

# IMF Working Paper

## Financial Inclusion, Growth and Inequality: A Model Application to Colombia

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Western Hemisphere Department

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### Abstract

Financial inclusion has been one of the key pillars of Colombia's development strategy for a number of years. Financial inclusion policies have aimed at channeling microcredit to poor, spreading formal banking system usage, fostering electronic payment acceptance, and making financial services more affordable. Using simulations from a general equilibrium model it is possible to identify the most binding financial sector frictions that preclude financial inclusion of enterprises, and study the effects on growth and inequality of efforts to remove these frictions. The study finds that lowering constraints on collateral promises higher growth while inequality is better tackled through measures that lower the financial participation cost.

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## I. INTRODUCTION AND BACKGROUND<sup>1</sup>

### **Over the past decade Colombia has witnessed substantial financial deepening.**

Supported by political stability, sound macroeconomic policies, and favorable external developments domestic private credit grew strongly in Colombia, at 14 percent in real terms on average since 2003, outpacing credit growth in regional comparators. At end-2012, the stock of credit-to-GDP amounted to 37 percent, still somewhat below the regional average (Figure 1, Appendix I).

**The record on financial inclusion has not, however, kept pace with credit growth.** Large amounts of credit do not always correspond to broad use of financial services as credit may be concentrated among the largest firms and highest income individuals. As in other middle-income countries in Latin America, this has also been the case in Colombia, where in 2011 only 15 percent of people belonging to the bottom 40 percent income share held an account at a formal financial institution against 45 percent in the top 60 income share. Young adults and the poor were much less likely to hold an account in a formal institution. The former were also much less likely to hold a formal loan (Figure 2, Appendix I).<sup>2</sup> Only 41 percent of small companies, with less than 20 employees, held a bank loan or a line of credit in 2010, against 72 percent of large firms (Figure 1, Appendix I). Disparities in financial access are one potential explanation for persistent income inequality. In fact, the Gini coefficient improved only marginally since 2000, from 58.7 to 55.9 percent in 2010, when the lowest quintile held only 3 percent of the income share.

**Colombia scored below the upper-middle-income average and the average for LACs on financial inclusion indicators related to households.** Fewer people in 2011 held debit and credit cards (23 and 10 percent of the population respectively), less than 5 percent of the population received government payments through bank accounts, and less than 10 percent held savings in a formal financial institution (Figure 3, Appendix I). Statistics on frequency of use of accounts for savings and payments were equally grim.<sup>3</sup> In contrast, informal finance was widespread, with a relatively larger share of adults declaring having received a loan from, or having saved through, informal channels. Among closest comparators, Colombia's

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<sup>1</sup> The author would like to thank Era Dabla-Norris, Valerie Cerra, Marina Tavares, and Filiz Unsal (all IMF) and Professor Robert Townsend, Stacy Carlson, and Yu Shi (all MIT) for their helpful suggestions and comments, and Yan Ji (MIT) for the calibration of the model to Colombia.

<sup>2</sup> These data are from the Global Financial Inclusion Database, which provides 506 country-level indicators of financial inclusion summarized for all adults and disaggregated by key demographic characteristics—gender, age, education, income, and rural or urban residence. It covers 148 economies.

<sup>3</sup> Results from the 2012 national survey of financial capabilities suggest that 45 percent of the population does not have any financial products, and 72 percent has no savings products. Informal borrowing (mainly from family and friends) was commonly reported as a coping strategy for easing financial strain for 56 percent of the population. Meanwhile, 65 percent of the population reported having been short of money to cover basic needs. (Reddy, et al., 2013)

usage of formal finance was slightly below average, while use of informal finance was on the higher end (Figure 4, Appendix I).<sup>4</sup>

**Financial deepening was also not fully “shared” across enterprises.** While from the perspective of firms progress on inclusion was recorded in a number of variables reported in the World Bank Enterprise Survey in 2010 compared to 2006, a greater share of enterprises claims to have been affected by insufficient financing more recently. Particularly affected were the firms in the food industry. Among all companies, over 50 percent of smaller ones (with less than 20 employees) have identified access to finance as a major constraint for their operations in 2010 (Figure 5, Appendix I).<sup>5</sup>

**While delivering strong economic growth is most policymakers’ concern, inequality and financial inclusion have been Colombia’s foremost preoccupations over the past several years.** The government has invested efforts and resources into eliminating constraints to access to financial services and increasing efficiency, depth and breadth of financial instruments. On the supply side there have been substantive improvements in physical infrastructure, regulatory framework and costs, while demand constraints were addressed by targeting financial literacy. Frictions were identified from the perspective of households, firms and banks, addressed, measured, and reported, making government’s initiatives focused and transparent, and progress measurable.

**The potential effect of these financial inclusion efforts on growth in Colombia has not, however, been studied, and neither has their implication for income inequality.** More inclusive financial systems can allow individuals to save more effectively for the future and diversify risk, as well as smooth consumption and shelter from abusive lending practices. This is beneficial for the aggregate economy as it increases savings and diversifies the pool of resources available for investment. Financial inclusion can also reduce banks’ concentration further lowering intermediation costs. At the corporate level, improved financial access allows small- and medium-size companies to use external financing for investments rather than relying in internal resources or informal mechanisms. Yet, well-intended policymakers’ measures to increase financial sector participation may have a weak effect on growth and TFP, and even a detrimental effect on equality in the transition and in the steady state if they fail to target and remove the most binding frictions in the financial sector.

**The paper attempts to fill this literature gap by analyzing the link between reforms implemented mainly on the micro side and their longer-term macroeconomic**

<sup>4</sup> A useful description of the coverage of different data sources on financial products usage in Colombia is available in Reddy et al. (2013).

<sup>5</sup> Non-financial corporations rely mainly on retained earnings as a source of funding and have low levels of leverage. Loans with - mainly domestic - banks represent less than half of their liabilities. In 2012, 7 percent of largest corporate borrowers accounted for 90 percent of loans (IMF, 2012).

**consequences.** The model is borrowed from Dabla-Norris et al. (2014). The findings suggest that relaxing collateral requirements precluding greater financial sector inclusion promises higher growth while inequality is better tackled through measures that lower the financial participation cost. This result is important inasmuch as efforts to address inequality through financial sector policy are called to complement those aimed at eliminating distortions in Colombia's fiscal policy framework, that have hindered a wider redistribution of economic gains.<sup>6</sup>

**The paper is organized as follows.** Section II identifies obstacles precluding greater financial inclusion and takes stock of authorities' efforts to eliminate them; section III presents the financial deepening model applied to Colombia and discusses model outcomes; and section IV concludes with policy recommendations.

## II. DETERMINANTS OF FINANCIAL INCLUSION

**Obstacles precluding greater financial inclusion may vary widely, and may be micro- or macro-focused in nature.** At the macro level, price volatility dissuades savers whose real wealth tends to erode with inflation while trust in institutions may be recouped with great difficulty following a banking system failure. A variety of obstacles to greater access to and use of financial services exist also at a micro-institutional level. High cost of services, aside from lack of savings, is the most often quoted reason for avoiding formal finance around the world.<sup>7</sup> This finding appears robust across regions as well as country income types (Demirguc-Kunt and Klapper, 2012).

**In practice, obstacles to financial inclusion can be broadly grouped into three distinct categories: access, depth, and efficiency.**

- Obstacles to access typically reflect distortions related to scarcity of physical infrastructure, high documentation requirements by banks for opening, maintaining, and closing accounts and for applying to loans, as well as various forms of immeasurable rationing, including red tape and the need for informal guarantors as connections to access finance. These obstacles increase the cost of participation in the financial system.
- Depth is generally determined by collateral requirements that can be high when the rule of law and, more generally, institutions are weak. These can include the state of creditors' rights, information disclosure requirements, and contract enforcement procedures, among others. In fostering greater transparency on practices, credit information, revealed

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<sup>6</sup> Colombia is reported to have had the weakest track record on equality compared to major Latin American countries, and the highest Gini coefficient, with inequality levels comparable to Haiti and Angola. This result appears at odds with the country's relatively strong and stable growth profile over the last two decades (IMF, 2013).

<sup>7</sup> In a survey reported by Maldonado and Tejerina (2010), about 70 percent of respondents claimed not to have savings.

through public credit registries and private credit bureaus, makes assessing risk easier (thereby lowering collateral requirements) and supports trust in the financial system.

- Intermediation efficiency is generally associated with the state of competition and the degree of asymmetric information facing financial institutions, and is reflected in interest spreads and banks' overhead costs.

Some of these obstacles may be particularly binding for poor households, especially those living in distant rural areas, and with lower financial literacy. Whatever the cost of access, it absorbs a higher share of the income of the poor and is likely to weigh more heavily on the choice of how to save and borrow. Therefore, distance to facilities, burdensome paperwork requirements, and other such inclusion barriers are likely to discourage both individuals and enterprises from using formal finance.

### A. Access

**Colombia has implemented a number of improvements to address constraints affecting cost of access.**

- Physical infrastructure, the number of access points for financial services, such as commercial bank branches, points of sale, and ATM machines, has increased, although it is still below the average for upper-middle-income countries.<sup>8</sup>
- Banks have been allowed to provide financial services (such as payment, withdrawal, and deposit) through correspondents for social transfers programs (such as *Familias en Accion*, *Banca de las Oportunidades*, and others) since 2006 and over 38,000 correspondents were registered as of 2013.

	<b>Physical Access of Financial Services</b>		
	2006	2008	2012
Commercial bank branches			
per 1,000 km <sup>2</sup>	3.7	4.0	4.6
100,000 adults	13.3	14.0	14.9
ATMs			
per 1,000 km <sup>2</sup>	...	7.7	11.1
per 100,000 adults	...	27.0	35.8

Sources: IMF Financial Access Survey.

**The government has subsidized the opening of accounts for most *Familias en Accion* transfers recipients and lowered the financial transaction tax (the “4\*1,000”) on low account balances.<sup>9</sup>** The program of interest subsidies on new mortgages granted to over

<sup>8</sup> Over the past year only, 320 branches and over 1,500 ATMs were added to the network. Financial services were absent in only 3 out of over 1,100 municipalities as of June 2013 as opposed to 28 percent of total in 2006.

