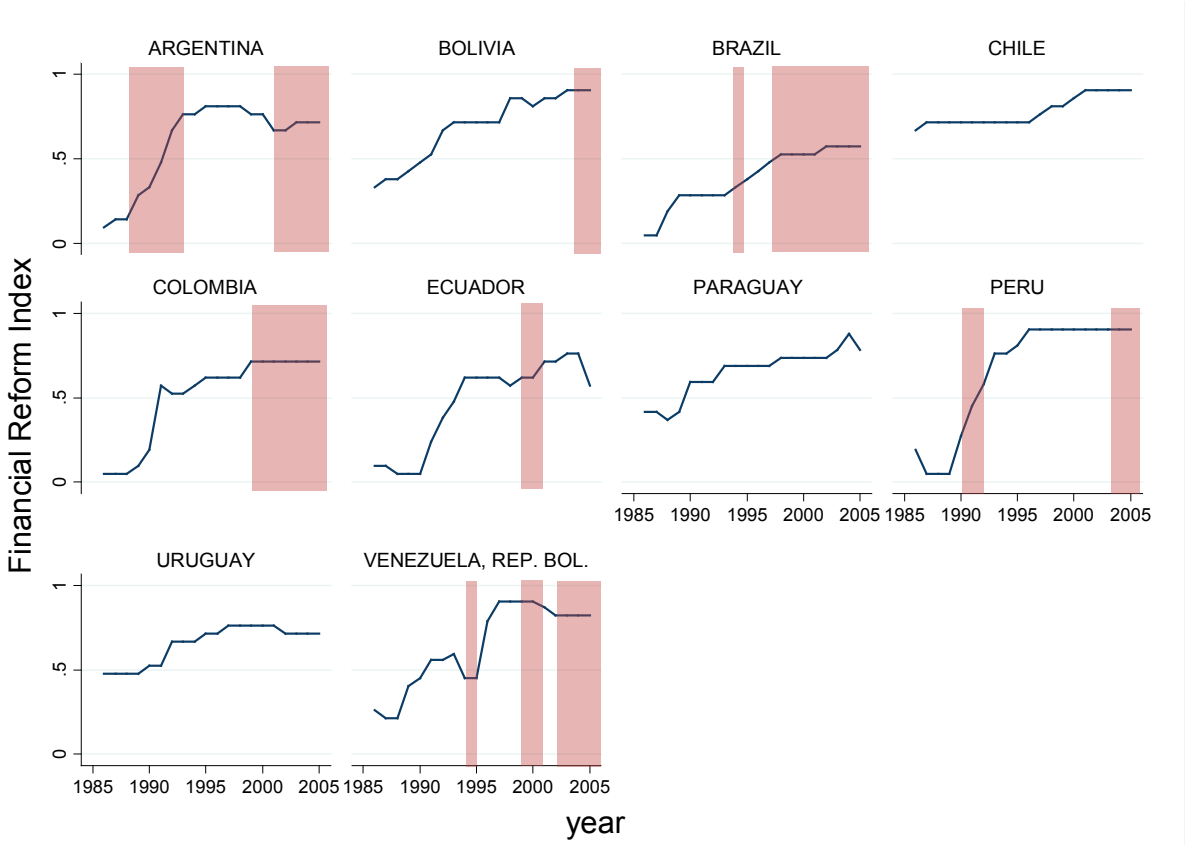

**Table 1. BAD tax rates by Country and Year**

Panel A presents the tax rate and the fiscal revenue scaled by GDP from the tax on bank account debits for each country and year in the sample. Panel B shows sample statistics for the BAD tax rate and the BAD tax revenue / GDP. I calculate weighted average tax rates when the tax is only in place for part of the year. See Appendix B for detailed definitions and sources.

Panel A. Sample statistics

| | Argentina | | Bolivia | | Brazil | | Colombia | | Ecuador | | Peru | | Venezuela | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tax Rate (%) | Revenue / GDP (%) | Tax Rate (%) | Revenue / GDP (%) | Tax Rate (%) | Revenue / GDP (%) | Tax Rate (%) | Revenue / GDP (%) | Tax Rate (%) | Revenue / GDP (%) | Tax Rate (%) | Revenue / GDP (%) | Tax Rate (%) | Revenue / GDP (%) |
| 1986 | | | | | | | | | | | | | | |
| 1987 | | | | | | | | | | | | | | |
| 1988 | 0.70 | 0.83 | | | | | | | | | | | | |
| 1989 | 0.70 | 0.66 | | | | | | | | | | | | |
| 1990 | 0.30 | 0.30 | | | | | | | | | 1.41 | 0.89 | | |
| 1991 | 1.05 | 0.91 | | | | | | | | | 0.81 | 0.58 | | |
| 1992 | 0.60 | 0.58 | | | | | | | | | | | | |
| 1993 | | | | | | | | | | | | | | |
| 1994 | | | | | 0.25 | 1.06 | | | | | | | 0.75 | 1.30 |
| 1995 | | | | | | | | | | | | | | |
| 1996 | | | | | | | | | | | | | | |
| 1997 | | | | | 0.20 | 0.74 | | | | | | | | |
| 1998 | | | | | 0.20 | 0.83 | | | | | | | | |
| 1999 | | | | | 0.22 | 0.75 | 0.20 | 0.49 | 1.00 | 3.51 | | | 0.50 | 1.13 |
| 2000 | | | | | 0.34 | 1.23 | 0.20 | 0.50 | 0.80 | 2.34 | | | 0.50 | 0.89 |
| 2001 | 0.60 | 1.46 | | | 0.36 | 1.32 | 0.30 | 0.64 | | | | | | |
| 2002 | 0.60 | 1.55 | | | 0.38 | 1.38 | 0.30 | 0.57 | | | | | 0.76 | 1.56 |
| 2003 | 0.60 | 1.57 | | | 0.38 | 1.36 | 0.30 | 0.60 | | | | | 0.88 | 1.35 |
| 2004 | 0.60 | 1.72 | 0.15 | 0.45 | 0.38 | 1.36 | 0.40 | 0.73 | | | 0.11 | 0.27 | 0.50 | 0.82 |
| 2005 | 0.50 | 1.77 | 0.28 | 0.82 | 0.38 | 1.36 | 0.40 | 0.71 | | | 0.08 | 0.27 | | |
| Country average: | 0.63 | 1.14 | 0.21 | 0.64 | 0.31 | 1.14 | 0.30 | 0.60 | 0.90 | 2.92 | 0.60 | 0.50 | 0.65 | 1.18 |

Panel B. Sample statistics (calculated only for country-years where a BAD tax is in place)

| | N. Obs. | Mean | St. Dev. | Min. | Max |
|---|---|---|---|---|---|
| BAD tax rate | 41 | 0.49% | 0.29% | 0.10% | 1.42% |
| BAD tax revenue / GDP | 41 | 1.05% | 0.61% | 0.27% | 3.51% |

## Table 2. Descriptive Statistics and Correlations

This table presents summary statistics and correlations for the country-level and the industry-level variables used in the panel regressions. Data sources and variables definitions are summarized in Appendix B.

