INTERNATIONAL MONETARY FUND

COLOMBIA

SELECTED ISSUES PAPER

June 2014

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SELECTED ISSUES

May 5, 2014

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COLOMBIA: ASSESSING SPILLOVER RISKS[1]

External shocks could spill over to the Colombian economy through the country's important and growing trade and financial linkages with the rest of the world. Colombia would be most exposed to a decline in oil prices, which could have a sizable adverse impact on the balance of payments, the fiscal accounts and growth. Growth shocks in key trading partners could also have a negative impact, particularly in the United States, which is Colombia's main trading partner. The projected rise in U.S. Treasury yields is estimated to increase Colombian government debt yields by about the same amount. Stress in the global financial system is estimated to have moderate direct effects on Colombia, while shocks in the Central American banking systems could have a significant impact on Colombian banks. The main channel of transmission of outward spillovers from Colombia to the region would be through the financial system given the significant market position of Colombian banks in Central America. Potential real outward spillovers through trade to the region are estimated to be small.

A.   Key Linkages

1.   **Colombia has important and growing trade and financial linkages with the rest of the world.**

- **Trade.** Colombia's total trade of goods (exports and imports) with the rest of the world rose from 25 percent of GDP in 2000 to an estimate of 31 percent of GDP in 2013. In recent years, the authorities have pursued an active policy to bolster trade. Colombia has signed or is negotiating free trade agreements with a number of countries, including the United States (implemented in 2012), Canada, Chile, Mexico, Switzerland, the European Union, South Korea, Turkey, Japan, China, Costa Rica, Panama, and Israel. In addition, Colombia is looking to increase trade with its Latin American neighbors through the "Pacific Alliance," an economic integration effort launched in 2011 comprising Chile, Colombia, Mexico and Peru. [2]

Merchandise Trade
(In percent of GDP)

Sources: WEO.
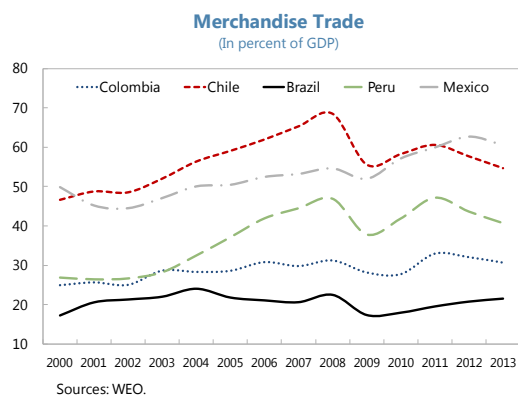
- **Exports.** About 70 percent of Colombia's total exports are commodities, including petroleum products (accounting for over 50 percent of total exports), coal, gold, emeralds, coffee, nickel, flowers, and bananas. Colombia is the third largest Latin American exporter of oil (after
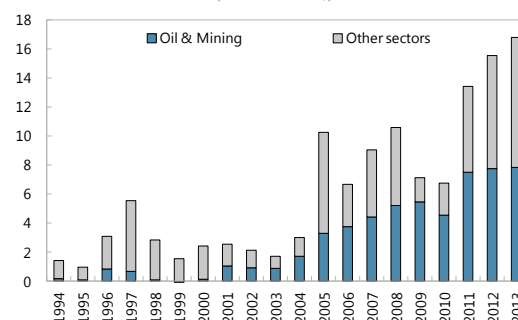
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[1] Prepared by Pablo Morra, Mauricio Ruiz, Carlos Goes, and Eugenio Cerutti.

[2] Costa Rica is also expected to join the Pacific Alliance.

 Venezuela and Mexico), and the largest exporter of coal to the United States. The main destinations of exports are the United States (receiving about 40 percent of total exports), the European Union (15 percent), China (5 percent), and some Latin American countries, including Venezuela, Ecuador, Chile, Brazil, Peru, Mexico, and Central America. Venezuela used to be Colombia's second largest trading partner, but bilateral trade ties have significantly diminished since 2009 due to political disputes. It remains, however, an important trading partner for manufacturing products.

- **Imports.** Colombia's main import products are industrial equipment, transportation equipment, consumer goods, chemicals, paper products, and electricity. The main sources of Colombia's imports are the United States (30 percent of total imports), China (11 percent), Mexico (10 percent), and Brazil (5 percent).

- **Remittances.** Colombia receives a significant amount of workers' remittances. Net remittances amounted to an estimated 1.2 percent of GDP in 2013. The relative importance of remittances as a share of GDP has declined, however, in recent years, from a peak of 3.5 percent of GDP in 2003.

- **Foreign direct investment (FDI).** Inward FDI grew rapidly in recent years, notably in the oil and mining sectors, reaching a record high of nearly US$17 billion in 2013 (4.4 percent of GDP). As of end-2013, the stock of foreign direct amounted to US$128 billion (33 percent of GDP). The United States, the United Kingdom, and Spain constitute the main sources of the investment (accounting for a combined 45 percent of the total stock). Colombia's outward direct investment also rose significantly in recent years, most notably due to the purchase of banks in Central America by the largest Colombian banks.

Inward Foreign Direct Investment, by sector
(In billions of US$)

Source: Banco de la República.

- **External credit lines.** According to data from the Bank of International Settlements (BIS), international banks have significant claims on Colombian borrowers. As of September 2013, these claims reached US$47 billion (12 percent of GDP), originating mostly from European banks (US$23 billion or 49 percent of the total)—of which US$18 billion were from Spanish banks (equivalent to 79 percent of all the European banks' claims)—, U.S. banks (US$11 billion or 23 percent of the total), and Japanese banks (US$2.7 billion or about 6 percent of the total). Of these claims, the bulk, 61 percent of the total (US$28.8 billion),

Claims of BIS reporting banks on Colombia as of September 2013

	USD bn	Share of total (percent)
Cross-border and local claims in all currencies		
Total	**47.1**	
Of which: Cross-border claims	15.4	32.7
Banks	8.5	18.0
Public sector	9.8	20.8
Non-bank private sector	28.8	61.2
By nationality of reporting banks		
European banks	23.0	48.8
Of which: Spain	18.1	38.4
UK	2.0	4.3
Germany	1.3	2.7
United States	11.1	23.5
Japan	2.7	5.7
Chile	2.1	4.4
Others	8.3	17.6
Other exposures	**24.6**	
Derivatives	1.2	
Guarantees	18.8	
Credit commitments	4.6	

Source: BIS

was on the non-bank private sector, while 18 percent (US$8.5 billion) were on banks. In addition to these claims, BIS reporting banks registered other exposures to Colombia, including derivatives, guarantees, and credit commitments, for about US$25 billion (6 percent of GDP).

- **Bond issuance.** The Colombian government and state-owned oil company, Ecopetrol, have fluid access to international capital markets, and have issued a significant amount of external debt at favorable terms in recent years. Colombia is rated BBB (two notches into investment grade level) by all three international credit rating agencies. In 2013, the government placed external bonds for US$2.6 billion and Ecopetrol issued US$2.5 billion. In 2014, the government placed US$2 billion 30-year external bonds at a yield of 5.65 percent, 190 basis points over U.S. Treasuries. As of end-2013, the stock of external Colombian government bonds outstanding was US$20.6 billion, and Ecopetrol's amounted to US$4 billion. By contrast, external bond issuance by private sector companies has been relatively small, concentrated in a few large corporates.

- **Portfolio flows**. Portfolio inflows to Colombia are relatively low as a share of total external inflows and vis-à-vis FDI flows, and are mostly directed to government bonds. These flows, however, have risen rapidly in recent years driven by increasing inflows by non-residents. In 2013, net portfolio inflows (excluding pension funds) are estimated to have totaled US$3.2 billion (0.8 percent of GDP).

Portfolio flows to Colombia (excluding pension funds)
(In billions of USD)
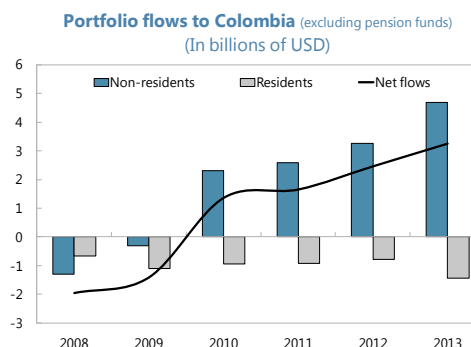
Source: Banco de la República.

- **International investment position.** Colombia's net international investment position (NIIP) improved over the past decade. At end-2013, the Colombia's net IIP position stood at -27 percent of GDP (-US$104.2 billion), improving from -31 percent of GDP in 2003. Gross foreign assets stood at 33 percent of GDP, while external liabilities amounted to 60 percent of GDP, of which about 55 percent were FDI liabilities (up from a share of 35 percent in 2003).

B. Inward Spillovers

2.   As a result of its important linkages with the rest of the world, the Colombian economy is significantly exposed to external shocks. Colombia is particularly exposed to a sharp decline in commodity prices, especially oil, negative growth shocks in key trading partners, and a deterioration in global financial conditions. The prospect of rising interest rates in the United States, as the Federal Reserve normalizes monetary policy, could also negatively impact Colombia if it were to lead to global financial volatility and lower growth in emerging markets.