<sup>9</sup> This debt tax had been initially introduced temporarily in 1998, during the banking crisis, but was maintained and increased twice since then, from 0.2 percent to 0.4 percent. It covers all financial transactions, including banknotes, promissory notes, wire transfers, internet banking, bank drafts checks, money and term deposit, overdrafts, installment loans, letters of credit, guarantees, performance bonds, securities underwriting commitments, safekeeping of documents, currency exchange, unit trusts and similar financial products. Its current phasing out is planned to start in 2015 and be concluded in 2018.

5,000 low income families since 2009 has been extended into 2014 and will cover up to 5 percentage points of the agreed interest rate for a 7-year period.

- An electronic money decree was issued to regulate financial transactions between individuals who are not necessarily linked to a formal financial intermediary.
- The National Treasury makes payments exclusively through commercial banks and uses the banks to collect taxes.

Moreover, new consumer credit products are being offered by the banks and are penetrating the market, while internet and mobile banking are becoming increasingly more popular.

## B. Depth

**Colombia's score on the strength of legal rights according to “Doing Business” (2014) is average but depth of credit information is considerably strong.** Colombia does not have public registries; however, the two private credit bureaus' coverage has increased substantially over the past years. At 72.5 percent of adults, coverage is more in line with advanced OECD countries. At present, operations of over 750,000 firms and over 20 million individuals are covered by private credit bureaus whose legislation was strengthened in 2010. Both positive and negative information is shared. Nevertheless, some deficiencies with handling of historical data exist inasmuch as “negative” information is kept in the system only for a maximum of 4 years. Moreover, the very lengthy judicial enforcement procedures, and the absence of special treatment for secured creditors in insolvency procedures, have induced financial institutions to seek collateralization of loans, thereby increasing costs faced by borrowers.

## C. Efficiency

**Banks concentration in Colombia may be a phenomenon correlated with depth as well as efficiency.** Asset concentration is believed to discourage banks from extending loans to smaller firms. When banks make high profits by lending to a narrow base of customers, they lose incentives to assess riskier customers and diversify their portfolio. In this case, low coverage of small firms is typically coupled with high collateral requirements and high spreads that compensate banks for the risk of failure but also act as gate-keeping expedient.<sup>10</sup>

**Colombia's link between asset concentration and the record of financial inclusion are not at odds with developments in its peer economies.** Colombia's high bank concentration, with over 70 percent of bank assets held by the five largest institutions, still scores relatively well in terms of regional peers, with Peru and Uruguay displaying much greater concentration (Figure 6). Brazil and Mexico have, however done better in terms of financial

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<sup>10</sup> Average interest rate spreads was 7.2 percent in 2012.

inclusion of households. Inclusion of enterprises in Colombia has also lagged behind Brazil and Peru in 2010, and was considerably worse than Chile's. Indeed, in recent years, credit growth in Colombia has mainly derived from an increase in the average size of loans, rather than an increase in the number of debtors (IMF, 2012).

#### **D. Progress and challenges**

**Recent years have witnessed steady progress in fostering financial inclusion in Colombia.** The authorities have been closely tracking access to financial services through semi-annual reports (Asobancaria, 2013) documenting the evolution in the number of users of different products based on banks' data. According to data on individual users, since 2011:

- The number of adults owning at least one financial product, the so-called “bancarization”, has increased from 63 to over 69 percent, supported by a substantial increase in the use of electronic deposit accounts, which more than trebled over this period;
- Credit and debit cards are becoming increasingly popular although their coverage is still low;
- The growth in the number of people with housing loans was also pronounced although the number of those holding consumer credit is still six times greater;
- On the side of enterprises, the strong increase in the number of checking and savings accounts has far outpaced the increase in access to commercial credit.

**Yet, actual usage of financial services is still low and costs are considerable.** It is important to distinguish between financial *access* and financial *usage*. Less than 13 percent of account holders made three or more deposits in a month in 2011, against only 5 percent in rural areas. While most recent statistics by Asobancaria suggest a steady increase in the total number of financial transactions, it is less clear if frequency of use has been spread out to a large share of individuals. At \$5.50 for entry-level savings, monthly charges on accounts are prohibitively expensive for a large share of the poor population and may be indicative of low market competition.<sup>11</sup>

**As the financial inclusion agenda proceeds to embrace the most vulnerable segments of the population, more will need to be done to enhance financial literacy.** Financial literacy is imperative for making informed financial decision and obtaining the best product at the lowest cost. The authorities have designed surveys and commissioned studies to address this essential part of financial inclusion (Box).

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<sup>11</sup> Basic ATM operations cost US\$0.60 per transaction at the bank's own ATM. (IMF, 2012)

### **Box. The Role of Financial Literacy**

**Financial literacy is a key ingredient for making sound financial decisions and also affects the perceived cost of financial services.** Extensive knowledge of alternative financial products and assessment of their adequacy in meeting agents' financial needs may not be expected to affect the willingness to save and borrow. However, financial knowledge may affect the perception of costs and tradeoffs in different financial products supporting sound financial decisions. In a recent survey conducted by the World Bank on behalf of the government, financial literacy was found to be positively correlated with use of bank accounts in Colombia while higher financial "capability" is associated with higher probability of using savings products and formal credit.<sup>12</sup> Maldonado and Tejerina (2010) have also found that understanding of financial services offered in the context of *Familias en Accion* program varies substantially across regions and a considerable share of benefits recipients are not aware of the implied costs of handling the accounts.

**The Colombian authorities have been monitoring the financial capability of the population and are developing a document (the CONPINES) that could support an overarching strategy for financial education.** A sub-section of the monthly households survey has, since 2010, included a questionnaire that helps assess the financial knowledge of a broad set of individuals and can feed important information for targeting segments of vulnerable customers. Based on this and other sources, the CONPINES strategy could promote technology for the use of personal financial information, such as mobile-phone and internet-base finance, but also enhance the financial education content of financial authorities' websites, and extend high-quality financial education through schools. There have been proposals to enshrine this strategy in law (Reddy, et al, 2013). Since financial literacy programs tend to employ substantial resources, it is important that training is targeted to unschooled and financially illiterate households who are most likely to access financial services as a result of this training.<sup>13</sup>

### **III. MODEL APPLICATION<sup>14</sup>**

**The model is borrowed from Dabla-Norris et al. (2014) and focuses on the financial inclusion of enterprises.<sup>15</sup>** This micro-funded, general equilibrium, overlapping generation

<sup>12</sup> In addition, banking correspondents are found to increase access to formal financial products only for individuals with high financial capability (Reddy, et al., 2013).

<sup>13</sup> In a randomized experiment investigated whether access to financial services increased as a result of financial literacy training in Indonesia. The study found that the program had a positive effect only for uneducated and financially illiterate households and was negligible for the general population. Financial incentives to opening savings accounts had a greater impact on inclusion (Cole, et al. 2009).

<sup>14</sup> Two data sets are used: the 2010 World Bank enterprise survey provides firm-level cross-sectional data (from 942 firms) and the development data platform includes data on gross savings, non-performing loans, and the interest rate spread.

model features heterogeneous agents who are distinguished from each other by wealth and talent and who can choose their occupations between workers and entrepreneurs. In equilibrium, only talented agents with some wealth chose to be entrepreneurs while untalented and those talented but with no wealth chose to be workers. There are two states of world, or “regimes,” one with credit and one with savings only. Individuals in the savings regime can save but cannot borrow. Participation in the savings regime is free, but to borrow, i.e. to move into the finance regime, individuals must pay a participation cost whose size is one of the determinants of financial inclusion. Once in the finance regime individuals may obtain credit but its size is constrained due to limited commitment (i.e. poor contract enforceability) which leads to the need to post collateral. Thus collateral is another determinant of financial inclusion affecting financial sector depth. Finally, because of asymmetric information between banks and borrowers, interest rates charged on borrowing account for costly monitoring of highly leveraged firms.<sup>16</sup> Because more productive and poorer agents are more likely to be highly leveraged the higher intermediation cost would be another source of inefficiency and financial exclusion but also inequality.

**In the model, financial inclusion affects growth and inequality through three channels.** First, more developed financial markets channel more funds to entrepreneurs, thereby increasing their output; second, more efficient contracts limit waste from frictions leading to higher growth; and third, more efficient allocation of funds in the financial system brings about an increase in TFP.<sup>17</sup> This occurs as financial deepening speeds up the process in which initially wealth constrained but talented workers become constrained entrepreneurs, while wealth constrained entrepreneurs become unconstrained entrepreneurs.<sup>18</sup>

**In terms of variables used in the model Colombia does not appear to be an outlier compared to regional peers and other developing countries.** The savings rate, representing the overall funds available for financial intermediaries in a closed economy, is below that of Chile and Peru, and interest rates spreads are higher Chile’s and Mexico’s. Yet, NPLs are low and have declined further below 3 percent more recently. Although not excessive by regional standards, Colombia’s collateral requirements, at 169 percent, are rather high, with some upper middle-income developing countries, namely Brazil, Malaysia, and Egypt, requiring between 60 and 90 percent collateral. At 57 percent of total registered

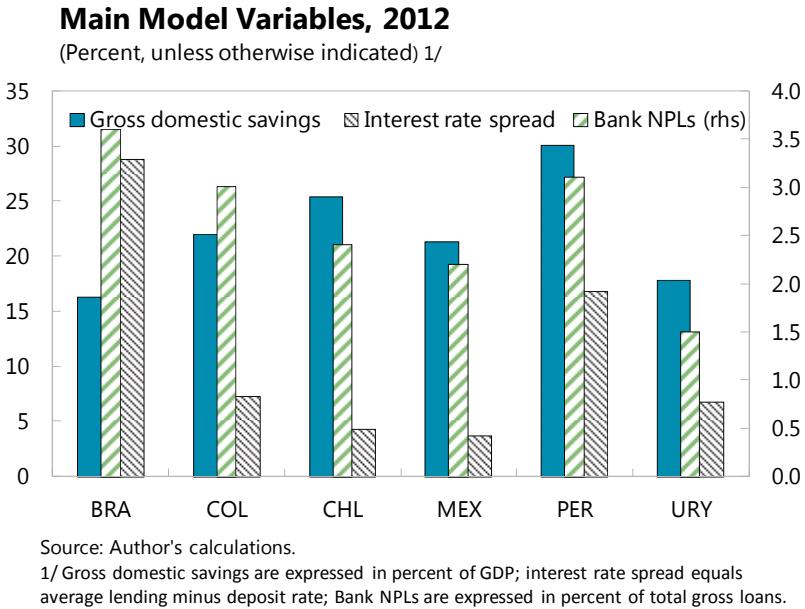
<sup>15</sup> The authors actually refer to financial “deepening”. However, while financial deepening often denotes an increase in the stock of credit in the economy—which can occur even if the number of borrowers remains unchanged—the model allows for crowding in of enterprises that were initially excluded from the financial sector. Hence, we are using the term “financial inclusion”.