Panel A. Country-level sample statistics

| | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| *Outcome variables:* | | | | | |
| Credit to the Private Sector / GDP | 198 | 30.2% | 19.0% | 7.0% | 127.7% |
| Demand; Savings and Time Deposits / GDP | 198 | 28.1% | 13.4% | 7.7% | 80.1% |
| Currency / Demand; Savings and Time Deposits | 198 | 16.2% | 10.6% | 0.5% | 55.6% |
| *Regressors:* | | | | | |
| *BAD tax measures:* | | | | | |
| BAD Tax Dummy | 200 | 0.21 | 0.40 | 0 | 1 |
| BAD Tax Rate | 200 | 0.11% | 0.28% | 0.00% | 1.42% |
| BAD Tax Revenue / GDP | 200 | 0.22% | 0.51% | 0.00% | 3.51% |
| *Control variables:* | | | | | |
| Government Expenditure / GDP | 199 | 12.1% | 3.6% | 3.0% | 22.7% |
| Log of GDP per capita (current US$) | 200 | 7.76 | 0.66 | 6.39 | 9.02 |
| Current account balance (% of GDP) | 200 | -1.6% | 4.8% | -14.7% | 17.6% |
| GDP growth (annual %) | 200 | 3.2% | 4.4% | -11.7% | 18.3% |
| Financial Reform Index (normalized) | 200 | 0.60 | 0.24 | 0 | 1 |
| Total Tax Revenue / GDP | 160 | 12.0% | 3.0% | 5.3% | 18.1% |

Panel B. Industry-level sample statistics

| | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| *Outcome variables:* | | | | | |
| Real output growth | 2484 | 2.9% | 10.6% | -47.1% | 37.0% |
| Gross fixed capital formation growth | 2484 | 2.5% | 86.2% | -276.7% | 284.0% |
| *Regressors:* | | | | | |
| High dependence on external finance dummy | 2484 | 0.40 | 0.49 | 0 | 1 |
| Low asset tangibility dummy | 2484 | 0.36 | 0.48 | 0 | 1 |
| High asset turnover dummy | 2484 | 0.52 | 0.50 | 0 | 1 |

Panel C. Country-level correlations

Correlations of country-level variables. All correlations are based on 197 country-year observations

| | BAD Tax Dummy | BAD Tax Rate | BAD Tax Revenue / GDP | Government Expenditure / GDP | Current account balance (% of GDP) | Inflation: consumer prices (annual %) | GDP growth (annual %) | Financial Reform Index | Total Tax Revenue / GDP | Income and capital gain tax revenue / GDP |
|---|---|---|---|---|---|---|---|---|---|---|
| BAD Tax Dummy | 1 | | | | | | | | | |
| BAD Tax Rate | 0.75 | 1 | | | | | | | | |
| BAD Tax Revenue / GDP | 0.84 | 0.92 | 1 | | | | | | | |
| Government Expenditure / GDP | 0.36 | 0.05 | 0.25 | 1 | | | | | | |
| Current account balance (% of GDP) | 0.34 | 0.35 | 0.37 | -0.13 | 1 | | | | | |
| Inflation: consumer prices (annual %) | 0.10 | 0.15 | 0.06 | 0.14 | 0.00 | 1 | | | | |
| GDP growth (annual %) | -0.16 | -0.27 | -0.23 | -0.16 | -0.03 | -0.15 | 1 | | | |
| Financial Reform Index | -0.06 | -0.10 | -0.10 | -0.14 | 0.06 | -0.45 | 0.08 | 1 | | |
| Total Tax Revenue / GDP | 0.07 | -0.07 | 0.02 | 0.02 | 0.14 | -0.07 | 0.27 | 0.36 | 1 | |
| Income and capital gain tax revenue / GDP | 0.05 | -0.09 | 0.00 | 0.07 | 0.32 | -0.01 | 0.14 | -0.09 | 0.60 | 1 |

Panel D. Correlations of Industry-Level Measures

Correlations of industry-level variables. The correlations in this table are based on 23 observations (one for each ISIC 2-digit level manufacturing industry in the sample)

| | High dependence on external finance dummy | Low asset tangibility dummy | High asset turnover dummy |
|---|---|---|---|
| High dependence on external finance dummy | 1 | | |
| Low asset tangibility dummy | 0.45 | 1 | |
| High asset turnover dummy | -0.09 | -0.27 | 1 |

## Table 3. The effect of BAD taxes on credit availability

This table reports the results of country-level regressions to estimate the effect of BAD taxes on the aggregate availability of credit. The model estimated is:

$$Bank\ Credit/GDP_{i,t} = \beta_0 + \beta_1 BAD\ Tax_{i,t} + \beta_2 X_{i,t} + CountryFE_i + YearFE_t + \varepsilon_{i,t} \quad (1)$$

The dependent variable is the ratio of domestic bank credit to the private sector over GDP. Country fixed effects and year fixed effects are included in all regressions. A dummy variable that takes a value of one for Ecuador starting in 1999, when the economy initiated a dollarization process, is also included. Standard errors are clustered by country. Appendix A details the list of countries in the sample, as well as the dates, the statutory rates and the fiscal revenues from the BAD tax in each country. Appendix B provides variable definitions and data sources. t-statistics are reported in parentheses below coefficients estimates; * indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level.