- **A sharp decline in oil prices** would cut export receipts (which account for over one half of total exports), reduce fiscal revenue (oil-related revenues amount to about 4½ percent of GDP or 16 percent of total government revenue), and negatively impact economic activity. It could also significantly reduce FDI inflows (considering that a significant share of them goes to the oil sector), with a further negative effect on the balance of payments. A drop of US$10 in the price

of oil would reduce exports by about US$3.3 billion (0.9 percent of GDP) and fiscal revenue by about 0.4 percent of GDP.

- **A negative growth shock** in key trading partners would reduce the demand for Colombian exports, weakening economic growth. Colombia could be particularly affected by a growth shock in the United States, the European Union, China, and a set of Central and South American countries, which account for the bulk of Colombia's foreign trade. Despite trade linkages with neighboring Venezuela have diminished in recent years, spillovers from any potential political or economic stress in the latter country could still be significant (particularly in border areas), given that Venezuela remains an important partner for manufacturing trade.

- **Deterioration in global financial conditions** (stemming from any event that could increase global risk aversion, such as geopolitical tensions or a revision in market expectations about macroeconomic fundamentals in the US, Europe, Japan, China, or the emerging markets) could reduce bank credit lines to Colombian borrowers and portfolio flows, negatively affecting the external accounts and economic activity. This shock could also operate through the channels described above by weakening global economic growth and/or triggering a decline in oil prices.

- **The expected rise in US interest rates** projected for the coming years is poised to negatively affect Colombia by increasing external borrowing costs (for both the government and the private sector) and reducing capital inflows. This could negatively affect the fiscal balance and corporate balance sheets, weakening investment spending and growth. This impact, however, could be mitigated (or even offset) by stronger growth in the United States (as is to be expected as monetary policy normalizes) and subsequent greater demand for Colombian exports (considering that the U.S. is the main destination of Colombian exports). In the event that the rise in U.S. interest rates were not accompanied by a corresponding increase in U.S. growth or led to large capital outflows from emerging markets, weaker global economic growth and/or a decline in oil prices, Colombia could see a net negative impact through the channels described above. In turn, financial volatility in emerging markets could also trigger dislocations in the domestic capital market and a sharp decline in the value of domestic financial assets, with negative implications for the real economy.

3.   **Staff has developed simulation exercises to estimate the potential impact of some of the shocks that could adversely affect the Colombian economy.** These exercises are meant to be illustrative, and do not cover the full effect of the potential shocks. Staff has estimated the impact on Colombia's real GDP growth of a decline in oil prices and a slowdown in the pace of growth of key trading partners. It has also studied the effect that the increase in 10-year U.S. Treasury yields could have on Colombian government bond yields; simulated the potential impact from stress in the international banking system; and quantified the exposure of the Colombian banking system to shocks in the Central American banking systems.

Impact from a decline in oil prices

4.   Colombia depends heavily on oil exports, making it vulnerable to a drop in oil prices.
As a result, a decline in oil prices would likely lead to lower growth of investment and consumption.
The correlation between oil prices and investment and private consumption growth in the
2000–2013 period was 0.93 and 0.45, respectively. Empirical analyses suggest that oil prices
Granger-cause and have statistically significant effects on the growth of investment and private
consumption with a three-quarter lag.

Oil prices and investment

Sources: Fund staff estimates.

Oil prices and private consumption

Sources: Fund staff estimates.
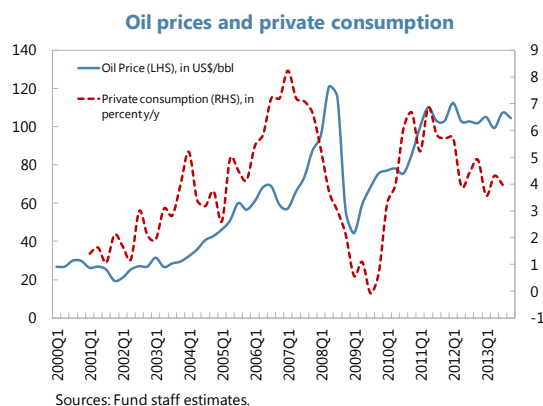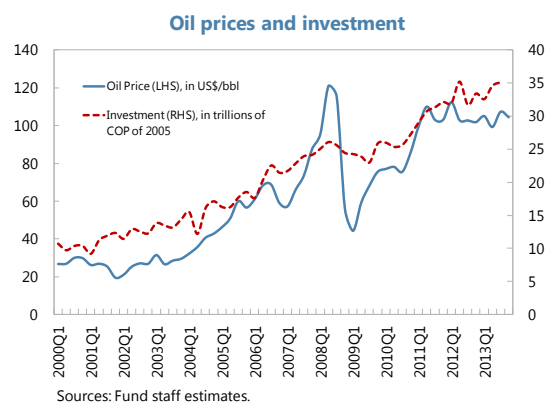
**5.   A decline of US$10 in oil prices could reduce Colombia's real GDP growth by about
1 percentage point cumulatively over one year after the shock.** A VAR model, including the
international price of oil, Colombia's exchange rate vis-à-vis the U.S dollar, oil export volumes and
Colombia's real GDP growth was used to assess the extent to which a decline in oil prices could
affect Colombia's growth. Cholesky decomposition was used as shock identification strategy, with
the ordering of the variables as listed above. The impulse response functions to the oil price shock
suggest a slight depreciation of the peso, and a reduction in real GDP growth. The cumulative
impact of the shock on real GDP growth amounted to ½ of a percentage point of GDP after six
months after the shock.

Impact from a slowdown in growth in key trading partners

**6.   A multi-country vector autoregressive (VAR) model was used to assess the impact on
Colombia's GDP growth of a slowdown in growth in key trading partners.** The exercise followed
the approach described in Poirson and Weber (2011). The model was estimated with quarterly real
GDP data for the sample period 2000Q1 to 2019Q4 (using IMF staff projections for 2014–2019) for
Colombia, the United States, China, the Euro Area, Venezuela, Argentina, Brazil, Chile, Costa Rica,
Ecuador, Mexico, Panama, and Peru, accounting for about 75 percent of Colombia's total exports.
Identification was obtained using the Cholesky ordering of the countries in the sample. For the
ordering we distinguished two set of countries: countries with large economies (the U.S., the Euro
Area, and China) that can be leading countries (i.e., not contemporaneously affected by the other
countries), and countries with smaller economies (Venezuela, Argentina, Brazil, Chile, Costa Rica,
Ecuador, Mexico, Panama, and Peru), which were ordered after the former. The orderings were

arranged so that the three countries in the first group would be ordered either first, second or third, and the countries in the second group would always come after them. This procedure resulted in 24 different orderings.

7.   Five separate shock scenarios were analyzed. Each scenario assumed a reduction of 1 percentage point in the projected rate of growth for 2014 of the United States, the Euro Area, China, Venezuela, and the other key Latin American trading partners (ex-Venezuela) relative to baseline projections. The exercise showed the following results:

Effects on a 1-percentage point slowdown in 2014 GDP growth of selected countries on Colombia's real GDP growth 1/

	2014	2015
United States	-0.1	0
Euro area	-0.2	-0.2
China	-0.1	-0.3
Venezuela	0	0
Selected Latin American countries 2/	-0.2	-0.5

Source: IMF staff estimates.
1/ Results of multi-country VAR model.
2/ Comprises Argentina, Brazil, Chile, Costa Rica, Ecuador, Mexico, Panama, and Peru

- United States growth shock. An adverse shock to U.S. growth would cut Colombia's GDP growth by about 0.1 percentage points in 2014, with the adverse impact diminishing to almost zero in 2015. The low sensitivity stemming from the exercise despite the U.S. being Colombia's largest trading partner possibly owes to the fact that a significant share of Colombia's trade with the U.S. is commodities (e.g., coal), which is possibly relatively more inelastic to adverse growth shocks.

- Growth shock in the Euro Area. A growth shock in the Euro Area would reduce Colombia's GDP growth by about 0.2 percentage points both in 2014 and 2015.

- China growth shock. The growth shock in China would have a similar intensity as the shock in Europe, of -0.1 percentage points in 2014 and -0.3 percentage points in 2015. The shock would propagate to Colombia directly as well as through its impact on the U.S., Euro Area, and Latin America.

- Venezuela growth shock. The exercise suggests that a slowdown in Venezuela would have no significant impact on Colombia. The results seems counter-intuitive given the still-significant (though greatly diminished) manufacturing trade between the two countries. The low sensitivity stemming from the exercise is probably due to the significant variability in growth in Venezuela in recent years relative to Colombia's more stable growth pattern.

- Combined growth shock in key Latin American trade partners (ex-Venezuela). A combined adverse growth shock in Colombia's main Latin American trade partners (ex-Venezuela) would have a substantial impact on Colombia's growth, of -0.2 percentage points in 2014 and -0.5 percentage points in 2015 respectively. The results highlight the important (and growing) trade links between Colombia and its Latin American neighbors, particularly in manufacturing, the close association of their economic cycles, and the fact that most are subject to similar shocks.