<sup>16</sup> Since only highly leveraged firms are monitored, firms face different costs of capital and may choose not to borrow even when credit is available.

<sup>17</sup> However, financial inclusion can also crowd in relatively untalented agents, decreasing TFP.

<sup>18</sup> GDP is calculated as the sum of all individuals’ income; TFP is the average entrepreneur’s talent weighted by their respective output.

firms, the number of firms with credit compares favorably. However, as identified above, small firms continue to face severe financial constraints.



**The model was calibrated with Colombian data using standard measures from the literature for some of the parameters as in the original paper.** The other parameters are estimated by matching the simulated moments to actual data. The gross savings rate is matched to estimate the bequest rate,  $\omega$ ; the average value of collateral is used to calibrate the degree of financial friction stemming from limited commitment,  $\lambda$ ; while the financial participation cost,  $\psi$ , intermediation cost,  $\chi$ , recovery rate,  $\eta$ , probability of failure,  $p$ , and the parameter governing the talent distribution,  $\rho$ , are jointly estimated to match the moments of the percentage of firms with credit, NPLs as a percent of total loans, interest rate spread, and the employment share distribution. In the model, the share of firms with credit is endogenous and is affected by  $\psi$ ,  $\lambda$ , and  $\chi$ . We conduct three isolated policy experiments that can help identify key constraints to financial sector inclusion and study the macro effects of their removal. The first experiment consists of reducing the financial participation cost,  $\psi$ . The second experiment consists of relaxing borrowing constraints in the form of collateral requirements,  $\lambda$ . The third experiment assumes an increase in intermediation efficiency,  $\chi$ .

### Calibration: Data, Model, and Estimated Parameters

Target Moments	Data	Model	Parameter
Savings (%GDP)	20	20	$\omega=0.2$
Collateral (% loan)	169	169	$\lambda=1.59$
Firms with credit (%)	57.2	57.4	
NPLs (%)	4	4.2	$\psi=0.06$
Top 5% emp. share	52.1	54.9	$x=0.3$
Top 10% emp. share	65.7	67.3	$\eta=0.37$
Top 20% emp. share	80.3	79.1	$p=0.17$
Top 40% emp. share	92.8	89.3	$\rho=3.8$
Interest rate spread (%)	6.2	5.0	

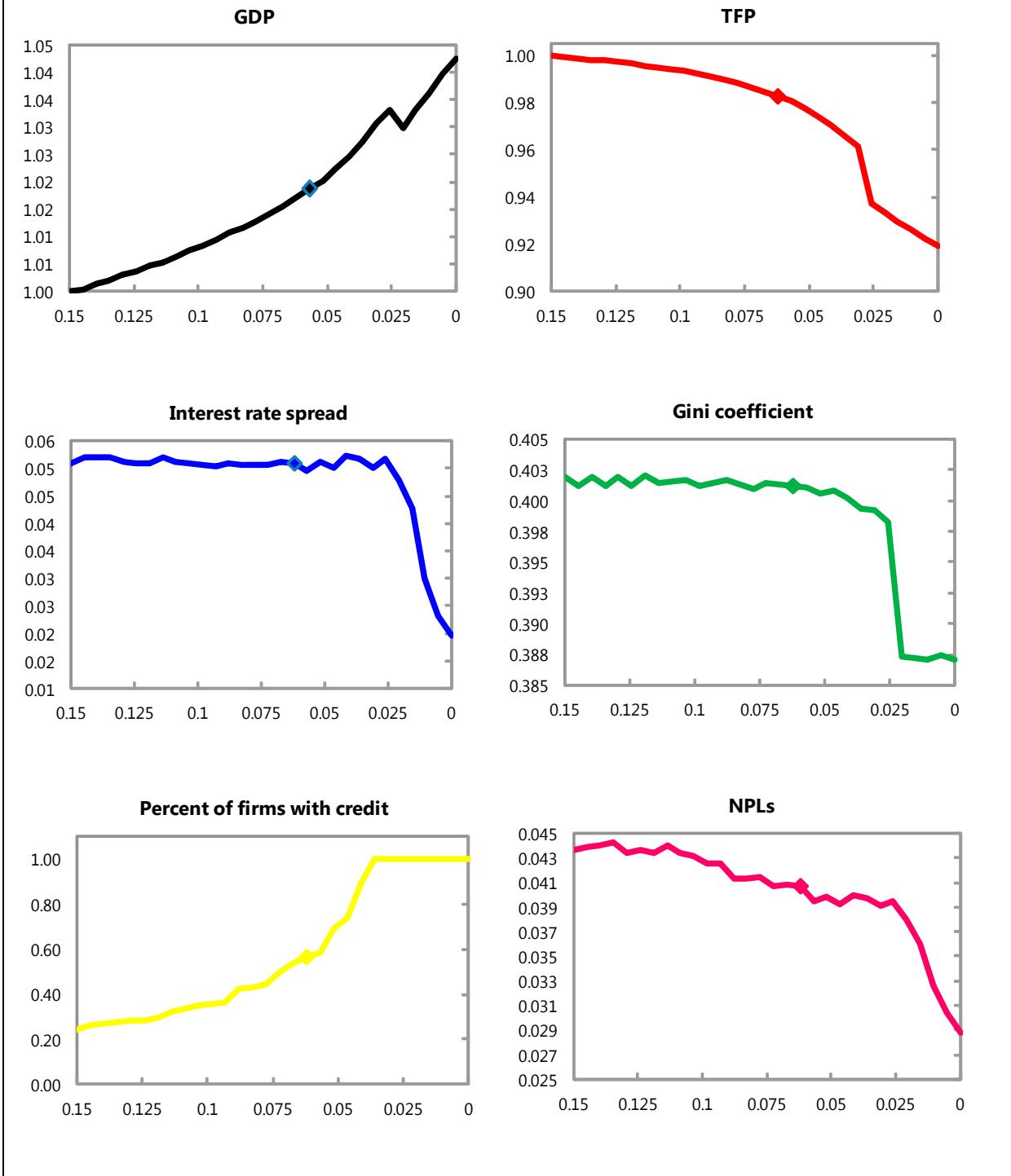
#### A. Reducing the participation cost

**The impact of a decline in the financial participation cost,  $\psi$ , from 0.15 to 0 on GDP reported in Figure 1 is favorable.** A decrease in the participation cost pushes up GDP through its positive effect on investment for two reasons: (i) a lower  $\psi$  enables more firms to have access to credit, and (ii) fewer funds are wasted in unproductive contract negotiation freeing up more capital for investment. However, aggregate TFP declines, implying efficiency losses in the allocation of capital. This occurs because the participation cost, which is fixed, has a higher weight in small firms' income. As the previously excluded firms enter the financial sector they push down TFP of the economy.

**The interest rate spread is very stable when financial participation cost is high, but decreases as  $\psi$  approaches zero.** This is because a decrease in  $\psi$  has two countervailing effects on interest rates in the model. First, the wealth effect—entrepreneurs become “richer”, and tend to deleverage, which results in a lower average interest rate spread. Second, a smaller  $\psi$  enables some severely wealth constrained workers to become entrepreneurs. These entrepreneurs choose a very high leverage ratio, driving the average interest rate spread up. The first effect dominates the second effect when borrowing constraints are very tight, thus discouraging constrained workers' access.

**As the financial market develops, income inequality decreases.** A decrease in  $\psi$  is disproportionately more beneficial for constrained workers and entrepreneurs without credit. It allows them to invest capital into production driving down the Gini coefficient. The share of firms with credit increases until all firms have access to finance as  $\psi$  approaches 0, while the share of non-performing loans (NPLs) declines. The decline in inequality reaches a plateau the process hits other binding constraints to inclusion.

**Figure 1. Comparative Statics: Reducing Participation Cost- $\psi$**



## B. Relaxing borrowing constraints

**Relaxing borrowing constraints by varying  $\lambda$  from 1 to 3 in Figure 2 has a positive effect on GDP and TFP.** The increase in aggregate GDP is greater than in the experiment related to financial participation costs. The relatively high savings rate implies that the decline in the collateral requirement unlocks financial resources, leading to a significant increase in GDP. As  $\lambda$  declines, TFP increases, implying a more efficient resource allocation across firms.<sup>19</sup> The effect on GDP is very large suggesting that credit constraints are one of the major obstacles to financial development in Colombia.