| | Credit to the private sector / GDP *All Countries* | | | Credit to the private sector / GDP *Only BAD Tax Countries* | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| BAD tax rate | -21.688** | | | -12.873** | | |
| | (-2.00) | | | (-2.02) | | |
| BAD tax revenue / GDP | | -17.543*** | | | -11.406*** | |
| | | (-3.73) | | | (-2.76) | |
| BAD tax dummy | | | -0.154*** | | | -0.116** |
| | | | (-2.78) | | | (-2.29) |
| Bank crisis dummy | -0.043** | -0.045** | -0.026* | -0.051 | -0.044 | -0.032 |
| | (-2.30) | (-2.48) | (-1.81) | (-1.53) | (-1.34) | (-1.05) |
| Government expenditure / GDP | -0.057 | 0.087 | 0.113 | 0.321 | 0.419 | 0.336 |
| | (-0.09) | (0.13) | (0.17) | (0.66) | (0.71) | (0.58) |
| Log of GDP per capita (current US$) | 0.049 | 0.019 | 0.048 | 0.032 | -0.031 | 0.027 |
| | (0.50) | (0.24) | (0.55) | (0.40) | (-0.40) | (0.36) |
| Current account balance / GDP | 0.383 | 0.425 | 0.442 | 0.747 | 0.698 | 0.714 |
| | (1.11) | (1.38) | (1.15) | (1.26) | (1.27) | (1.28) |
| Financial reform index (normalized) | 0.067 | 0.059 | 0.086 | 0.062 | 0.038 | 0.063 |
| | (0.34) | (0.33) | (0.45) | (0.17) | (0.12) | (0.18) |
| GDP growth (annual %) | 0.113 | 0.077 | 0.187 | 0.725* | 0.672 | 0.715* |
| | (0.27) | (0.20) | (0.50) | (1.70) | (1.66) | (1.70) |
| GDP growth - Lag 1 | -0.276 | -0.227 | -0.252 | -0.002 | -0.028 | -0.059 |
| | (-0.59) | (-0.57) | (-0.57) | (-0.00) | (-0.08) | (-0.12) |
| GDP growth - Lag 2 | -0.075 | 0.009 | 0.046 | 0.229 | 0.188 | 0.252 |
| | (-0.18) | (0.02) | (0.11) | (0.47) | (0.39) | (0.50) |
| Inflation: consumer prices | 0.018** | 0.016* | 0.018** | 0.020** | 0.018** | 0.019** |
| | (2.12) | (1.96) | (2.10) | (2.54) | (2.35) | (2.53) |
| High inflation dummy | -0.028 | -0.044 | -0.029 | -0.020 | -0.040 | -0.025 |
| | (-0.54) | (-1.01) | (-0.61) | (-0.35) | (-0.85) | (-0.48) |
| Country Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 197 | 197 | 197 | 137 | 137 | 137 |
| r2 | 0.661 | 0.688 | 0.678 | 0.633 | 0.647 | 0.649 |

**Table 4. Differences-in-differences estimation: The effect of BAD taxes on credit availability**

This table reports the results of country-level regressions to estimate the effect of BAD taxes on the aggregate availability of bank credit. The model estimated is:

$$Bank\ Credit/GDP_{i,t} = \beta_0 + \beta_1 BAD\ Tax_{i,t} + \beta_2 (Initial\ Bank\ Credit/GDP_i * BAD\ Tax_{i,t}) + \beta_3 X_{i,t} + CountryFE_i + YearFE_t + \varepsilon_{i,t} \quad (2)$$

The dependent variable is the ratio of domestic credit to the private sector over GDP. Country and year fixed effects are included in all regressions. A dummy variable that takes a value of one for Ecuador starting in 1999, when the economy initiated a dollarization process, is also included. Standard errors are clustered by country. Appendix A details the list of countries in the sample, as well as the dates, the statutory rates and the fiscal revenues from BAD taxes in each country. Appendix B provides variable definitions and data sources. t-statistics are in parentheses below coefficients estimates; * indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level.

| | Bank credit to the private sector / GDP | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| BAD tax rate | -22.874** | | |
| | (-2.40) | | |
| BAD tax revenue / GDP | | -14.050*** | |
| | | (-3.56) | |
| BAD tax dummy | | | -0.125** |
| | | | (-2.32) |
| Initial Private Credit/GDP * BAD tax rate | -106.656** | | |
| | (-2.51) | | |
| Initial Private Credit/GDP * BAD tax revenue/GDP | | -33.869** | |
| | | (-2.16) | |
| Initial Private Credit/GDP * BAD tax dummy | | | -0.334** |
| | | | (-2.42) |
| Bank crisis dummy | -0.035 | -0.044* | -0.026 |
| | (-1.60) | (-1.87) | (-1.19) |
| Government expenditure / GDP | -0.177 | 0.019 | 0.045 |
| | (-0.26) | (0.03) | (0.07) |
| Log of GDP per capita (current US$) | 0.016 | -0.002 | 0.038 |
| | (0.18) | (-0.03) | (0.46) |
| Current account balance (% of GDP) | 0.276 | 0.328 | 0.410 |
| | (0.89) | (1.10) | (1.12) |
| Financial reform index (normalized) | 0.055 | 0.047 | 0.078 |
| | (0.31) | (0.29) | (0.46) |
| Inflation: consumer prices | 0.017** | 0.015* | 0.017* |
| | (2.02) | (1.81) | (1.96) |
| High inflation dummy | -0.039 | -0.062 | -0.051 |
| | (-0.80) | (-1.49) | (-1.14) |
| GDP growth (annual %) | 0.192 | 0.140 | 0.162 |
| | (0.47) | (0.35) | (0.45) |
| GDP growth - Lag 1 | -0.225 | -0.217 | -0.256 |
| | (-0.53) | (-0.58) | (-0.57) |
| GDP growth - Lag 2 | -0.019 | -0.043 | -0.022 |
| | (-0.05) | (-0.12) | (-0.06) |
| Initial Private Credit/GDP | 0.103 | 0.150 | 0.231 |
| | (0.60) | (0.76) | (1.21) |
| Country Effects | Yes | Yes | Yes |
| Year Effects | Yes | Yes | Yes |
| Observations | 196 | 196 | 196 |
| r2 | 0.676 | 0.698 | 0.687 |

**Table 5. Pre-post cross-country analysis: The effect of BAD taxes on the preference for currency**

This table reports the results of country-level regressions to estimate the effect of BAD taxes on the aggregate availability of credit. The model estimated is:

$$Y_{i,t} = \beta_0 + \beta_1 BAD\ Tax_{i,t} + \beta_2 X_{i,t} + CountryFE_i + YearFE_t + \varepsilon_{i,t}$$

The dependent variable in columns (1) to (3) is the ratio of currency outside banks over total bank deposits, and in columns (4) to (6) is the ratio of total bank deposits over GDP. Country fixed effects and year fixed effects are included in all regressions. A dummy variable that takes a value of one for Ecuador in 1999 and 2000, when the economy initiated a dollarization process, is also included. Standard errors are clustered by country. Appendix A details the list of countries in the sample, as well as the dates, the statutory rates and the fiscal revenues from the BAD tax in each country. Appendix B provides variable definitions and data sources. t-statistics are reported in parentheses below coefficients estimates; * indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level.