Impact from the normalization of monetary policy in the United States

8.   **The expected normalization of monetary policy in the United States will affect the Colombian economy through different channels.** Economic growth is projected to strengthen and unemployment to decline in the U.S. in the coming years. The strengthening of the U.S. economy should benefit the Colombian economy by increasing the demand for Colombian exports. However, as the economic picture in the U.S. improves, the Federal Reserve is expected to normalize the monetary policy stance, initially by tapering asset purchases (as it has already begun doing), eventually by ending them, and ultimately by increasing short term interest rates. This will push up interest rates in Colombia, increasing borrowing costs and curtailing investment and growth. The net impact on Colombia from stronger growth and higher interest rates in the U.S. is thus uncertain. To assess the effect of an increase in U.S. interest rates on Colombia, staff estimated a model of the yield on 10-year peso-denominated government bonds.

9.   **Staff estimates suggest that changes in U.S. Treasury yields have a significant short-term impact on local Colombian bond yields.** A vector error correction model (VECM) was estimated to examine the relationship between yields on 10-year Colombian peso-denominated government bonds, and the short-term interest rate, the yield on 10-year U.S. Treasury bills, a measure of global risk aversion, exchange rate risk, and idiosyncratic sovereign credit risk. Using data from mid-2010 to late 2013, the model showed that a 100 basis points-increase in 10-year U.S. Treasury yields translates into an increase of 91 to 123 basis points in 10-year Colombian government bond yields after 6 months. Hence, the analysis suggests that Colombian interest rates could rise sharply in the event there were new bouts of market volatility caused by a shift in expectations or surprises about U.S. monetary policy. The same analysis for other countries in the region shows that the response of domestic government bond yields to an increase in U.S. Treasury yields would be larger in Brazil and Peru, similar to the one estimated for Colombia in Mexico, and lower in Chile.

Response of Colombian 10-year government bond yields to a 100-basis point increase in 10-year U.S. Treasury yields
(Cumulative responses after 6 months, in basis points)

Source: IMF staff estimates.

Response of 10-year government bond yields to a 100-basis point increase in 10-year U.S. Treasury yields
(Cumulative responses after 6 months, in basis points)

Source: IMF staff estimates.

10. **The model suggests that 10-year government bonds yields are broadly in line with fundamentals.** After a significant rally in 2012, Colombian government bond yields had fallen about 60 basis points below the level implied by fundamentals (i.e., the predicted value from the VECM) by March 2013. Since then, bond yields started rising. After May 22, bond yields rose sharply, initially overshooting, but eventually converging to the fundamental values estimated by the model. In early 2014, at about 7 percent, 10-year peso-denominated government bond

Colombian 10-year government bond yields
(Actual yields and model estimates, in percent per annum)

Source: IMF staff estimates.

yields were broadly in line with fundamentals as predicted by the model. The analysis does not cover the most recent decline in government bond yields following the announcement by JP Morgan (in late March) of the increase of Colombian bonds' weight in its emerging market bond indices.
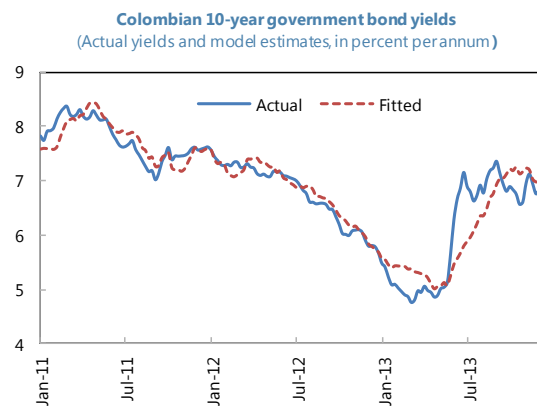
Spillovers from stress in international banks

11. **A spillover analysis was conducted to estimate the effects from stress in international banks that are involved in lending to Colombian borrowers.** The analysis covers cross-border lending to Colombian borrowers by international banks, as well as lending through their affiliates in Colombia. The exercise drew on the RES Bank Contagion Module, based on the banking statistics of the BIS. In the simulation, a first round considered losses on asset holdings of international banks that reduce (partially or fully) their capital, based on assumptions of a decline in value of different types of assets (e.g., claims on the public sector, banking sector, and non-bank private sector of an individual country or group of countries). In the second round, if losses are large, banks were assumed to restore their capital adequacy ratios through deleveraging (i.e., sale of assets and refusal to roll-over existing loans), thus reducing credit lines to all borrowers, including those in Colombia as well as those in other countries. In the third round, banks were assumed to reduce their lending to other banks, potentially triggering fire sales, further deleveraging, and additional losses at other banks. Final convergence is achieved when no further deleveraging occurs.

12. **The model suggests that foreign credit availability to Colombian borrowers could be significantly affected by losses in claims of international banks on selected economies.** Based on the assumed decline in value (10 percent in the exercise) of private and public sector assets of a certain country or group of countries, the model estimates the losses of foreign banks and their implications for credit to Colombian borrowers. The largest direct impact of this shock in terms of reduction in international banks' credit to Colombian borrowers would stem from combined losses in European assets (6.6 percent of GDP). Considering individual countries, the shocks that would pose the largest adverse affects in credit to Colombian borrowers would be losses in Spanish assets (5.3 percent of GDP), Canadian assets (2.6 percent of GDP), U.K. assets (1.2 percent of GDP), Japanese (0.8 percent of GDP) and U.S. and German assets (0.4 percent of GDP).

Spillovers to Colombia from International Banks' Exposures as of September 2013

Country	Shock originating from:	Impact on Credit Availability
	Magnitude 1/	(percent of GDP) 2/
USA	10	-0.4
Canada	10	-2.6
UK	10	-1.2
Germany	10	-0.4
France	10	-0.3
Spain	10	-5.3
Italy	10	0.0
Greece	10	0.0
Portugal	10	0.0
Selected European Countries 3/	10	-6.6
Japan	10	-0.8

Source: RES Bank Contagion Module based on BIS, ECB, and IFS data.
1/ Magnitude denotes the percent of on-balance sheet claims (all borrowing sectors) that lose value.
2/ Reduction in foreign banks credit to Colombia due to the impact of the analyzed shock in their balance sheets, assuming a uniform deleveraging across domestic and external claims.
3/ Greece, Ireland, Portugal, Italy, Spain, France, Germany, Netherlands, and the UK.

13.   The indirect effects on the Colombian economy associated with the analyzed shocks, however, could be much larger. The model estimates do not consider the negative effects of deleveraging on market confidence, balance sheets of corporates, and output growth, which could have a sizable adverse impact on the economy. The impact stemming from these factors could be potentially more damaging for the Colombian economy than the estimated direct spillovers estimated in the exercise.

Spillovers from losses in Colombian banks' investments abroad

14.   In recent years, Colombia's three largest financial institutions expanded aggressively abroad. The aim of their expansion plans was to diversify and complement their home operations. With this purpose, they acquired financial institutions, primarily in Central America, where they attained a significant market position. As of end-2013, the assets of Colombian banks' subsidiaries abroad reached US$54 billion, accounting for 26.8 percent of the total assets of the Colombian banking system.

15.   The international expansion of the Colombian banks has left them significantly exposed to shocks in the Central American region. As of end-2013, the assets of Colombian banks' subsidiaries in Central America amounted to US$44.4 billion,

Assets of Colombian banks' subsidiaries abroad (2013)

	In USD bn	As a share of total investments abroad	As a share of Colombia's banking system's assets
Panama	24.5	45.3	12.1
El Salvador	7.6	14.0	3.8
Costa Rica	5.4	9.9	2.7
Honduras	3.6	6.6	1.8
British Virgin Islands	3.0	5.6	1.5
Guatemala	2.2	4.0	1.1
Chile	1.8	3.4	0.9
Peru	1.7	3.2	0.9
Cayman Islands	1.3	2.4	0.6
Nicaragua	1.2	2.2	0.6
Mexico	1.1	2.1	0.6
Puerto Rico	0.3	0.6	0.2
Barbados	0.2	0.3	0.1
Dom Rep	0.1	0.1	0.0
Bahamas	0.1	0.1	0.0
Uruguay	0.03	0.05	0.0
USA	0.02	0.03	0.0
TOTAL	**54.0**	**100.0**	**26.8**
Central America	**44.4**	**82.1**	**22.0**

Source: Fund staff estimates based on Financial Superintendence of Colombia.

equivalent to 82 percent of the total assets of Colombian banks' subsidiaries abroad. These accounted for about 22 percent of the total assets of the Colombian banking system, and about a third of the total assets of the three Colombian banks with investments in Central America. Hence, a shock to the Central American banking systems could have a significant impact on the Colombian banking system. Ranked by the amount of the assets of their subsidiaries in the region, Colombian banks are most exposed to shocks in Panama (concentrating 55 percent of Colombian banks' assets in the region), El Salvador (17 percent), Costa Rica (12 percent), and Honduras (8 percent). Individual country exposures, however, may not give a completely accurate picture, as some of the subsidiaries of the Colombian banks are domiciled in one country but operate across the Central American region, particularly in the case of the Panamanian banks. Hence, the above figures may underestimate exposure to individual countries. Exposure to shocks in Central America is mitigated by the strength of the balance sheets and soundness indicators of the subsidiaries in the region, which for the most part boast adequate capitalization and robust profitability.