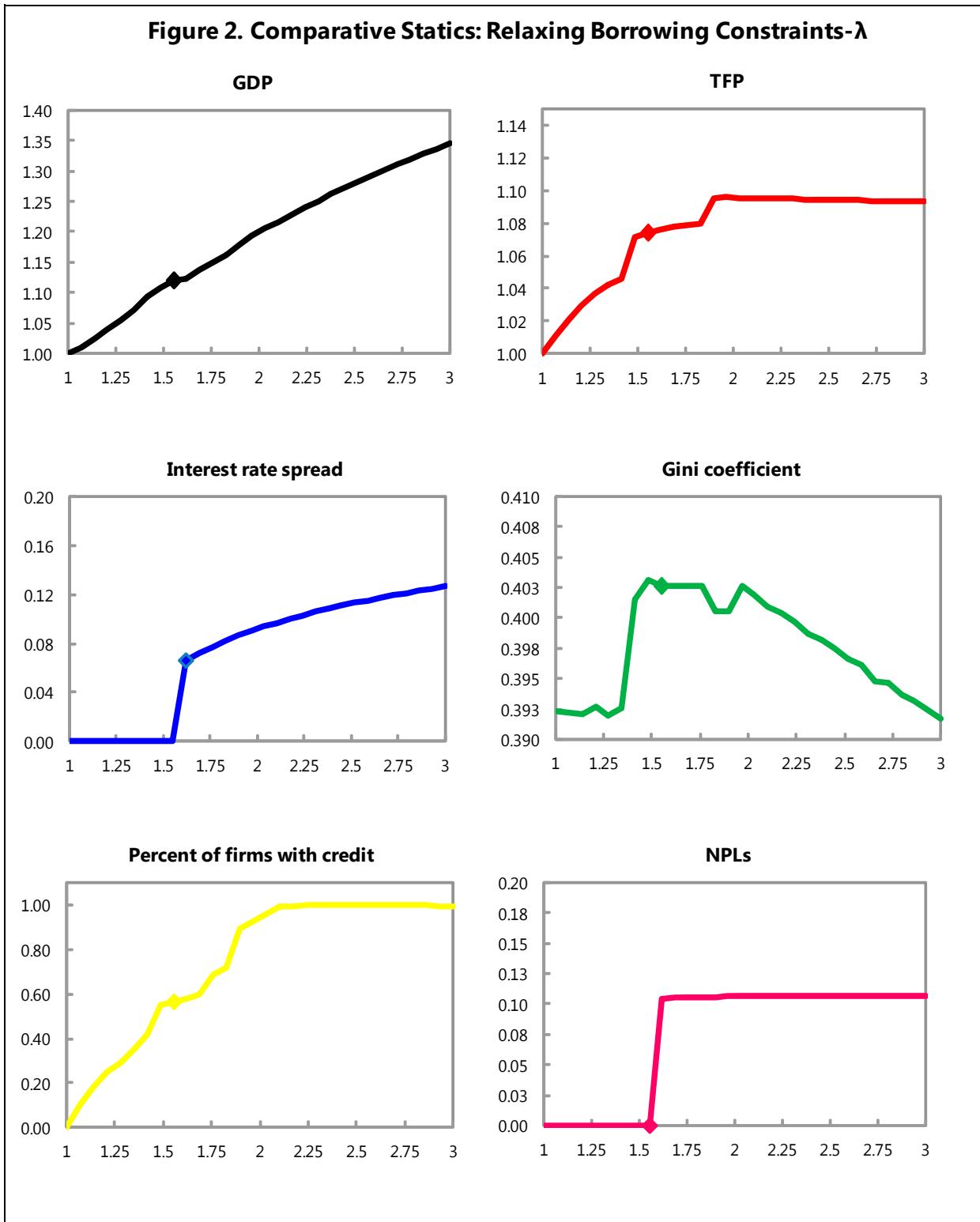
**The interest rate spread increases in this scenario.** The spread is zero when  $\lambda$  is low, because firms leverage is low and no default happens even when production fails. As  $\lambda$  increases above a threshold, agents leverage more, the share of non-performing loans increases, and the interest rate spread starts increasing. Also, in line with Kuznets theory, when  $\lambda$  increases from low levels, talented entrepreneurs leverage more and increase their profits, driving up the Gini coefficient. However, as  $\lambda$  becomes larger, the sharp increase in the interest rate shrinks entrepreneurs' profits, leading to a lower Gini coefficient. The stage in which Colombia is now (i.e. its current value of  $\lambda$ ) suggests that inequality should be declining.

**A relaxation of borrowing constraints pushes up the share of firms with credit but also increases NPLs.** Relaxing the borrowing constraint provides more external credit to entrepreneurs once they pay the participation cost. This induces more entrepreneurs to join the financial regime. However, NPLs increase. This occurs as a relaxation of collateral constraints opens up the doors for small new entrants who tend to be more leveraged. This phenomenon underlines a trade-off between growth and stability that needs to be carefully managed.<sup>20</sup>

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<sup>19</sup> Townsend et al. describe this process in the following way: a relaxation of the borrowing constraint benefits talented entrepreneurs more as they often desire to operate firms at a larger scale than untalented entrepreneurs. Relaxing the borrowing constraint allows all entrepreneurs to borrow more, but, on average, untalented ones do not borrow as much because their small maximum business scale may have already been achieved. As a result, more talented entrepreneurs expand business scales, driving up TFP in the “finance regime”.

<sup>20</sup> Note that caution should be made in interpreting the magnitude of the changes in the variables of interest across experiments in the figures. The scales on the y-axis of the figures are intentionally different to allow appreciating the various turning points of the variables.



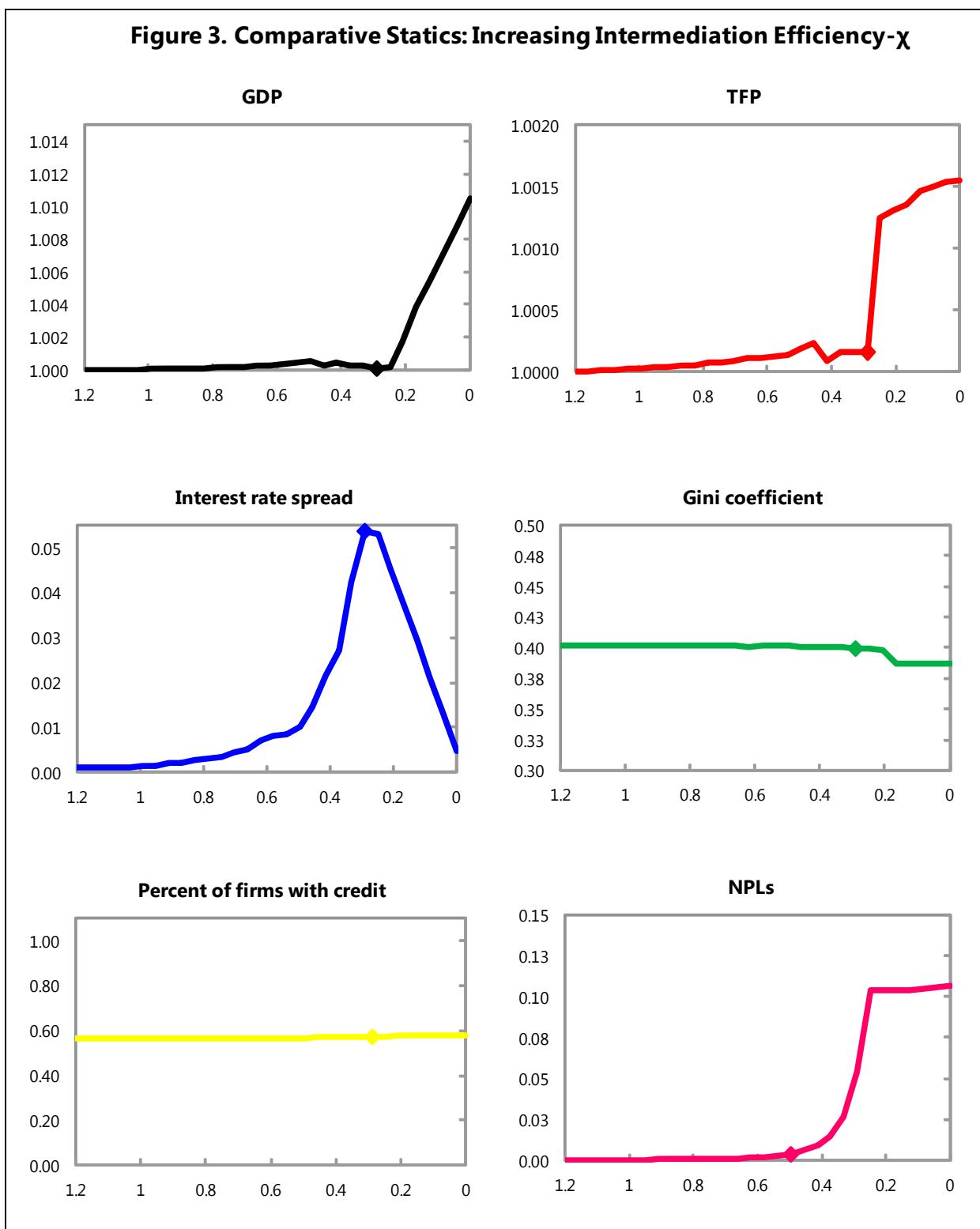
### C. Increasing intermediation efficiency

**Varying the financial intermediation cost,  $\chi$ , from 1.2 to 0 in Figure 3 pushes up growth and TFP.** GDP and TFP are responsive to a decrease in  $\chi$  although less so compared to the case where  $\lambda$  is lowered. At higher levels of  $\chi$ , better intermediation efficiency only benefits the highly leveraged firms which are few (due to the low financial inclusion ratio and tight borrowing constraints). As  $\chi$  decreases further TFP increases because the lower intermediation cost facilitates the allocation of capital to more efficient entrepreneurs.

**The interest rate spread can be expected to decrease.** The spread increases initially for lower levels of  $\chi$  and decreases sharply as  $\chi$  approaches zero, displaying an inverted V shape. There are two opposing forces affecting the spread stemming from a decline in  $\chi$ : first, the decline in the cost of borrowing induces risky firms to leverage more, pushing up NPLs and increasing the endogenous interest rate spread; second, the decline in  $\chi$  decreases the interest spread directly. Whether the interest rate spread increases or decreases depends on which effect dominates.