| | Currency / Bank deposits | | | Bank deposits / GDP | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| BAD tax rate | 11.603** | | | -12.986** | | |
| | (2.35) | | | (-2.26) | | |
| BAD tax revenue / GDP | | 9.324*** | | | -7.657** | |
| | | (3.97) | | | (-2.57) | |
| BAD tax dummy | | | 0.077*** | | | -0.089*** |
| | | | (3.57) | | | (-3.71) |
| Bank crisis dummy | 0.005 | 0.006 | -0.004 | -0.048** | -0.046* | -0.038* |
| | (0.22) | (0.29) | (-0.18) | (-1.98) | (-1.85) | (-1.66) |
| Government expenditure / GDP | 0.375 | 0.298 | 0.283 | 0.227 | 0.368 | 0.332 |
| | (0.78) | (0.59) | (0.55) | (0.51) | (0.82) | (0.67) |
| Log of GDP per capita (current US$) | 0.035 | 0.050 | 0.035 | -0.063 | -0.086 | -0.062 |
| | (0.57) | (0.90) | (0.61) | (-0.92) | (-1.18) | (-0.93) |
| Current account balance (% of GDP) | -0.153 | -0.175 | -0.184 | 0.206 | 0.255 | 0.244 |
| | (-0.75) | (-0.95) | (-0.82) | (0.97) | (1.12) | (1.01) |
| Financial reform index (normalized) | -0.108 | -0.103 | -0.117 | -0.072 | -0.085 | -0.061 |
| | (-0.89) | (-0.92) | (-1.02) | (-0.51) | (-0.61) | (-0.45) |
| Inflation: consumer prices | 0.000 | 0.001 | 0.000 | 0.005 | 0.004 | 0.005 |
| | (0.09) | (0.45) | (0.19) | (1.11) | (0.82) | (1.08) |
| GDP growth (annual %) | -0.074 | -0.056 | -0.117 | 0.099 | 0.109 | 0.138 |
| | (-0.27) | (-0.22) | (-0.42) | (0.42) | (0.52) | (0.64) |
| GDP growth - Lag 1 | 0.051 | 0.024 | 0.031 | -0.284 | -0.223 | -0.263 |
| | (0.24) | (0.12) | (0.15) | (-0.95) | (-0.88) | (-0.93) |
| GDP growth - Lag 2 | -0.068 | -0.113 | -0.136 | -0.012 | 0.039 | 0.054 |
| | (-0.21) | (-0.37) | (-0.44) | (-0.04) | (0.14) | (0.17) |
| High inflation dummy | 0.032 | 0.040 | 0.032 | -0.023 | -0.033 | -0.024 |
| | (1.00) | (1.30) | (1.01) | (-0.63) | (-0.92) | (-0.64) |
| Country Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 197 | 197 | 197 | 197 | 197 | 197 |
| r2 | 0.705 | 0.730 | 0.715 | 0.650 | 0.652 | 0.660 |

**Table 6. Differences-in-differences estimation: The effect of BAD taxes on industry output growth**

This table reports the results of industry-level regressions to estimate the differential effect of BAD taxes on industry output growth. The dependent variable in all regressions is the annual real output growth rate in industry *j*, in country *i* at time *s*. The DID estimate corresponds to the coefficient estimate for $\beta_3$. Standard errors are clustered by country-industry. t-statistics are reported in parentheses below coefficients estimates; * indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level. The model estimated is:

$$Output\ Growth_{i,j,s} = \beta_1 dBADTax_{i,s} + \beta_2 dInd._j + \beta_3 (dBADTax_{i,s} * \beta_2 dInd._j) + \varepsilon_{i,j,t} \quad (3)$$

Panel A. DID model: Low DEF vs. High DEF and Pre vs. Post-BAD tax

| | Pre BAD tax | Post BAD tax | Post-Pre Difference |
|---|---|---|---|
| Low DEF Industries | 0.018 | 0.023 | 0.005 |
| High DEF Industries | 0.028 | -0.072 | -0.100 |
| Treatment-Control Difference: | 0.01 | -0.095** | DID: **-0.105**** |
| | (0.61) | (-2.59) | (-2.37) |
| Observations | 251 | | |
| r2 | 0.059 | | |

Panel B. DID model: High Tangibility vs. Low Tangibility and Pre vs. Post-BAD tax

| | Pre BAD tax | Post BAD tax | Post-Pre Difference |
|---|---|---|---|
| High Tangibility Industries | 0.025 | 0.021 | -0.004 |
| Low Tangibility Industries | 0.017 | -0.076 | -0.093 |
| Treatment-Control Difference: | -0.008 | -0.097** | DID: **-0.089*** |
| | (-0.41) | (-2.03) | (-1.83) |
| Observations | 251 | | |
| r2 | 0.060 | | |

Panel C. DID model: Low DEF & High Tangibility vs. High DEF & Low Tangibility and Pre vs. Post-BAD tax

| | Pre BAD tax | Post BAD tax | Post-Pre Difference |
|---|---|---|---|
| Low DEF & High Tangibility Industries | 0.023 | 0.018 | -0.005 |
| High DEF & Low Tangibility Industries | 0.019 | -0.117 | -0.136 |
| Treatment-Control Difference: | -0.004 | -0.135** | DID: **-0.131**** |
| | (-0.2) | (-2.4) | (-2.18) |
| Observations | 251 | | |
| r2 | 0.081 | | |

**Table 7. Differences-in-differences estimation with Country-Year, Country-Industry and Industry-Year fixed effects: The effect of BAD taxes on industry output growth**

This table reports the results of industry-level regressions to estimate the differential effect of BAD taxes on industry output growth. Regressions in Panel A include country-industry and industry-year fixed effects. Regressions include country-year, country-industry and industry-year fixed effects. The dependent variable in all regressions is the annual real output growth rate in industry *j*, in country *i* at time *t*. Standard errors are two-way clustered by country-industry and year. t-statistics are reported in parentheses below coefficients estimates; * indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level. The model estimated is:

$$Output\ Growth_{i,j,t} = \beta_1(BAD\ Tax_{i,t} * dInd._j) + \beta_2(BankCrisis_{i,t} * dInd._j) + Country\ \&\ IndustryFE_{i,j} + Industry\ \&\ YearFE_{j,t} + Country\ \&\ YearFE_{i,t} + \varepsilon_{i,j,t} \quad (4)$$

| | Output growth | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| BAD tax rate * High DEF dummy | -7.320* | | |
| | (-1.85) | | |
| Banking crisis dummy * High DEF dummy | 0.021 | | |
| | (0.73) | | |
| BAD tax rate * Low tangibility dummy | | -8.748** | |
| | | (-2.02) | |
| Banking crisis dummy * Low tangibility dummy | | 0.046 | |
| | | (1.39) | |
| BAD tax rate * High DEF dummy * Low tang. Dummy | | | -10.179** |
| | | | (-2.01) |
| Banking crisis dummy * High DEF dummy * Low tang. Dummy | | | 0.022 |
| | | | (0.55) |
| Country-Year Effects | Yes | Yes | Yes |
| Country-Industry Effects | Yes | Yes | Yes |
| Industry-Year Effects | Yes | Yes | Yes |
| Observations | 2339 | 2339 | 2339 |
| r2 | 0.479 | 0.480 | 0.480 |