**Assets and market share of Colombian banks' subsidiaries abroad as of December 2013**

	Colombia	Panama	Costa Rica	Guatemala	Honduras	El Salvador	Nicaragua	Central America
Assets, in billions of USD								
Total System	**201.7**	**97.7**	**41.6**	**28.1**	**17.0**	**14.2**	**5.3**	**203.9**
Bancolombia	46.7	15.4				4.0		19.4
Banco de Bogota	29.8	8.0	3.8	2.2	2.4	1.5	1.2	19.0
Davivienda	24.3	1.2	1.6		1.2	2.1		6.0
Colombian banks		**24.5**	**5.4**	**2.2**	**3.6**	**7.6**	**1.2**	**44.4**
Assets as a share of parent bank's assets								
Bancolombia		32.9				8.6		41.5
Banco de Bogota		26.8	12.8	7.2	8.0	5.2	3.9	63.9
Davivienda		4.7	6.4		5.0	8.4		24.6
Colombian banks		**24.3**	**5.3**	**2.1**	**3.6**	**7.5**	**1.2**	**44.0**
Market share (by assets), in percent								
Bancolombia	23.2	15.7				28.1		9.5
Banco de Bogota	14.8	8.2	9.1	7.7	13.9	10.8	22.4	9.3
Davivienda	12.1	1.2	3.8		7.1	14.4		2.9
Colombian banks		**25.1**	**12.9**	**7.7**	**21.1**	**53.2**	**22.4**	**21.8**

Source: Fund staff estimates based on Financial Superintendence of Colombia.

C. Outward Spillovers

16.   The main channel of transmission of shocks from Colombia to other countries would be through the financial sector (e.g., via cross-border bank lending and foreign direct investment links). This channel could be significant for some Central American countries, where Colombian banks have expanded significantly in recent years, in the event these came under financial stress. The countries most exposed to shocks in Colombian banks are El Salvador, Panama, Nicaragua, and

Market share of Colombian banks' subsidiaries in Central America (by assets)

Source: Fund staff estimates based on Financial Superintendence.

Honduras, where Colombian banks have attained a significant market position. These risks, however, are mitigated by the strength of the capital positions and other soundness indicators of the Colombian banks.
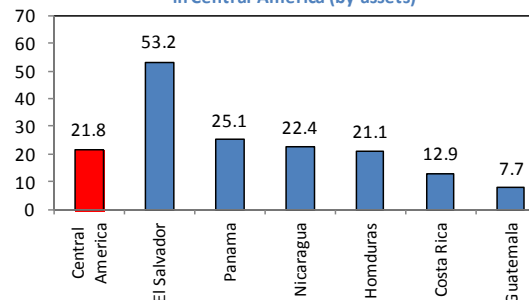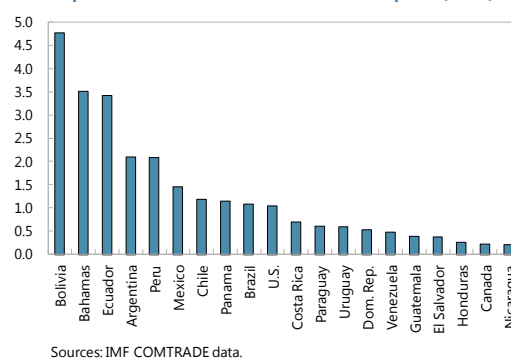
COLOMBIA

17.   Another possible channel of transmission of shocks would be through trade. A slowdown in growth in Colombia could affect other countries by reducing their exports to Colombia. Trade data suggests that, in such an event, the most affected countries could be Bolivia, Bahamas and Ecuador, for which Colombian demand accounts for 4.8, 3.5 and 3.4 percent of their total exports, respectively. For the rest of trading partners in the region, the share of exports to Colombia in their total exports does not exceed 2 percent, suggesting that the potential for real spillovers is small.

Exports to Colombia as a share of total exports (2013)

Sources: IMF COMTRADE data.

18.   There could be potential for pure market contagion through investor perception of regional risk, e.g., in response to adverse economic or political developments in Colombia, but the magnitude that such a shock could have is difficult to gauge.

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COLOMBIA'S FISCAL RULE AND ADJUSTMENT IN THE CONTEXT OF RESOURCE WEALTH[1]

A.   Introduction

1.   Colombia has introduced a fiscal rule in recent years. In June 2011, Congress approved a budget balance fiscal rule for Colombia's central government. This rule (that started being implemented in 2012) calls for a decreasing central government's structural deficit (correcting for oil revenues and the output gap) to be below 2.3 percent of GDP in 2014, 1.9 percent in 2018, and 1.0 percent starting in 2022. The 2013 medium term fiscal framework (MTFF) projects an additional decline in the deficit to 0.8 percent in 2023 and 2024.

2.   Public savings implied by the fiscal rule need to be evaluated in the context of revenue from natural resources and development needs. Like other resource-rich countries, Colombia faces challenges of managing this revenue to optimally smooth consumption and investment decisions over time, avoid boom-bust cycles, and transform the resource wealth into other assets, including infrastructure, to support Colombia's development needs.

3.   This paper analyses Colombia's fiscal rule and implied fiscal consolidation over the medium-term in the context of its resource wealth. It provides an overview of recent fiscal changes, evaluates the intertemporal savings behavior of the medium-term fiscal rule against simple benchmarks for resource-rich countries, illustrates the fiscal effort to achieve the medium-term targets under the fiscal rule, and presents debt trajectories under alternative scenarios.

B.   The Fiscal Regime and Recent Changes

4.   Key elements of Colombia's fiscal framework have been in place for more than a decade.

- **Constraints on sub-national fiscal balances were introduced during the late 1990s.** Law 358 (1997; "Ley de semáforos"; traffic lights law) gives the Ministry of Finance and Public Credit authority to limit the level of indebtedness of sub-national governments. Law 617 (2000; "Ley de responsabilidad fiscal territorial"; fiscal responsibility law for territories) established expenditure limits for both non financial public sector (NFPS) and sub-national governments. For any local government, current expenditures cannot exceed a fraction of its freely disposable current revenues. A local government not adhering to this rule would have to agree to a fiscal adjustment plan, to be monitored by the Ministry of Finance.

- **A fiscal responsibility law (underpinning the formulation of a medium-term fiscal framework) was approved in 2003.** The Fiscal Transparency and Responsibility Law (Law 819)

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[1] Prepared by Leonardo Martinez and Martín Wachs.

requires the central government to present the MTFF to Congress each year. In particular, the central government has to report on fiscal performance over the previous year, and in the event of non-compliance with the targets set in the previous MTFF, it shall explain such deviation and present corrective measures. Sub-national governments are also required to present their MTFF to assemblies and councils.

5.   The government further strengthened the fiscal framework in 2011–12.

- **A fiscal sustainability principle was added as a constitutional criterion.**

- **The government adopted reforms to strengthen the management and distribution of oil and mining royalties.** As mandated by the new oil and mining royalty regime, in 2012 the government formulated a bi-annual royalty-funded capital budget and created investment committees to approve viable projects.

- **A structural balance rule was enacted at the central government level.** The rule prescribes lowering the structural deficit to 2.3 percent of GDP by 2014 and keeping it below 1 percent from 2022 onwards. The rule has a well-defined escape clause, which allows for fiscal expansion when the expected output growth rate is at least 2 percentage points lower than potential. Furthermore, in case of extraordinary events threatening the macroeconomic stability of the country, the limits in the fiscal rule may be temporarily suspended, subject to the favorable opinion of CONFIS (an internal fiscal council headed by the Finance Minister). In mid-2012, the government created two technical committees to provide inputs on the output gap and structural oil prices to the Consultative Committee charged with devising the methodology and other operational aspects of the rule.

- **The government outlined a debt management strategy.** The strategy tilts the composition of public debt toward domestic-currency debt based on objectives of minimizing risks and costs.

C.   Fiscal Use of Natural Resource Wealth

6.   Colombia has a significant amount of natural resource wealth. The majority of natural resource fiscal revenues come from oil. Oil-related revenue accounts for about 17 percent of fiscal revenue of the combined public sector (4.8 percent of GDP), and 18 percent of fiscal revenue for the central government (3.1 percent of GDP). There is great uncertainty about the level of oil reserves in Colombia with proven reserves of between 6 and 8 years over the last decade, and other definitions of reserves suggesting a much longer reserve horizon. The country also possesses the largest coal reserves in Latin America, is the world's biggest producer of emeralds, and has significant amounts of gold and nickel. Colombia also produces natural gas, copper, iron ore and bauxite.

7.   Resource-rich countries face several decisions on the use of resource revenue. First, the country needs to choose how much of the resource wealth to consume versus save each year. Second, a decision needs to be taken on how to invest revenues that are saved, including building up foreign assets through a sovereign wealth fund, drawing down public debt, and investing in

domestic projects that generate returns over time. The framework for managing resource wealth also needs to deal with volatility stemming from commodity price fluctuations.