**However, the percent of firms with credit remain unchanged.** Efficient intermediation appears to be disproportionately benefiting a small number of highly leveraged firms, while the general equilibrium effects on wages and the interest rate may be preventing smaller firms from entering the financial system. The Gini coefficient declines only marginally at very low parameter levels.

**Figure 3. Comparative Statics: Increasing Intermediation Efficiency -  $\chi$**



## D. Discussion of results

### Comparative statics

**Comparison of results across measures shows that different financial inclusion strategies have differential effects on the variables of interest.** First, relaxing constraints on collateral appears to offer the greatest benefits in terms of growth, TFP and inclusion of firms. Yet, the effect on inequality is much lower compared to the case when the cost of access decreases, and the increase in the share of firms with credit is strong, at 76 percent. In fact, entrepreneurs who are already included in the financial system benefit more from the reduction in collateral and less so from a reduction in participation cost which is a fixed cost and a relatively lower share of their income. The latter, however, benefits new entrepreneurs more decreasing inequality. Nevertheless, the “poor” may still be better off overall under the lower collateral scenario, albeit not relative to the “rich”.<sup>21</sup>

**Different financial inclusion strategies may imply trade-offs and present undesired side effects that need to be closely monitored.** A side effect of a decrease in collateral constraints is increasing spreads and NPLs. Low NPLs are not necessarily welcome as they may precisely be a reflection of limited lending, possibly circumscribed to low-leveraged, rich entrepreneurs. Entry of new entrepreneurs would however still point to the need for close monitoring of NPLs and possibly mitigating macro prudential measures.

**Some financial inclusion measures may not have the result policymakers are hoping for.** Increasing intermediation efficiency does not appear to bear a particularly strong effect on any variable. This most likely occurs because collateral constraints and participation costs are more binding financial sector frictions. Greater intermediation efficiency would be enjoyed only (or disproportionately more) by entrepreneurs that are already included in the financial system and would not affect inequality.

The Impact of Financial Inclusion

(Percent)

	GDP	TFP	Interest rate spread	Gini coefficient	Percent of firms with credit	NPLs
↓ ψ to 0	4.3	-8.1	-3.1	-1.5	75.9	-1.5
↑ λ to 3	34.6	9.3	12.6	-0.1	99.6	10.7
↓ χ to 0	1.1	0.2	0.4	0.0	1.1	10.7

<sup>21</sup> Inequality does not decrease substantially with lower  $\lambda$  because “rich” entrepreneurs (possibly also more talented and more productive) can borrow much more when collateral constraints are released increasing firm size and profits, thus becoming richer. The optimal production scale of new entrants is lower and, even if they can borrow, they are not likely to achieve the same profits.

**These examples are illustrative, as the calibration for the financial inclusion process is chosen arbitrarily.** It may well be possible to increase  $\lambda$  beyond 3 in a shorter period of time compared to that necessary to achieve other changes, with greater positive effects on the Gini coefficient. Moreover, as many reforms are implemented on various fronts contemporaneously they are likely to affect the frictions in unison with additive effects.<sup>22</sup>

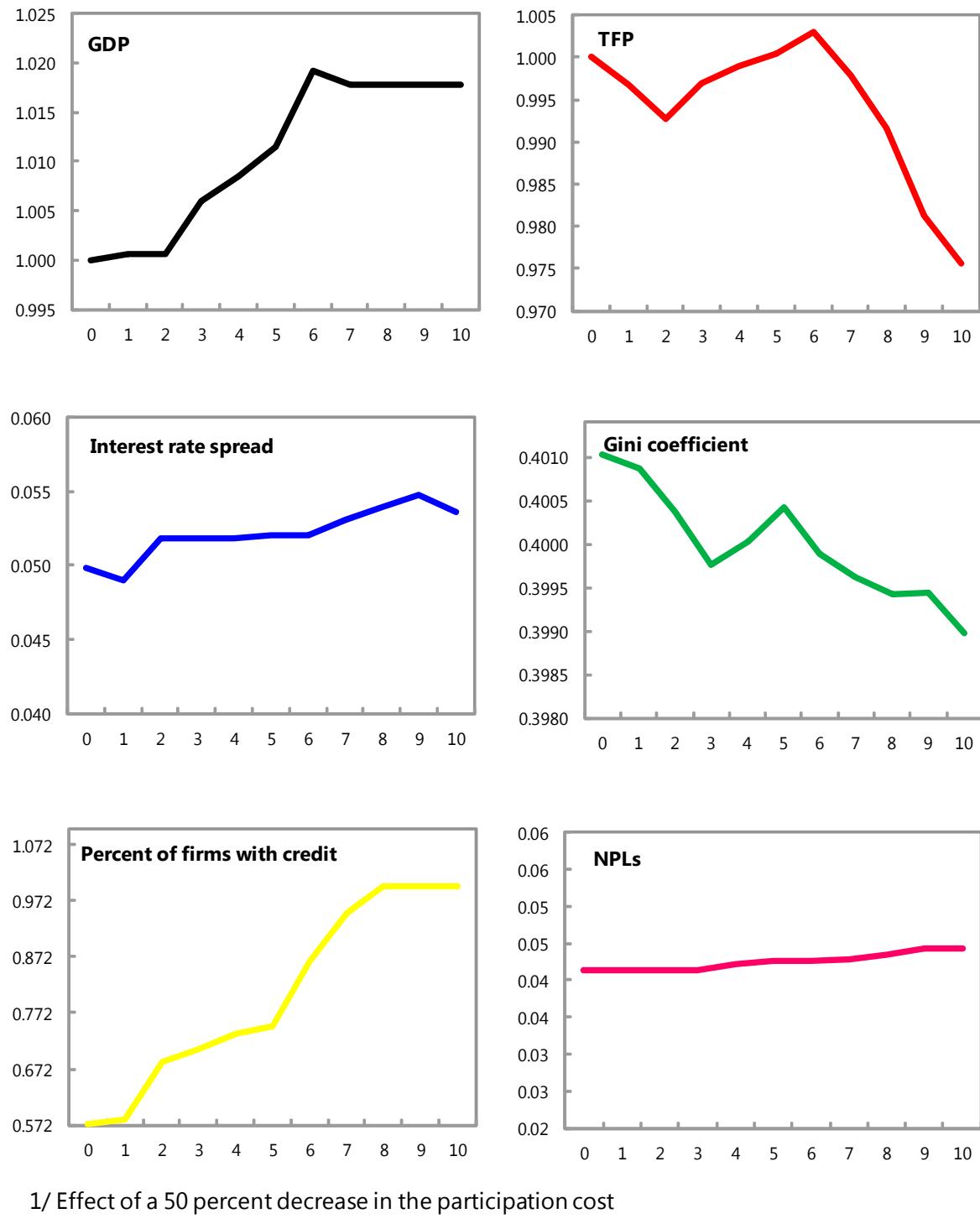
### Transitional dynamics

**Figures 4-6 included below show the transitional dynamics of various measures.** Starting at year 0, the figures show the dynamics reflecting a linear decrease in  $\varphi$  and  $\chi$  by 50 percent, and an increase in  $\lambda$  by 30 percent over 10 years. The interpretation of results remains the same with the addition of the time dimension of financial inclusion. Nevertheless, the transitional dynamics is important inasmuch as it points to possible temporary trade-offs of various measures. For instance, lowering cost of access in Figure 4 implies a temporary increase in the Gini coefficient in the transition period before it declines to a lower level.

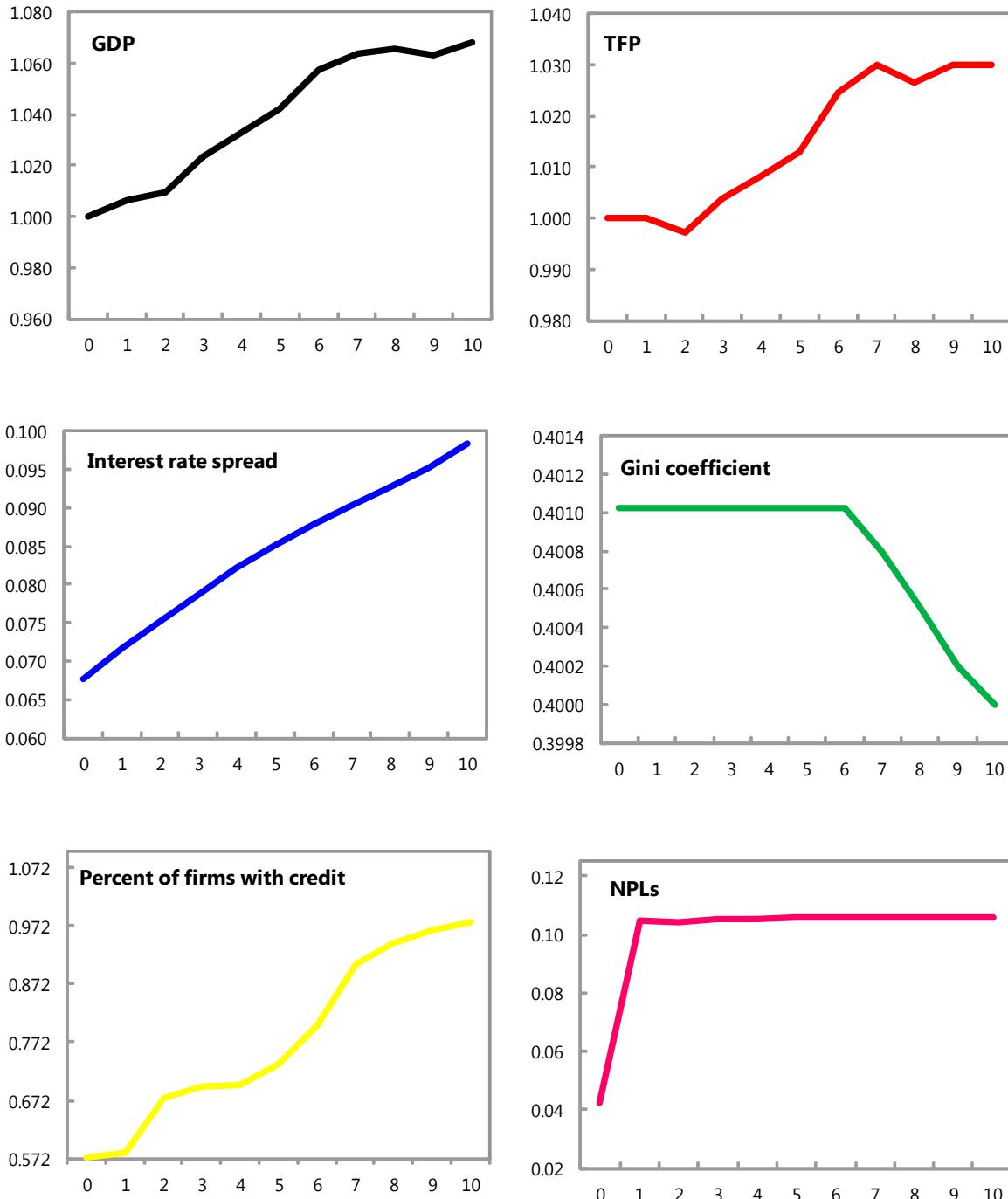
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<sup>22</sup> The results of the calibration to Colombia are similar to the emerging economies' experiments in the original paper by Dabla-Norris et al. (2014), in particular to the results of Philippines, suggesting that there may be similarities in the process of financial inclusion for countries with similar economies and similar level of development.