## Table 8. The sensitivity of gross fixed capital formation (GFCF) to output

This table reports the results of country-industry-level regressions to estimate the effect of BAD taxes on the elasticity of industry investment to industry output. The model estimated is:

$$ln\left(\frac{Investment_{i,j,t}}{Invesstment_{i,j,t-1}}\right) = \beta_1 ln\left(\frac{Output_{i,j,t}}{Outpu_{i,j,t-1}}\right) + \beta_2 BAD\ Tax_{i,t}$$

$$+\beta_3\left[ln\left(\frac{Output_{i,j,t}}{Outpu_{i,j,t-1}}\right) * BAD\ Tax_{i,t}\right] + Country\ \&\ IndustryFE_{i,j} \qquad (5)$$

The dependent variable is the annual real growth in industry gross fixed capital formation. Country – Industry fixed effects are included in all regressions. Standard errors are clustered by both country and year. t-statistics are reported in parentheses below coefficients estimates; * indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level.

| | GFCF Growth | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Output growth | 0.786*** | 0.792*** | 0.818*** |
| | (5.85) | (5.97) | (5.65) |
| BAD tax rate | -7.180 | | |
| | (-1.12) | | |
| BAD tax rate * Output growth | -38.579*** | | |
| | (-4.33) | | |
| BAD tax revenue / GDP | | -4.865 | |
| | | (-0.85) | |
| BAD tax revenue / GDP * Output growth | | -28.597*** | |
| | | (-3.07) | |
| BAD tax dummy | | | -0.032 |
| | | | (-0.23) |
| BAD tax dummy * Output growth | | | -0.557** |
| | | | (-2.17) |
| Country-Industry Effects | Yes | Yes | Yes |
| Observations | 1479 | 1479 | 1479 |
| r2 | 0.0948 | 0.0951 | 0.0952 |

## Table 9. Robustness Test: Is the reduction on the availability of credit due to higher taxes?

This table reports the results of country-level regressions to estimate whether the effect on the provision of credit is explained by an increase in government spending, or a crowding-out effect, and not by the introduction of BAD taxes. Country fixed effects and year fixed effects are included in all regressions. Standard errors are clustered by country. Appendix A details the list of countries in the sample, as well as the dates, the statutory rates and the fiscal revenues from the BAD tax in each country. Appendix B provides variable definitions and data sources. t-statistics are reported in parentheses below coefficients estimates; * indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level.

| | Credit to the private sector / GDP | | | Credit to the private sector / GDP | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| BAD tax rate | -18.400* | | | -20.803* | | |
| | (-1.84) | | | (-1.86) | | |
| BAD tax revenue / GDP | | -14.064** | | | -14.830** | |
| | | (-2.31) | | | (-2.19) | |
| BAD tax dummy | | | -0.149*** | | | -0.163** |
| | | | (-2.79) | | | (-2.60) |
| Bank crisis dummy | -0.013 | -0.022 | -0.006 | -0.010 | -0.022 | -0.007 |
| | (-0.52) | (-0.82) | (-0.31) | (-0.38) | (-0.80) | (-0.33) |
| Government expenditure / GDP | -0.288 | -0.283 | -0.407 | -0.235 | -0.203 | -0.048 |
| | (-0.63) | (-0.74) | (-0.91) | (-0.41) | (-0.43) | (-0.20) |
| Log of GDP per capita (current US$) | -0.027 | -0.044 | 0.026 | -0.033 | -0.050 | 0.011 |
| | (-0.49) | (-0.69) | (0.63) | (-0.50) | (-0.67) | (0.19) |
| Current account balance (% of GDP) | 0.726 | 0.763 | 0.790 | 0.784 | 0.803 | 0.858 |
| | (1.28) | (1.37) | (1.38) | (1.28) | (1.37) | (1.40) |
| Inflation: consumer prices | 0.006 | 0.005 | 0.005 | 0.007 | 0.005 | 0.005 |
| | (1.28) | (1.09) | (1.10) | (1.41) | (1.15) | (1.16) |
| High inflation dummy | 0.023 | 0.011 | 0.027 | 0.013 | 0.001 | 0.013 |
| | (0.41) | (0.23) | (0.52) | (0.21) | (0.02) | (0.25) |
| Total tax revenue / GDP | -0.727 | -0.461 | -0.531 | | | |
| | (-0.64) | (-0.50) | (-0.53) | | | |
| Income and capital gains tax revenue / GDP | | | | -0.148 | -0.027 | 0.043 |
| | | | | (-0.17) | (-0.04) | (0.06) |
| Country Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 160 | 160 | 160 | 157 | 157 | 157 |
| r2 | 0.737 | 0.756 | 0.757 | 0.734 | 0.753 | 0.755 |

## Table 10. Robustness Test: Industry growth, the business cycle and government expenditure

This table reports the results of industry-level regressions to estimate the differential effect of BAD taxes on industry output growth, including additional interacted control variables. The interaction terms with *GDP Growth, Lag 1* and *GDP Growth, Lag 2* test whether the differential effect on industrial growth is explained by fluctuations in the business cycle. The interaction terms with *Gov. Expenditure/GDP* test whether an increase in government spending, or a crowding-out effect, is driving industrial growth. The dependent variable in all regressions is the annual real output growth rate in industry *j*, in country *i* at time *t*. All regressions include country-year, country-industry and industry-year fixed effects. Standard errors are two-way clustered by country-industry and year. t-statistics are reported in parentheses below coefficients estimates; * indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level. The model estimated is:

| | Output growth | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| High DEF dummy * BAD tax rate | -7.728** | | |
| | (-2.14) | | |
| High DEF dummy * Banking crisis dummy | 0.017 | | |
| | (0.66) | | |
| High DEF dummy * GDP Growth, Lag 1 | 0.316 | | |
| | (1.09) | | |
| High DEF dummy * GDP Growth, Lag 2 | -0.321 | | |
| | (-1.11) | | |
| High DEF dummy * Gov. Expenditure/GDP | -0.3490 | | |
| | (-0.95) | | |
| Low tangibility dummy * BAD tax rate | | -7.861** | |
| | | (-1.98) | |
| Low tangibility dummy * Banking crisis dummy | | 0.043 | |
| | | (1.48) | |
| Low tangibility dummy * GDP Growth, Lag 1 | | 0.553* | |
| | | (1.73) | |
| Low tangibility dummy * GDP Growth, Lag 2 | | -0.350 | |
| | | (-1.00) | |
| Low tangibility dummy * Gov. Expenditure/GDP | | 0.0540 | |
| | | (0.11) | |
| High DEF dummy * Low tang. Dummy * BAD tax rate | | | -9.955** |
| | | | (-2.29) |
| High DEF dummy * Low tang. Dummy * Banking crisis dummy | | | 0.022 |
| | | | (0.59) |
| High DEF dummy * Low tang. Dummy * GDP Growth, Lag 1 | | | 0.563 |
| | | | (1.27) |
| High DEF dummy * Low tang. Dummy * GDP Growth, Lag 2 | | | -0.425 |
| | | | (-0.95) |
| High DEF dummy * Low tang. Dummy * Gov. Expenditure/GDP | | | 0.3560 |
| | | | (0.75) |
| Country-Year Effects | Yes | Yes | Yes |
| Country-Industry Effects | Yes | Yes | Yes |
| Industry-Year Effects | Yes | Yes | Yes |
| Observations | 0.482 | 0.483 | 0.482 |
| r2 | 192 | 192 | 192 |

**Table 11 Robustness Test: Does the growth difference between High DEF and Low DEF industries predict the introduction of BAD taxes?**

This table reports the results of a probit regression to estimate the predictive power of the growth difference between High and Low DEF industries, GDP growth and banking crisis on the implementation of BAD taxes.

Panel A. Probit regressions: Estimation results

| | BAD Tax Dummy | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| High vs. Low DEF Growth Diff. - Lag 1 | -1.682 | -1.631 | -0.937 |
| | (-1.57) | (-1.41) | (-0.74) |
| High vs. Low DEF Growth Diff. - Lag 2 | -1.176 | -0.937 | -1.202 |
| | (-1.12) | (-0.90) | (-1.14) |
| Bank Crisis Dummy - Lag 1 | | 0.676* | 0.254 |
| | | -1.690 | -0.610 |
| Bank Crisis Dummy - Lag 2 | | -0.038 | 0.203 |
| | | (-0.09) | -0.480 |
| GDP growth - Lag 1 | | | -11.967*** |
| | | | (-3.55) |
| GDP growth - Lag 2 | | | -2.255 |
| | | | (-0.70) |
| Observations | 125 | 125 | 125 |
| Pseudo r2 | 0.0184 | 0.0536 | 0.1601 |

Panel B. Probit regressions: Marginal effects at percentiles 20, 40, 60 and 80 for High vs. Low DEF Growth Differential, GDP growth and Bank crisis dummy (from regression in column (3) in panel A above)

| Covariates Evaluated | | | Margin | Std. Error |
|---|---|---|---|---|
| High - Low DEF Growth, Lag 1 | | | | |
| (p20) | = | -8.25% | 24.8% | 4.6% |
| (p40) | = | -2.26% | 23.4% | 3.8% |
| (p60) | = | 2.22% | 22.3% | 3.8% |
| (p80) | = | 6.32% | 21.4% | 4.3% |
| High - Low DEF Growth, Lag 2 | | | | |
| (p20) | = | -8.09% | 25.5% | 4.6% |
| (p40) | = | -1.26% | 23.4% | 3.8% |
| (p60) | = | 2.64% | 22.2% | 3.7% |
| (p80) | = | 7.34% | 20.8% | 4.0% |
| GDP growth - Lag 1 | | | | |
| (p20) | = | 0.30% | 30.2% | 5.1% |
| (p40) | = | 2.66% | 21.4% | 3.8% |
| (p60) | = | 4.33% | 16.2% | 3.6% |
| (p80) | = | 5.77% | 12.5% | 3.6% |
| GDP growth - Lag 2 | | | | |
| (p20) | = | 0.36% | 24.4% | 4.3% |
| (p40) | = | 2.86% | 22.9% | 3.8% |
| (p60) | = | 4.42% | 22.0% | 4.0% |
| (p80) | = | 5.84% | 21.3% | 4.5% |
| Bank Crisis Dummy - Lag 1 | | | | |
| 0 | | | 18.5% | 4.3% |
| 1 | | | 26.0% | 11.7% |
| Bank Crisis Dummy - Lag 2 | | | | |
| 0 | | | 18.9% | 4.6% |
| 1 | | | 24.8% | 11.0% |

Statistical tests for the equality of predicted margins (p-values)

| High - Low DEF Growth, Lag 1 | (p20) | (p40) | (p60) |
|---|---|---|---|
| (p40) | 0.807 | | |
| (p60) | 0.674 | 0.844 | |
| (p80) | 0.581 | 0.726 | 0.869 |

| High - Low DEF Growth, Lag 2 | (p20) | (p40) | (p60) |
|---|---|---|---|
| (p40) | 0.718 | | |
| (p60) | 0.573 | 0.824 | |
| (p80) | 0.439 | 0.643 | 0.802 |

| GDP growth - Lag 1 | (p20) | (p40) | (p60) |
|---|---|---|---|
| (p40) | 0.174 | | |
| (p60) | 0.027 | 0.326 | |
| (p80) | 0.005 | 0.090 | 0.466 |

| GDP growth - Lag 2 | (p20) | (p40) | (p60) |
|---|---|---|---|
| (p40) | 0.258 | | |
| (p60) | 0.213 | 1.089 | |
| (p80) | 0.192 | 0.977 | 1.616 |

| Bank Crisis Dummy - Lag 1 | 0 | 1 |
|---|---|---|
| 1 | 0.547 | |

| Bank Crisis Dummy - Lag 2 | 0 | 1 |
|---|---|---|
| 1 | 0.596 | |

## Table 12. Falsification test: Pre-BAD tax introduction trends

Panel A. Falsification test on bank credit regressions: Pre-BAD tax introduction trends

This table reports the results of falsification tests for the country-level regressions in Table 3. A false BAD tax variable is included for the two years *prior* to the introduction of the BAD tax in each country. The dependent variable in all regressions is the ratio of bank credit to the private sector scaled by GDP in country *i* at time *t*. Standard errors are clustered by country. t-statistics are reported in parentheses below coefficients estimates; * indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level.