8. **The IMF has developed a framework for analyzing intertemporal use of resource revenues.**[2] Resource-dependent economies are identified as those that have resource revenue above 20-25 percent of total revenues, and a reserve horizon of less than 30 to 35 years. Colombia's revenues from oil and minerals are somewhat below the definition of a resource-dependent country, but are still significant, and there is great uncertainty about the level of natural resource reserves in Colombia.

9. **Colombia's non-resource primary balance (NRPB) is estimated to be below benchmarks for resource-rich countries.** Common benchmarks for the NRPB are those that maintain net public wealth constant as a percent of non-resource GDP, in real per capita terms, or in real terms.[3] The central government's non-oil balance for 2013, estimated at -3 percent of GDP, was below the least restrictive of the NRPB benchmarks (i.e., keeping wealth constant in real terms), even under an assumption of 120 years of natural resource production.

Table: Non-Resource Primary Balance (NRPB) Necessary to Keep Net Public Wealth Constant

Years of production	30	60	90	120
	(Percent of GDP)			
2013 Net Public Wealth	34.6	58.7	67.3	70.3
2013 NRPB, constant wealth in real terms	-0.9	-1.5	-1.7	-1.8
2013 NRPB, constant wealth in real per capita terms	-0.6	-1.0	-1.1	-1.2
2013 NRPB, constant wealth share of NR GDP	0.9	1.5	1.7	1.8

Source: Fund staff calculations.

10. **These estimates rely on standard parameter values.** The real return on wealth is assumed to be 2.5 percent, the inflation rate is 3 percent, non-resource GDP growth is 5.1 percent, and population growth is 0.8 percent. The discount rate is computed using the real return of wealth and inflation. Unless noted otherwise, assumptions for 2013–2024 are those in Colombia's 2013 MTFF. Central government's revenues from oil and minerals as a percentage of GDP are assumed to decline linearly from the 2013 to the 2024 value reported in the MTFF. It is also assumed that after 2024, the nominal GDP growth rate is 7.5 percent, and the central government's resources from oil

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[2] See International Monetary Fund, 2012, "Fiscal Frameworks for Resource Rich Developing Countries," IMF Staff Discussion Note 12/04 (Washington: International Monetary Fund).

[3] See International Monetary Fund, 2012, "Macroeconomic Policy Frameworks for Resource-Rich Developing Countries—Analytical Frameworks and Applications," IMF Policy Paper (Washington: International Monetary Fund). The NRPB that keeps wealth constant in real terms is given by $W*\rho$, where W denotes net public wealth as a percentage of GDP and ρ denotes the real rate of return on wealth. The NRPB that keeps wealth constant in real per capita terms is given by $W*(\rho-p)$, where p denotes the rate of population growth. The NRPB that keeps wealth constant as a percentage of non-resource GDP is $W*(\rho-\gamma)$, where γ denotes the rate of non-resource GDP growth.

and minerals grow 2.0 percent during the assumed years of production (reflecting price growth) and are zero after that. Net public wealth is computed as the present value of the central government's revenue from oil and minerals minus its 2013 net debt.

11. Estimates are not very sensitive to the assumption on the rate of return on wealth. Lowering the assumed real rate would increase net public wealth but would lower the percentage of this wealth the government should expend to keep its wealth constant. Thus, the effect of changing the assumed real rate on the NRPB that keeps wealth constant is ambiguous and may be small. For instance, the NRPB that would keep wealth constant in real terms under 120 years of production is 1.6 percent of GDP under an assumed real rate of 1.5 percent (this value is similar to the 1.8 percent obtained under the baseline assumption).

12. The fiscal consolidation prescribed by Colombia's fiscal rule could stabilize net public wealth. The rule mandates the central government to reduce its structural deficit to 1 percent of GDP by 2022. The authorities' medium term fiscal framework (MTFF) projects an additional decline to 0.8 percent of GDP by 2024. Considering that oil and mineral-revenues and interest payments are projected to decline by 0.9 and 0.6 percentage points of GDP during the same period, the NRPB would improve by 1.9 percentage points of GDP by 2024.

Figure 1: Colombia Net Public Wealth

Source: Fund staff calculations.

Starting from an estimated central government net public wealth of 58.7 percent of GDP in 2013 (assuming 60 years of production), adherence to the fiscal plan in the MTFF would imply that real net public wealth bottoms out at 70 percent of its 2013 value in 2030, and starts increasing after that (assuming the 2024 primary balance is maintained).[4] Since Colombia's GDP growth is projected to be higher than the likely rate of return of financial wealth, net public wealth as a percentage of GDP decreases more abruptly, bottoming out in 2042 at 15.2 percent (Figure 1). However, because high projected GDP growth would make future generations richer than the current generation, it would not be necessary to increase current savings to establish intergenerational real income parity.
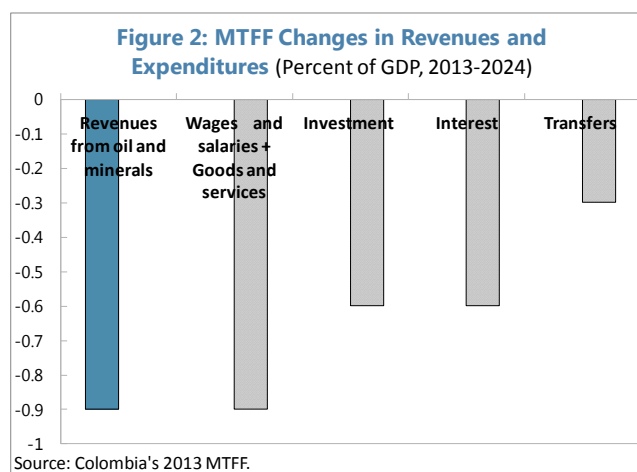
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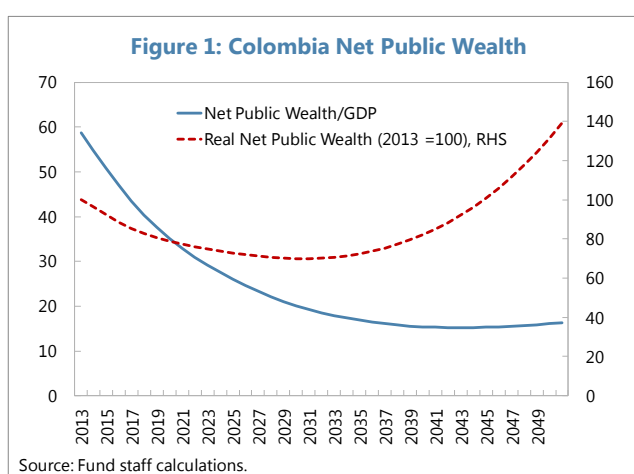
[4] If the government only achieves a 0.8 percent deficit after 2024, debt would stabilize at 10.5 percent of GDP.

D. Challenges to the Planned Consolidation

13.   There are significant challenges to the consolidation foreseen in Colombia's fiscal framework. The MTFF projects this consolidations will be achieved with an unprecedented decline in expenditure that in some cases may be undesirable. The projected expenditure decline must achieve the planned deficit reduction while compensating for the projected decline in revenues (Figure 2).

14.   Central government's revenues as a percentage of GDP are projected to decline from 16.8 percent in 2013 to 15.9 percent in 2024. Revenues as a percentage of GDP are projected to start declining in 2016, from a 2015 peak of 17.1 percent. This decline is accounted for by the decline of the importance of government's income coming from oil and minerals (from 3.0 percent of GDP in 2013 to 2.1 percent of GDP in 2024).

Figure 2: MTFF Changes in Revenues and Expenditures (Percent of GDP, 2013-2024)

Source: Colombia's 2013 MTFF.

15.   Expenditures are projected to decline as a percentage of GDP from 19.1 to 16.7. This decline is comprised of a fall in five expenditures categories:

- **Expenditures in wages and salaries are projected to decline from 2.2 percent in 2013 to 1.6 percent of GDP in 2024.** To achieve this adjustment, expenditures in wages and salaries are assumed to grow at the rate of inflation, which is projected to be lower than the GDP growth rate. However, such a decline as a share of GDP is unprecedented. Between 1994 and 2012, expenditures in wages and salaries remained between 1.9 and 2.3 percent of GDP (Figure 3).

- **Expenditures in goods and services are projected to decline from 0.8 to 0.5 percent of GDP.**[5] This decline also assumes that expenditures in goods and services grow at the rate of inflation, and is also unprecedented. Expenditures in goods and services as a percent of GDP have been roughly constant in the past (Figure 3), with a 1994–2012 average of 0.8 percent of GDP.

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[5] Estimated expenditures in goods and services were 1.0 percent of GDP in 2013, higher than the 0.8 percent projected in the 2013 MTFF.