**Figure 4. Transitional Dynamics: Relaxing Constraints to Access 1/**

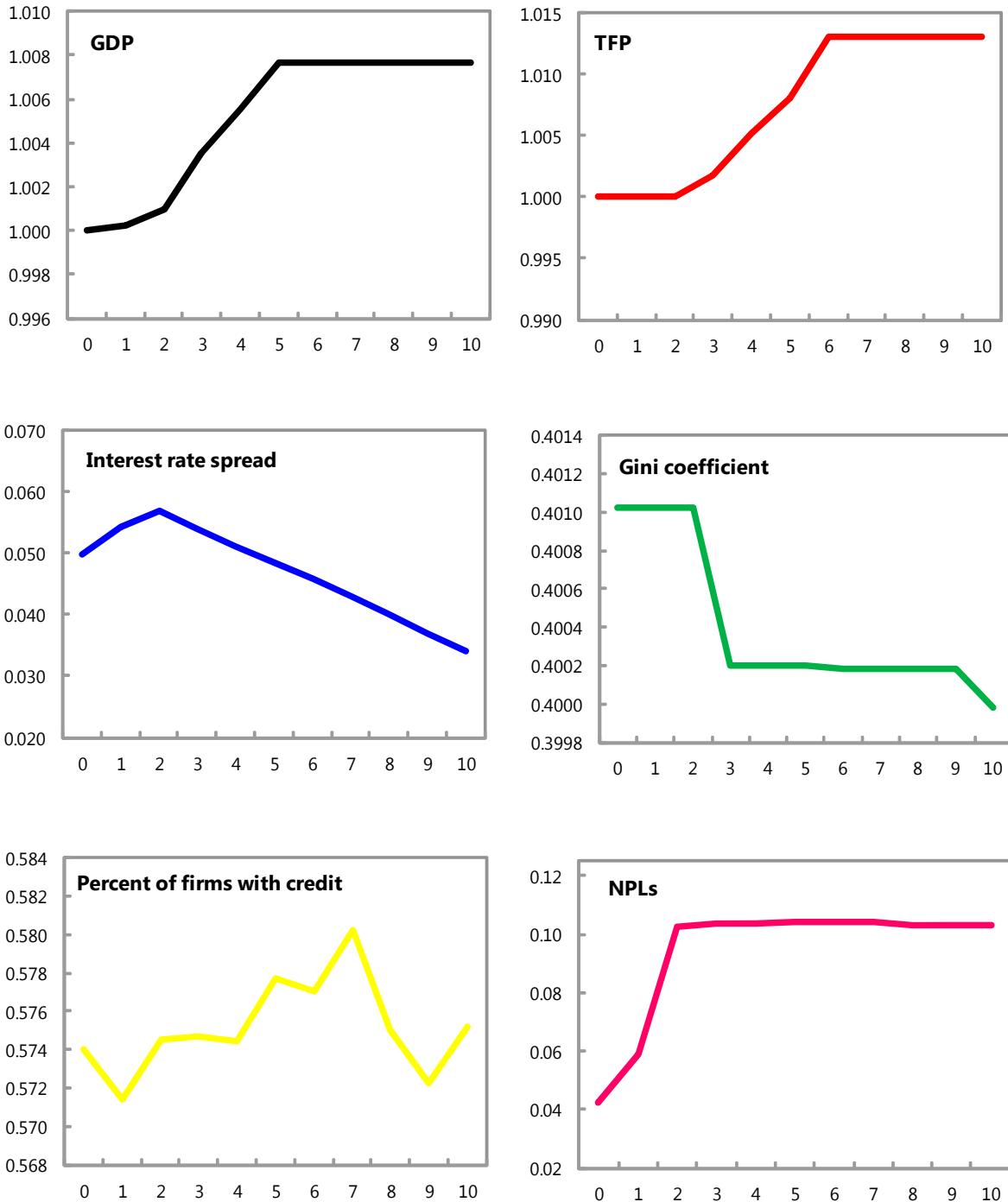


**Figure 5. Transitional Dynamics: Relaxing Borrowing Constraints 1/**



1/ Effect of a relaxation of borrowing constraints by 30 percent.

**Figure 6. Transitional Dynamics: Increasing Intermediation Efficiency 1/**



1/ Effect of a 50 percent decrease in the intermediation cost.

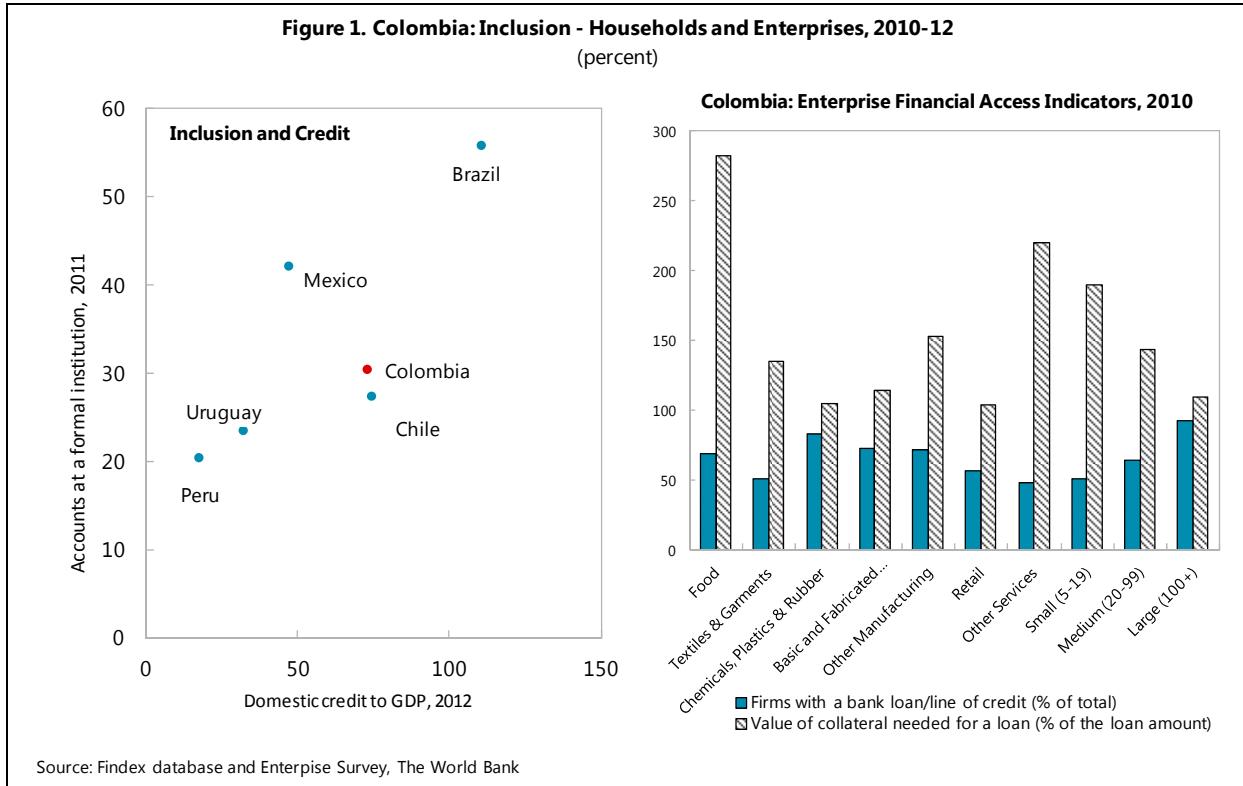
#### IV. CONCLUSIONS

**Boosted by government support in various areas and financial sector innovation, financial inclusion is progressing in Colombia.** Microcredit is growing, “bancarization” is spreading, and electronic payments are increasingly being accepted for economic transactions. The financial inclusion agenda continues to gain momentum, supported by domestic policy interest as well as global focus on financial inclusion. Authorities’ efforts in this area can only be expected to intensify going forward.

**The effects of governments’ financial inclusion actions on growth and inequality will depend upon the pace and choice of measures implemented.** Grouping the various micro initiatives and the remaining challenges into three broad areas of financial frictions—participation costs (access), borrowing constraints (depth), and intermediation efficiency—it is possible to assess the effects the removal of constraints has on main macroeconomic variables in a general equilibrium model. Simulations suggest that relaxing various financial sector frictions may affect growth and inequality differently in the transition and in the steady state. Lowering constraints on collateral precluding greater financial sector inclusion promises higher growth while inequality is better tackled through measures that lower the financial participation cost. However, some measures may imply tradeoffs that need to be monitored closely.