| | Credit to the private sector / GDP *All Countries* | | | Credit to the private sector / GDP *Only BAD Tax Countries* | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| BAD tax rate | -22.944** | | | -14.780** | | |
| | (-2.08) | | | (-2.37) | | |
| BAD tax revenue / GDP | | -17.873*** | | | -13.895*** | |
| | | (-3.87) | | | (-4.03) | |
| BAD tax dummy | | | -0.158*** | | | -0.108*** |
| | | | (-3.01) | | | (-2.66) |
| False BAD tax rate | -3.292 | | | -3.479 | | |
| | (-0.93) | | | (-0.91) | | |
| False BAD tax revenue / GDP | | -0.779 | | | -0.893 | |
| | | (-0.37) | | | (-0.35) | |
| False BAD tax dummy | | | -0.009 | | | 0.010 |
| | | | (-0.20) | | | (0.22) |
| Bank crisis dummy | -0.044** | -0.045** | -0.026 | -0.068* | -0.062* | -0.044 |
| | (-2.43) | (-2.53) | (-1.63) | (-1.92) | (-1.72) | (-1.49) |
| Government expenditure / GDP | -0.006 | 0.102 | 0.150 | 0.176 | 0.163 | 0.159 |
| | (-0.01) | (0.15) | (0.23) | (0.37) | (0.25) | (0.25) |
| Log of GDP per capita (current US$) | 0.041 | 0.017 | 0.048 | 0.092 | 0.047 | 0.082 |
| | (0.42) | (0.19) | (0.53) | (0.78) | (0.43) | (0.70) |
| Current account balance / GDP | 0.387 | 0.427 | 0.444 | 0.763 | 0.683 | 0.724 |
| | (1.12) | (1.38) | (1.15) | (1.41) | (1.51) | (1.39) |
| Financial reform index (normalized) | 0.046 | 0.057 | 0.083 | 0.016 | 0.024 | 0.084 |
| | (0.25) | (0.32) | (0.45) | (0.04) | (0.07) | (0.23) |
| GDP growth (annual %) | 0.096 | 0.073 | 0.187 | 0.648 | 0.571 | 0.689 |
| | (0.23) | (0.19) | (0.49) | (1.54) | (1.35) | (1.59) |
| GDP growth - Lag 1 | -0.256 | -0.223 | -0.244 | 0.045 | -0.019 | -0.026 |
| | (-0.53) | (-0.55) | (-0.53) | (0.09) | (-0.05) | (-0.05) |
| GDP growth - Lag 2 | -0.069 | 0.007 | 0.049 | 0.300 | 0.264 | 0.328 |
| | (-0.17) | (0.02) | (0.12) | (0.63) | (0.56) | (0.65) |
| Inflation: consumer prices | 0.018** | 0.016* | 0.018** | 0.021*** | 0.019** | 0.020** |
| | (2.14) | (1.97) | (2.13) | (2.77) | (2.62) | (2.62) |
| High inflation dummy | -0.029 | -0.044 | -0.028 | -0.011 | -0.029 | -0.018 |
| | (-0.54) | (-1.01) | (-0.58) | (-0.17) | (-0.60) | (-0.34) |
| Country Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 197 | 197 | 197 | 137 | 137 | 137 |
| r2 | 0.664 | 0.688 | 0.679 | 0.643 | 0.663 | 0.655 |

Panel B. Falsification test on industry growth regressions: Pre-BAD tax introduction trends

This table reports the results of falsification tests for the industry-level regressions in Table 7. A false BAD tax variable is included for the two years *prior* to the introduction of the BAD tax in each country. The dependent variable in all regressions is the annual real output growth rate in industry *j*, in country *i* at time *t*. Standard errors are clustered by country-industry. t-statistics are reported in parentheses below coefficients estimates; * indicates significance at the 10% level, ** at the 5% level, and *** at the 1% level.

| | Output growth | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| BAD tax rate * High DEF dummy | -7.782** | | |
| | (-2.13) | | |
| Banking crisis dummy * High DEF dummy | 0.021 | | |
| | (0.80) | | |
| False BAD tax * High DEF dummy | -1.674 | | |
| | (-0.73) | | |
| BAD tax rate * Low tangibility dummy | | -9.578** | |
| | | (-2.39) | |
| Banking crisis dummy * Low tangibility dummy | | 0.046 | |
| | | (1.53) | |
| False BAD tax * Low tangibility dummy | | -2.879 | |
| | | (-1.23) | |
| BAD tax rate * High DEF dummy * Low tang. Dummy | | | -10.801** |
| | | | (-2.26) |
| Banking crisis dummy * High DEF dummy * Low tang. Dummy | | | 0.022 |
| | | | 0.022 |
| False BAD tax * High DEF dummy * Low tang. Dummy | | | -1.960 |
| | | | (-0.63) |
| Country-Year Effects | Yes | Yes | Yes |
| Country-Industry Effects | Yes | Yes | Yes |
| Industry-Year Effects | Yes | Yes | Yes |
| Observations | 2339 | 2339 | 2339 |
| r2 | 0.479 | 0.481 | 0.480 |

**Table 13. Falsification Test: Is the effect on industry output growth due to the tax affecting the demand for capital?**

This table reports the results of industry-level regressions to estimate the differential effect BAD taxes on industry output growth, but using as an industry characteristic an indicator variable for High asset turnover.

| | Output growth |
|---|---|
| | (1) |
| BAD tax rate * High asset turnover dummy | -0.856 |
| | (-0.13) |
| Banking crisis dummy * High asset turnover dummy | 0.007 |
| | (0.14) |
| Country-Year Effects | Yes |
| Country-Industry Effects | Yes |
| Industry-Year Effects | Yes |
| Observations | 2339 |
| r2 | 0.477 |