Figure 3: Historical Central Government's Expenditures
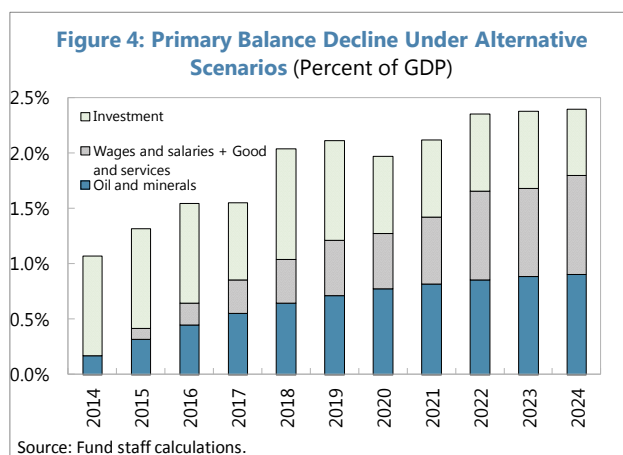(Percent of GDP)

Source: Ministry of Finance.
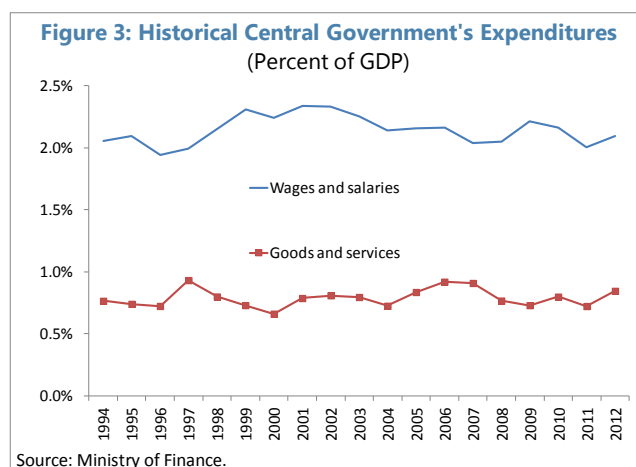
- **Investment is projected to decline from 2.9 to 2.3 percent of GDP.** This decline may be undesirable given Colombia's investment needs and projected new investment expenditures due to the 4G infrastructure program, with budgetary caps ("*vigencias futuras*") reaching 0.4 percent of GDP between 2020 and 2044.

- **Following existing legislation, transfers are projected to decline by 0.3 percent of GDP.** This does not consider the probable fiscal costs of reforms to the social security system needed to increase coverage.

- **Interest payments are projected to fall 0.6 percent of GDP.**

16.   In addition to achieving these expenditure reductions, there are other challenges to the fiscal consolidation proposed in the MTFF. For instance, the MTFF also projects that a decline of 1.3 percentage points of GDP in revenues due to the gradual elimination of taxes on financial transactions and wealth will be fully compensated by an increase in revenues from other taxes. Other fiscal risks include contingent liabilities from Public-Private Partnerships (PPPs), potential fiscal costs of a successful peace process, and fiscal pressures from the pensions and health care systems.[6] Of course, there are also mitigating factors for these risks. For instance, a successful peace process could have a positive impact on GDP growth and thus on debt dynamics, and a further increase in formality would be reflected in higher tax revenues. Risks to the MTFF projections are illustrated by the latest revision: the 2013 MTFF projects a 2023 debt to GDP ratio of 26.4 percent, higher than the 24.5 percent projected in the 2012 MTFF.

17.   Furthermore, Colombia's fiscal accounts do not reflect investment financed with PPPs in the debt stock. The MTFF projects the central government's net debt to decline from

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[6] Following Law 819 of 2003, the MTFF includes an assessment of non-explicit public debts associated with pension and severance liabilities and a valuation of contingent liabilities related with state guarantees in PPP projects, credit operation guarantees and lawsuits against the state.

33.6 percent of GDP in 2013 to 25.3 percent of GDP in 2024. However, adding investment financed with PPPs to the debt stock could offset this debt decline. The present value of planned investments to be financed through PPPs under the 4G infrastructure program is estimated to be 6.4 percent of GDP.[7] The present value of government's expenses for this program projected in the MTFF through 2044 is 15.6 percent of GDP. The government also guarantees toll revenues for the program.


Figure 4: Primary Balance Decline Under Alternative Scenarios (Percent of GDP)

Source: Fund staff calculations.

E. Debt Dynamics in Alternative Scenarios

18.   For illustrative purposes, alternative debt dynamics can be calculated under combinations of the following less favorable assumptions than those in the MTFF:

- **Central government's investment remains constant as a percent of GDP at the 2013 level (Figure 4).**

- **Expenditures in wages and salaries and goods and services remain constant as a percent of GDP at the 2013 level (Figure 4).**

- **The government's revenues from the oil and mining sector decline more than projected in the MTFF.** The MTFF assumes oil prices grow with the U.S. PPI for raw materials. Oil production is projected to increase by 19 percent between 2013 and 2018, and to decline by 12 percent between 2018 and 2024 (resulting in a 2014 production 5 percent higher than the one in 2013; Figure 5). For the alternative scenario, it is assumed that oil revenues decline to 1.2 percent in 2024 (instead of declining to 2.1 percent, as in the MTFF). This assumption is consistent with: (i) the growth of the government's oil and mining income between 2013 and 2024 following the growth of the value of the oil production, and (ii) a decline of 20 percent in oil prices through 2019 consistent with future prices, and oil prices growing at the rate assumed in the MTFF after 2019 (Figure 5). The yearly effect in the primary balance is computed assuming that revenues as

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[7] Colombia's Consejo Nacional de Política Económica y Social, document 3760.

a percent of GDP decline linearly from the 2013 value to the 2024 value, both in the MTFF and in the alternative scenario (Figure 4).

Figure 5: Oil Assumptions

Sources: Colombia's 2013 MTFF and Fund staff calculations.
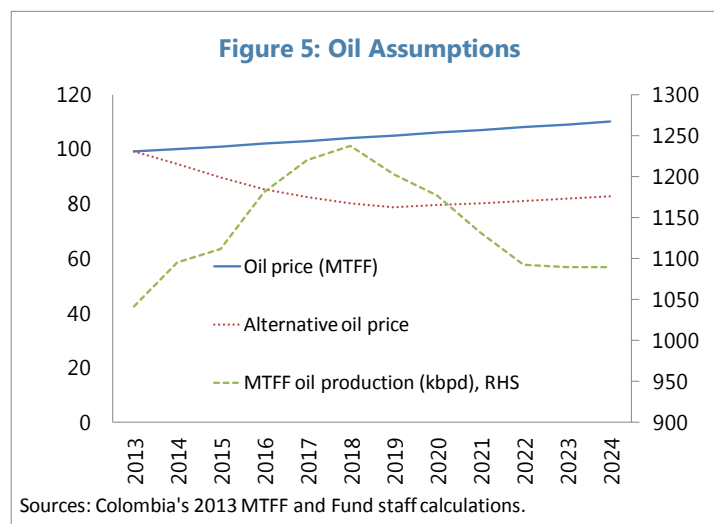
- **The GDP growth rate (4.0 percent) is lower than the real effective interest rate (5.0 percent).** The average growth rate in the MTFF is 4.6 percent. For expositional simplicity, it is assumed that the lower growth rate does not have a negative effect on the primary balance. Thus, this scenario presents a lower bound to the effect of a negative growth shock to the debt dynamics. This scenario is combined with the shocks to the primary balance presented above.[8]

19.   Debt dynamics are computed using the simplest possible equation. The debt-to-GDP ratio evolves according to

$$d_{t+1} \;=\; d_t \, \frac{1 + r_{t+1}}{1 + g_{t+1}} \; - \; pb_{t+1}$$

where d denotes the debt-to-GDP ratio, r the real effective interest rate paid for debt, g the real GDP growth rate, and pb the primary balance as a percentage of GDP. Using this simple equation, a baseline constant real effective interest rate of 4.3 percent is inferred from the debt reduction reported in the MTFF, using the reported assumptions for the growth rate and the primary balance (Figure 6).

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[8] Alternative scenarios assume the government does not respond to the proposed shock. Section D presents the fiscal effort required to compensate the shock in each alternative scenario.