**Some ideas already in the implementation phase are promising and new areas of intervention could also be explored.** The financial inclusion model is theoretical by nature and does not allow for identifying country-specific micro-level measures that may be most successful in removing financial sector friction. However, the authorities are already acting on several different fronts. The recent proposal to license electronic-money issuers, that would be entitled to collect deposits and offer electronic payment services, goes in the right direction towards creating more competition in the financial sector. This can in turn have positive effects on collateral requirements but also on the other two financial inclusion barriers, participation costs and intermediation efficiency. The recently passed Law on movable property should also relax borrowing constraints by increasing transparency and improving access to information. Moreover, supporting policies to improve the regulatory flexibility—by, for instance, simplifying account opening (as discussed in the recent FSAP)—and policies to enhance consumer protection, could also contribute to lowering the participation cost in a more substantial way. Going forward, some areas for identifying remaining frictions may include possible regulatory obstacles to bank entry, market practices on the use of collateral, and options for further improving access to and adequacy of credit information.

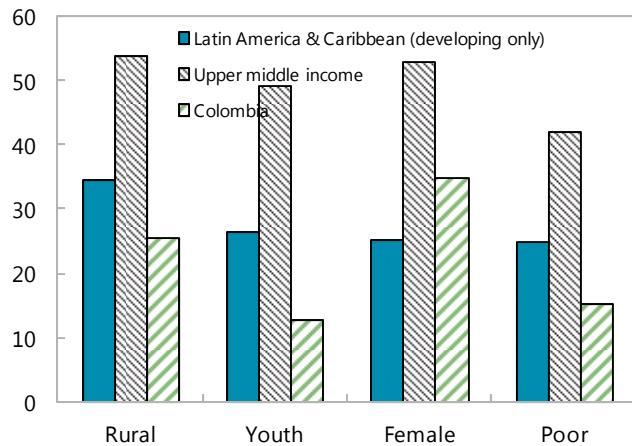
## Appendix I. Taking Stock of Financial Inclusion



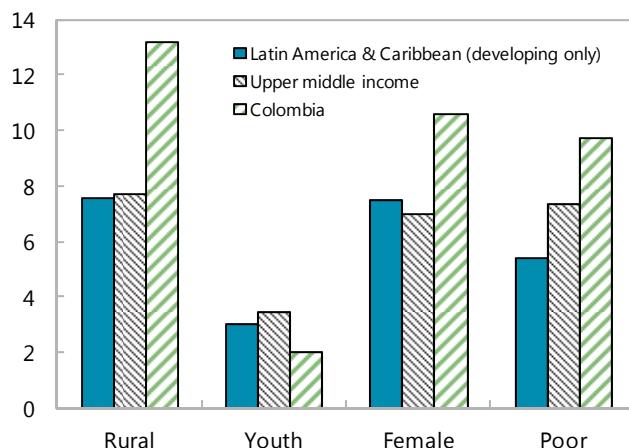
### **Figure 2. Colombia: Formal Finance, 2011**

(Percent of population age 15 and above, unless otherwise indicated) 1/

**Account at a Formal Financial Institution**



**Loan from a Financial Institution in the Past Year**

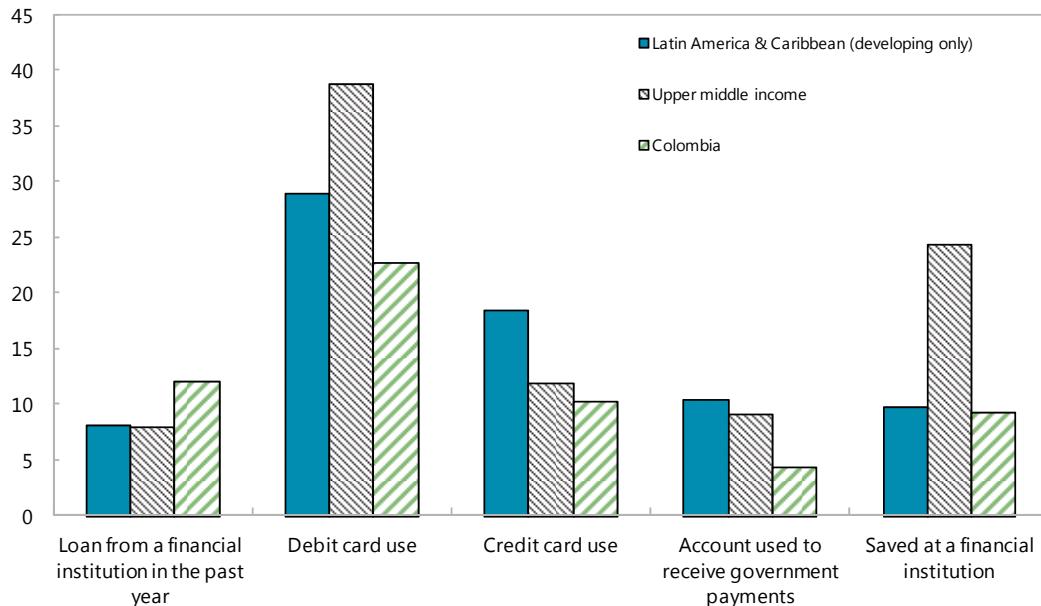


Sources: Findex database, World Bank

1/ Youth - percent of population aged 15–24; Poor - percent of population aged 15 and above whose income is in the bottom 40 percent.

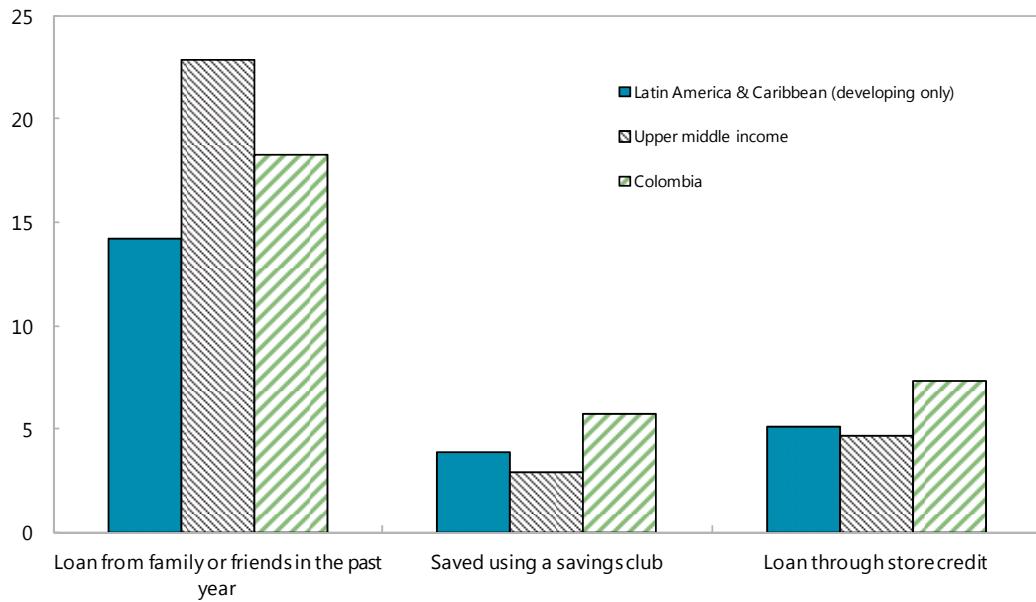
**Figure 3. Colombia: Financial Inclusion Indices, 2011**  
 (percent of population aged 15 and above)

### Formal Finance



### Informal Finance

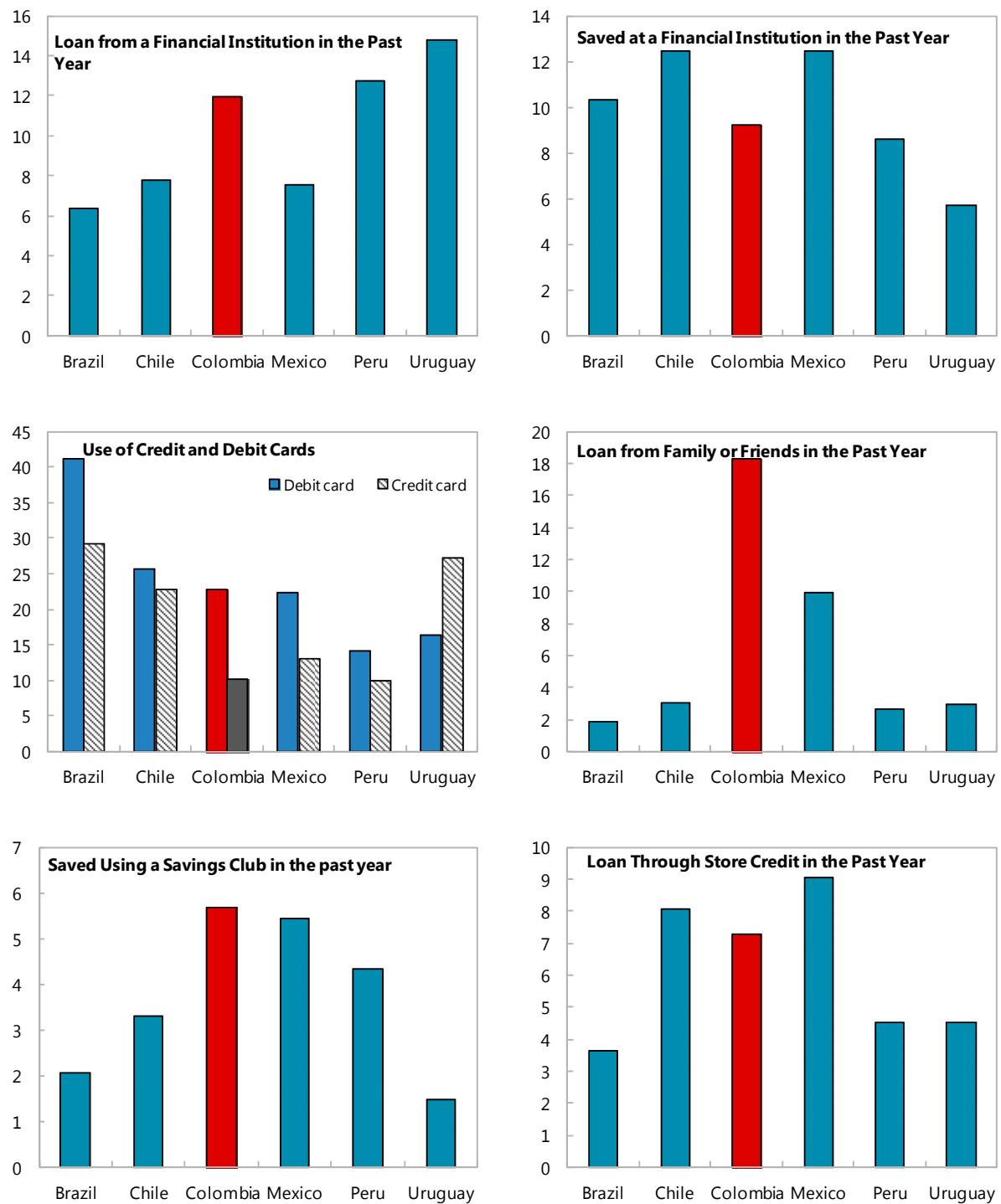
(Past year)



Source: Findex Database, World Bank.