# Appendix A. BAD taxes in Latin America

Panel A. The timing, tax base and brief history of BAD taxes in Latin America

| Country | Dates | Brief history |
|---|---|---|
| Argentina | 1988 - 1992<br>2001 - Present | Argentina has experimented with bank debit taxes in three distinct episodes. After a short lived implementation in 1976 when the tax was only in place for three months, Argentina reintroduced the BAD tax in 1983 for a three-year period and then again between 1988 to 1992. While its introduction in 1983 was largely motivated by the need to finance the country's public debt, its reinstatement at the end of the 1980s was mostly driven by declining tax revenues, increasing tax avoidance, high inflation and weakened economic conditions. More recently, the *Impuesto sobre los debitos y creditos en cuentas bancaria* (tax on bank debits and credits) was put in place again in 2001, following the economic crisis of the late 1990s. In this latter episode the tax base was extended to include both debits and credits from bank accounts. Baca-Campodónico et al (2006) document that in Argentina the tax was followed by an increased in the demand for cash, even when inflation was rapidly increasing. This was exacerbated by the use of quasi-currencies (such as of provincial bonds) that were exempt from the tax. |
| Bolivia | 2004 - Present | The *Impuesto a las transacciones bancarias* (tax on bank transactions) was introduced in April of 2004 following a failed attempt at taxing personal income and net wealth. Following the introduction of the tax, Bolivia's central bank documented an increase in the use of currency and a reduction in both the number of electronic transfers and in the number of cleared checks. |
| Brazil | 1994<br>1997 - 2007 | Brazil first enacted the tax in 1993 to finance health care programs but the Supreme Court quickly abolished it on the grounds that it had been earmarked for a specific use, which was deemed unconstitutional. A subsequent ruling allowed the tax to be collected for a year in 1994. In 1997 the *Contribución Provisoria sobre Movimentación Financiera* (temporary tax on financial transactions) was introduced. It lasted until 2007. To reduce avoidance of the tax, cheques in Brazil could only be endorsed once. Albuquerque (2006) finds that the tax helps explain an increase in interest rates, and that it has had a negative effect on financial intermediation. Koyama and Nakane (2001) find that the tax has reduced the issuance of checks and has induced portfolio reallocation from term deposits to mutual funds. Koyama and Nakane also argue that bank debit tax increases gross bank spreads while reducing net spread, which ultimately lowers the profitability of all private parties in the intermediation of funds. |
| Colombia | 1999 - Present | The *Gravamen a las transacciones financiearas* (financial transactions tax) was adopted in 1999 amid a weak economy, an unhealthy financial system and low fiscal revenues. In 2001, the tax rate was increased from 0.2% to 0.3%. In 2003 two important changes were made: First, the tax base was amplified to include some transactions that were being used mainly by financial institutions and firms to avoid the tax; second, it established a levy on the liquidation and renovation of certificates of deposits financial intermediaries by financial institutions. The tax rate was again raised in 2004 to its current level of 0.4%. Arbeláez et al (2002) documented a significant increase on the demand for currency relative to bank deposits following the introduction of the tax. They also show a decrease in the number of checks cleared after the tax. |

| | | |
|---|---|---|
| Ecuador | 1999 - 2000 | In Ecuador a broad tax of 1% on banking and financial transactions was introduced in 1999 to reduce the fiscal revenues effect of the sharp decline in world oil prices. The *Impuesto a la circulacion de capitales* (tax to capital circulation) was initially introduced to replace the income tax. However, at the end of 2000 the income tax was reinstated and the financial transactions tax was eliminated. Revenues from the tax were strong in 1999 when it was meant to replace the income tax, but when the latter was reintroduced in 1999 the productivity of the tax declined significantly. Ecuador's case is arguably the one where effects of the tax on financial intermediation are more severely compounded by weak economic conditions, particularly in the banking system. |
| Peru | 1990 - 1991<br>2004 - Present | In Peru a 1.0% tax on bank debits was introduced in 1989 as a measure to raise fiscal revenues during a period of rising inflation. The tax rate was increased to 2.0% in 1990 due to the need to raise fiscal revenues. Nevertheless, Baca-Campodónico et al document that the growing financial disintermediation led the government to reduce the tax rate to 1% in 1991 and 0.75% in 1992. When reintroduced in 2004, the tax base was widened to include both debits and credits. |
| Venezuela | 1994<br>1999 - 2008 | In Venezuela the *Impuesto al debito bancario* (bank account debit tax) was first introduced for less than a year in 1994. It was reintroduced in May, 1999 until May, 2000. In 2002 it was again reinstituted and extended until 2008, when it was eliminated. In both episodes the tax was introduced as a temporary measure to ease the fiscal stress caused by falling oil revenues. Faust et al (2001) examine the effects of the first two BAD tax episodes and argue that this particular tax policy resulted in a change in the preference for currency by economic agents. Specifically, the show a significant decline in the number of cleared checks and an increase in the amount currency held outside banks. |

# Appendix B. Variable definitions and data sources

| Variable | Definition | Source |
|---|---|---|
| *Country-level variables:* | | |
| Bank credit to the private sector /GDP | Ratio of domestic bank credit to the private sector over GDP | IMF's International Financial Statistics (IFS). Private credit by deposit money banks (IFS line 22d); GDP in local currency (IFS line 99B..ZF) |
| Demand, savings and time deposits / GDP | Ratio of demand, savings and time deposits over GDP | IMF's IFS. Total deposits (IFS line 24 and 25); GDP in local currency (IFS line 99B..ZF) |
| Currency / Demand, savings and time deposits | Ratio of currency in circulation to demand, savings and time deposits | IMF's IFS. Currency in circulation (IFS line 14); Total deposits (IFS line 24 and 25) |
| BAD tax rate | Statutory BAD tax rate | Central Banks and Statistical Agencies, Baca-Campodónico et al. (2006) and Galindo and Majnoni (2006) |
| BAD tax revenue / GDP | Fiscal revenues from the BAD tax over GDP | Central Banks and Statistical Agencies, Baca-Campodónico et al. (2006) and Galindo and Majnoni (2006). GDP in local currency (IFS line 99B..ZF) |
| BAD tax dummy | Dummy for years when a BAD tax is in place | Central Banks and Statistical Agencies, Baca-Campodónico et al. (2006) and Galindo and Majnoni (2006) |
| Government Expenditure / GDP | General government final consumption expenditure as a percentage of GDP | The World Bank's World Development Indicators & Global Development Finance, 2012 |
| Log of GDP per capita (current US$) | Natural logarithm of GDP per capita in current US$ | The World Bank's World Development Indicators & Global Development Finance, 2012 |
| Current account balance (% of GDP) | Current account balance (sum of net exports of goods, services, net income, and net current transfers) as a percentage of GDP | The World Bank's World Development Indicators & Global Development Finance, 2012 |
| Inflation: consumer prices (annual %) | Inflation, consumer prices (annual percentage) | The World Bank's World Development Indicators & Global Development Finance, 2012 |
| Total Tax Revenue / GDP | Total revenue from all taxes over GDP | Economic Commission for Latin America and the Caribbean (ECLAC) |
| Income and capital gain tax revenue / GDP | Revenue from income and capital gain taxes over GDP | ECLAC |
| Banking crisis dummy | Dummy for years of banking crises | Laeven and Valencia (2012) |
| *Industry-level variables:* | | |
| Output growth | Log (Real Output$_{i,j,t}$ / Real Output$_{i,j,t-1}$); for country *i*, industry *j* and year *t* | United Nations Industrial Development Organization's (UNIDO) Industrial Statistics Database (INDSTAT2), 2011. Deflated using annual whole prices inflation |
| GFCF growth | Log (Real Gross Fixed Capital Formation$_{i,j,t}$ / Real Gross Fixed Capital Formation$_{i,j,t-1}$); for country *i*, industry *j* and year *t* | UNIDO's INDSTAT2, 2011. Deflated using annual whole prices inflation |