Figure 6: Baseline assumptions and debt
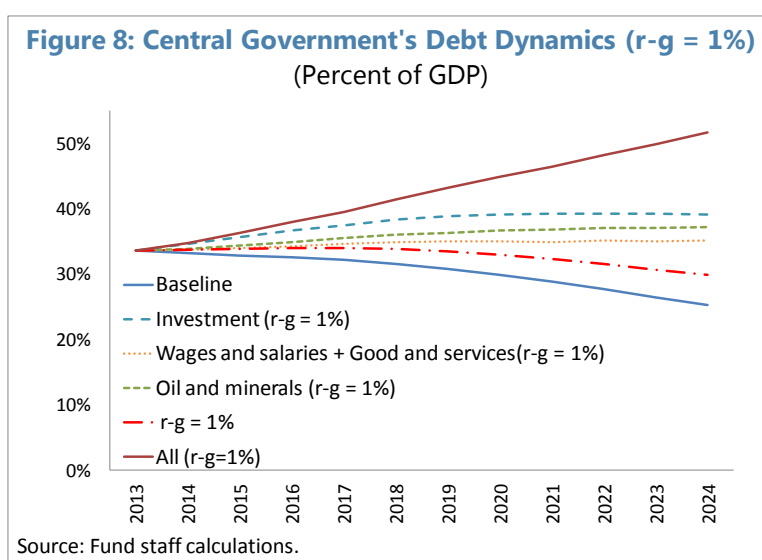

Source: Fund staff calculations.
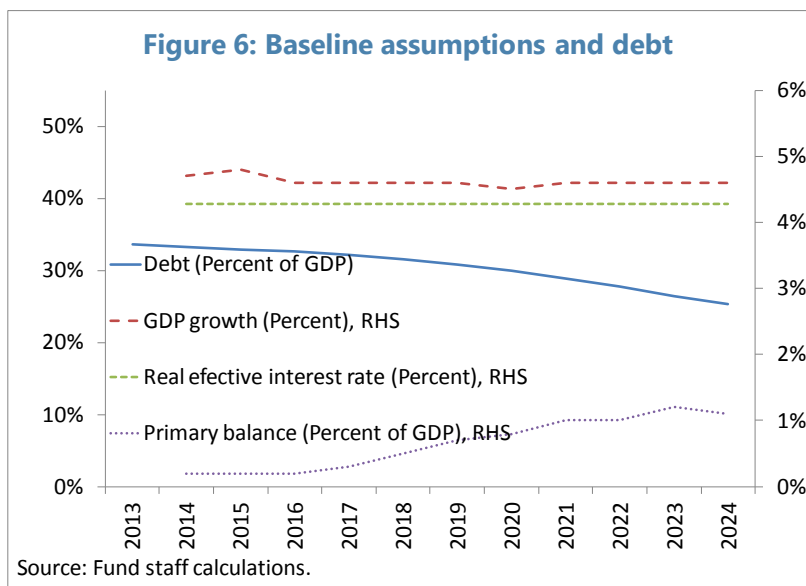
20.   With the baseline assumptions for the growth and interest rates, a failure to achieve any of the planned expenditure reductions or a larger decline in revenues from oil and minerals would eliminate most of the debt reduction projected in the MTFF (Figure 7). Failure to achieve the planned reduction of investments would have the larger effect on debt dynamics, with a projected 2024 debt ratio of 33.8 percent of GDP, higher than the estimated 2013 level (33.6 percent). This is so even though the increase of the primary balance from the failure to reduce investment would be lower than the one from other alternative scenarios, because the investment reduction is more front-loaded (Figure 4). The projected 2024 debt to GDP ratio is 30.3 percent without a reduction of wages and salaries and goods and services, and 32.2 percent with the larger reduction of revenues from oil and minerals. The combinations of the three negative assumptions for the primary balance would result in a continuously increasing debt to GDP ratio that would reach 45.8 percent in 2024.

Figure 7: Central Government's Debt Dynamics
(Percent of GDP)
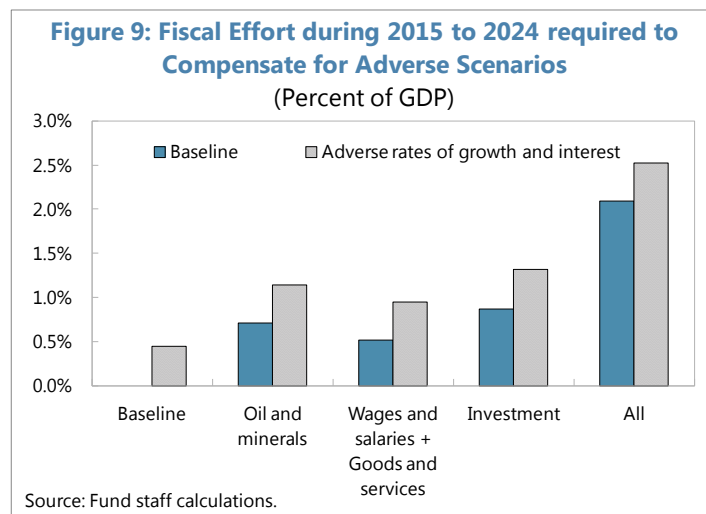

Source: Fund staff calculations.
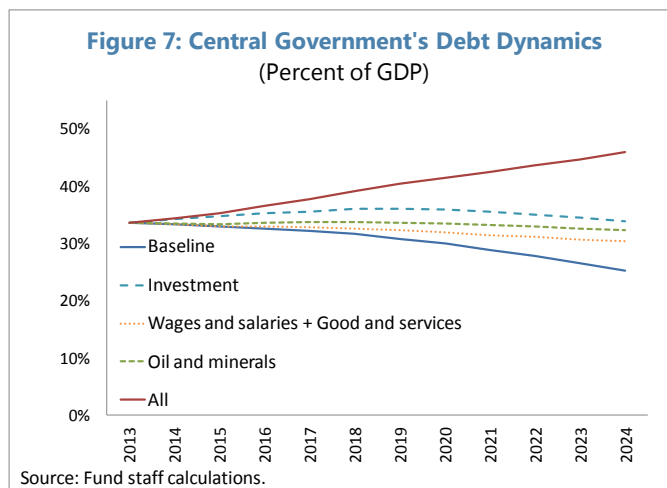
21.   With the more pessimistic assumptions for the growth and interest rates, a failure to achieve any of the planned expenditure reductions or the larger decline in revenues from oil and minerals would result in an increasing debt to GDP ratio (Figure 8). By itself, the more pessimistic assumptions for the growth and interest rate eliminates the majority of the debt reduction projected in the MTFF, resulting in a projected 2024 debt-to-GDP ratio of 30.7 percent. The projected 2024 debt to GDP ratios are 39.1 percent without the fall of investment expenditures, 35.3 percent without a reduction in expenditures in wages and salaries and goods and services, and 37.2 percent with the larger reduction of revenues from oil and minerals. The combinations of the four negative assumptions would result in a continuously increasing debt to GDP ratio that would reach 51.6 percent in 2024.

Figure 8: Central Government's Debt Dynamics (r-g = 1%)
(Percent of GDP)

Source: Fund staff calculations.

F.   Fiscal Effort to Improve Debt Dynamics

22.   Achieving the fiscal consolidation in the MTFF under the more pessimistic assumptions described above would require an increase in revenues. The required fiscal effort was estimated as the permanent improvement in the central government's primary balance required starting in 2015 to achieve the central government's debt reduction projected in the MTFF by 2024 (the MTFF projects that the central government's debt will decline from 33.6 percent of GDP in 2013 to 25.3 percent of GDP in 2024). The analysis shows that compensating for a larger decline in oil and mining revenue would require a fiscal effort of 0.7 percentage points of GDP, maintaining stable ratios of current and investment spending would imply fiscal efforts of 0.5 and 0.9 percent of GDP respectively, while a more adverse growth and interest rate environment could cost 0.4 percent of GDP. The analysis suggests that the authorities may face a total fiscal effort of about 2½ percent of GDP to meet their fiscal consolidation goals if the adverse scenarios considered materialized.

Figure 9: Fiscal Effort during 2015 to 2024 required to Compensate for Adverse Scenarios
(Percent of GDP)

Source: Fund staff calculations.

G.   Conclusions

23.   Colombia has a strong fiscal framework that prescribes a prudent, albeit challenging, fiscal consolidation over the medium term. A number of changes have taken place over the past decade and a half to strengthen Colombia's fiscal framework, including the introduction of a structural balance rule at the central government level. This rule prescribes a path of adjustment over the medium-term, which would compare well to standard benchmarks on the intertemporal use of fiscal revenue from resource wealth. However, achieving the adjustment will be challenging. An increase in revenues could help achieve the consolidation envisioned in the fiscal framework without unprecedented or undesirable reductions in expenditure.

RECENT PERFORMANCE OF COLOMBIA'S MANUFACTURING SECTOR: EXCHANGE RATE OR STRUCTURAL?[1]

Colombia's manufacturing sector has performed relatively poorly in recent years despite the country's strong overall economic performance. Several possible explanations have emerged to explain the sluggish growth in this sector. They include real exchange rate appreciation, weak external demand, structural changes, and other competitiveness issues including poor infrastructure and high labor costs. A firm-level analysis shows some structural changes (related to trade disruption with Venezuela and increased trade competition from China) may partially explain the recent weakness of the manufacturing sector. At the same time, we find no strong evidence that real appreciation has negatively affected the performance of the manufacturing sector.

A. Introduction

1.   Colombia's manufacturing sector has performed relatively poorly since 2008. Real GDP grew, on average, by 4 percent between 2008 and 2013 despite the global financial turmoil of 2008–09, due to favorable commodity prices and Colombia's strong economic policy framework. At the same time, Colombia's manufacturing sector output grew only by 0.1 percent on average. As a result, the share of manufacturing in percent of real GDP has declined from 14 percent at the end of 2007 to 11 percent in 2013. The contraction of the manufacturing sector relative to the overall economic activity was more pronounced during the cyclical downturns. The manufacturing sector contracted by four percent during the global financial turmoil, even though the growth of the overall economy remained positive. Similarly, the manufacturing sector exhibited a fairly sharp contraction between the second half of 2012 and the first half of 2013, when overall economic activity slowed but kept growing at the average pace of 3 percent (y/y).