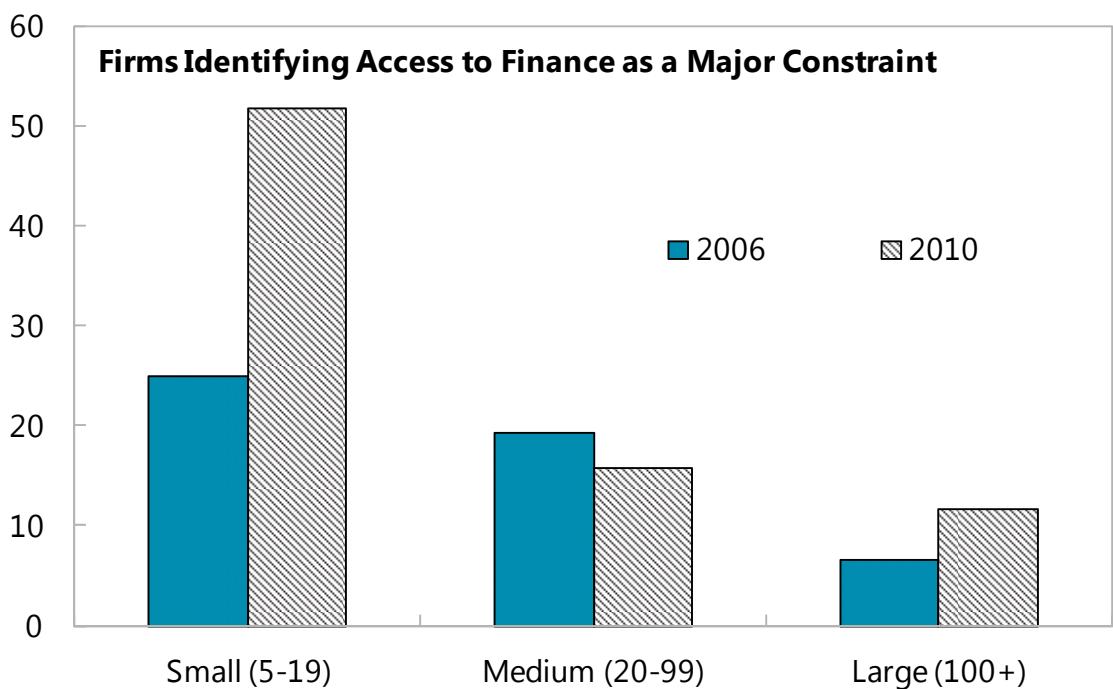
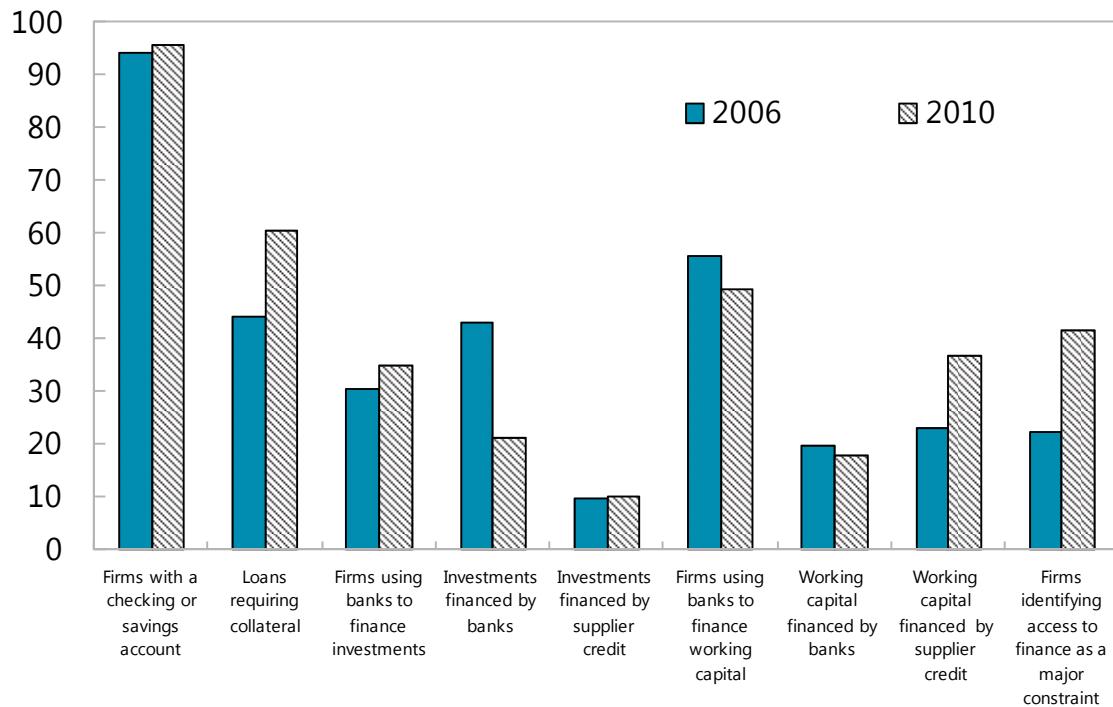
**Figure 4. Colombia: Formal and Informal Finance, 2011**

(percent)

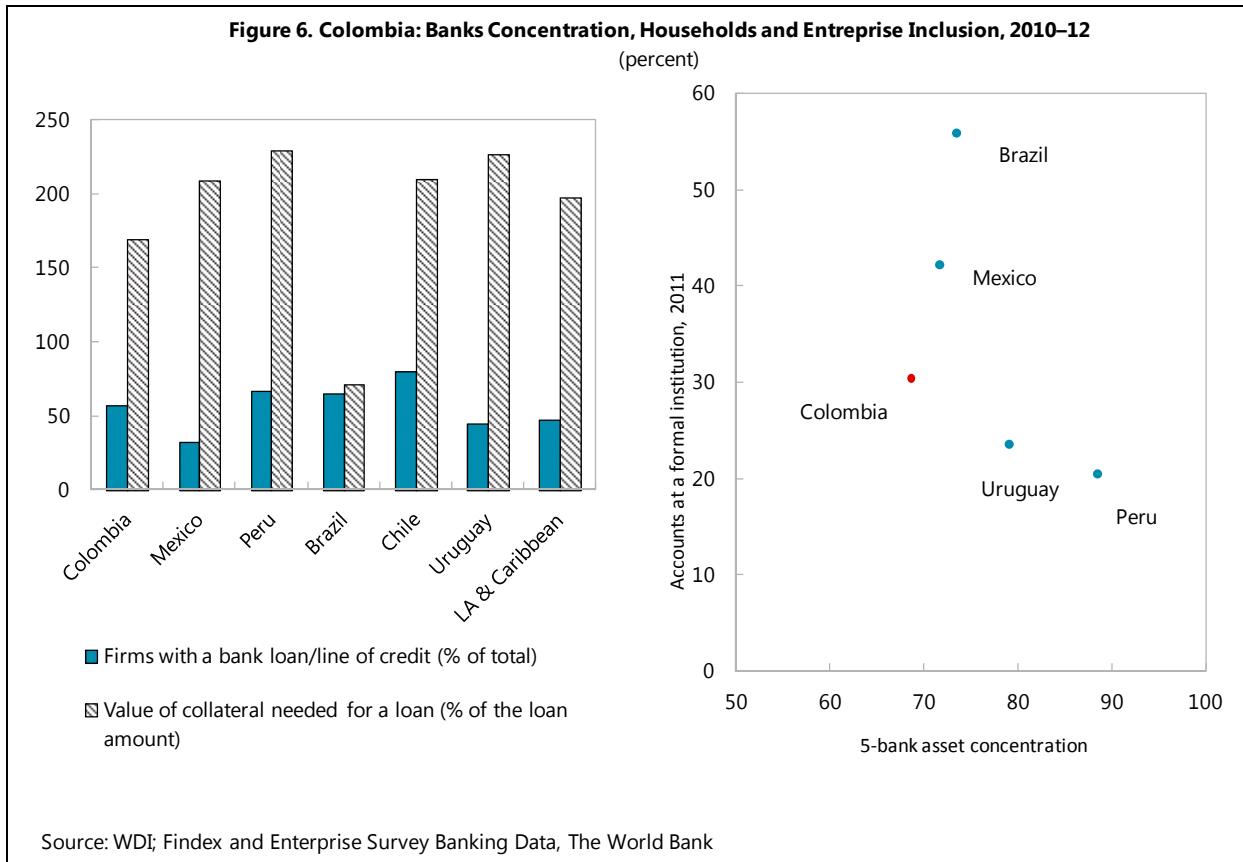


Source: Findex database; The World Bank.

**Figure 5. Colombia: Enterprise Survey Indicators, 2006–10**  
(percent)



Source: Enterprise Survey, The World Bank.



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