Manufacturing Sector
(In percent of real GDP)
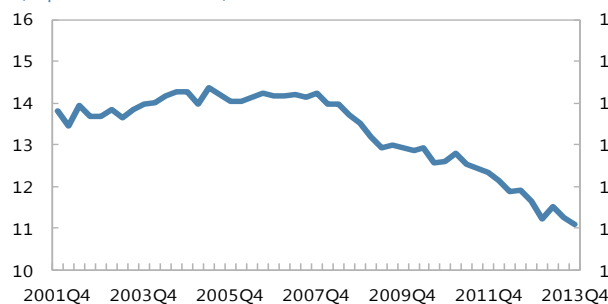
Growth of Real GDP and Manufacturing Sector
(y/y percent change)
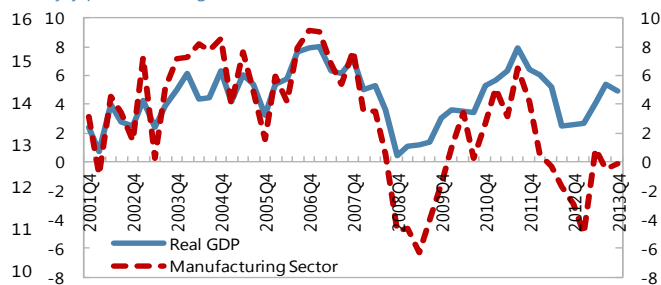
Source: Departamento Administrativo Nacional de Estadística (DANE).

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[1] Prepared by Naomi Griffin, in collaboration with the Colombia's Superintendence of Corporations (Superintendencia de Sociedades).

2.   Several possible explanations have emerged to explain the recent weakness of the manufacturing sector. The main policy concern has been the overvaluation of the real effective exchange rate which may have hampered the competitiveness of the manufacturing sector; Colombia's peso has appreciated by 18 percent in real terms against the U.S. dollar between 2008 and 2012. In this light, the recent weakening of the peso is welcomed by policymakers as it could restore the competitiveness of the manufacturing sector and boost its output. Alternative explanations include weak external demand for Colombia's manufacturing products as well as structural changes induced by international trade. In particular, trade disruption with Venezuela and increased imports from countries such as China and Mexico may have contributed to the contraction of Colombian manufacturing output. Finally, other competitiveness issues, including high labor costs and poor infrastructure, have long been regarded as key obstacles for the growth of the manufacturing sector.

3.   This paper examines the effects of real appreciation, external demand, and structural changes related to international trade on the recent performance of the Colombian manufacturing sector. In particular, the paper investigates the real effective exchange rate and external demand specific to the manufacturing sector, using the trade-partner weights taken from the United Nation's COMTRADE database. Using the same database, the paper also looks into the structural changes in Colombia's trading partners for exports and imports of manufacturing goods. This paper does not investigate other competitive issues such as high labor costs and poor infrastructure, since these issues have existed for quite some time. However, it is possible that these pre-existing competitiveness issues have made the negative effects of real appreciation and structural changes more acute than they otherwise would have been. The paper also does not look into the effects of technological changes that may have affected the performance of certain manufacturing industries.

4.   Real effective exchange rate appreciation has been fairly modest for manufacturing exports. Even though the U.S. is the dominant market for Colombia's petroleum products, the share of the U.S. in Colombia's manufacturing exports has been less significant. In addition, many of Colombia's trading partners for manufacturing exports have experienced real appreciation of their currencies against the U.S. dollar. Accordingly, the loss of competitiveness associated with the appreciation of the real exchange rate does not appear to be so severe vis-à-vis most of the major manufacturing trading partners, with the exceptions for the U.S. and Mexico.

5.   There have been some significant structural changes in the international trade of manufacturing products. In particular, exports of manufacturing goods to Venezuela declined sharply after 2008 following deterioration in their trade relations. At the same time, imports of manufacturing goods from China and Mexico increased significantly. Increased manufacturing imports from China have not been driven by the real effective exchange rate, as the Colombian peso has depreciated against the Chinese currency during this period. Rather, it seems to be driven by increased access to Chinese manufacturing products. In the case of Mexico, the real appreciation against the Mexican peso seems to have played a role in increasing imports from Mexico.

6.   A firm-level analysis is conducted using a large number of manufacturing companies. The database of the manufacturing firms, prepared by the Colombian Superintendence of Corporations (Superintendencia de Sociedades), includes a large number of private manufacturing companies that satisfy certain criteria in terms of their asset levels.[2] The database is annual and covers the period from 2000 to 2012 for roughly 4,850 manufacturing companies.

7.   There is no strong evidence that real exchange rate appreciation negatively affected manufacturing firms' profitability during this period. In contrast, on average, real exchange rate appreciation (export-weighted at 2-digit industry level) has contributed positively to manufacturing firms' profitability. The positive correlation between real appreciation and profit growth may be caused by the presence of imported intermediate inputs, to the extent that the export-weighted real effective exchange rate used in the analysis is correlated with the real effective exchange rate for imported intermediate goods. At the same time, the regression results show that export intensive companies suffered greater losses with real exchange rate appreciation compared to the companies that exported less.

8.   Structural changes related to international trade may have contributed to the poor performance of Colombia's manufacturers in recent years. The results of the firm-level analysis show the structural changes caused by trade disruption with Venezuela and greater competition from China seem to have reduced the average profitability of the firms that belong to the affected industries. The results also show that external demand (constructed by using export-weighted real GDP growth of trading partners at 2-digit industry level) did not seem to have played a key role.

B.   Real Effective Exchange Rate and External Demand

9.   Colombia's strong policy framework combined with the boom in the commodity sector has strengthened Colombia's exchange rate. Colombia has enjoyed a strong inflow of foreign direct investment over the past several years. These inflows, averaging close to 4 percent of GDP between 2006 and 2012, have allowed Colombia to maintain a balance of payments surplus and to accumulate international reserves. At the same time, Colombia's real effective exchange rate, especially against the U.S. dollar, has appreciated significantly, by over 30 percent between 2006 and 2012. Appreciation of the Colombian peso has raised a concern that the exchange rate may have been a key factor for the relatively weak performance of the manufacturing sector in recent years.[3]

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[2] The Superintendence of Companies exercises inspection, monitoring and control of commercial companies, branches of foreign companies and sole proprietorships that are not listed in stock exchange (the corporations that are listed in stock exchange are supervised by other superintendents) and whose assets exceeds 500 times the minimum monthly legal wage. The minimum monthly legal wage is set each year by the government and was 589,500 pesos (US$315) in 2013. As a result of this criterion, some corporations whose assets are close to the threshold may leave the database one year (if the assets fall below the threshold) and enter again the following year (if the assets rise above the threshold).

[3] Economic literature has pointed out that resource rich countries often experience a phenomenon known as the "Dutch disease," characterized by the loss of competitiveness in non-commodity producing sectors as a result of an overvalued exchange rate. For a comprehensive survey of this literature, see Frankel (2010). Clavijo, Fandiño and Vera (2014) find a support for the Dutch disease hypothesis during the 1970–2010 period using the VEC model.

10.   Colombia's real exchange rate remained fairly competitive against most major trading partners of manufacturing goods except for the U.S. and Mexico. Despite the real appreciation of the Colombian peso against the U.S. dollar, the appreciation of the bilateral real exchange rate since 2008 against most major trading partners has been fairly modest, with the exception of Mexico. As a result, the real effective exchange rate weighted by export trading partners of manufacturing goods remained relatively stable since 2008 (the spike in 2009 was caused by Venezuela).[4] The real effective exchange rate weighted by import trading partner of manufactured goods exhibits slightly sharper appreciation since 2008 due to the larger weight of the United States.

Manufacturing Goods Trading Partners
(Average for 2007, 2009 and 2012)

| Export	Percent share	Import	Percent share
Venezuela	29.9	United States	38.4
United States	19.5	Argentina	9.9
Ecuador	10.6	Brazil	7.7
Peru	6.4	Mexico	7.2
Mexico	3.8	China	6.5
China	3.7	Canada	4.4
Brazil	3.2	Chile	4.4
Belgium	3.0	Ecuador	4.2
Chile	2.6	Germany	3.2
Germany	2.6	Peru	3.0
Italy	2.5	Venezuela	2.4
Japan	2.5	Japan	1.6
Panama	2.1	France	1.5
Spain	1.9	Spain	1.2
Netherlands	1.8	Italy	1.2
Others	4.1	Others	3.1

Sources: COMTRADE; and IMF staff calculations.

Real Effective Exchange Rate
(2000=100, + depreciation)
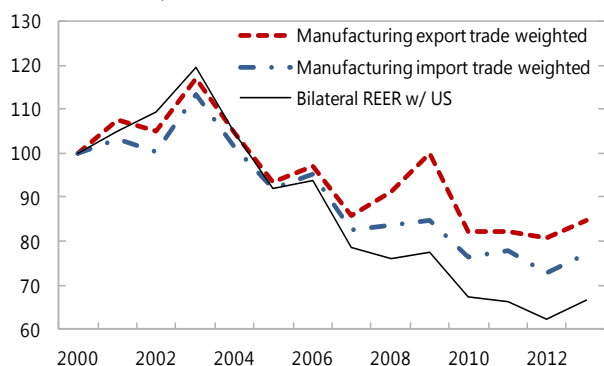
Sources: COMTRADE; WEO; and IMF staff calculations.

Bilateral Real Exchange Rate
(2000=100, + depreciation)
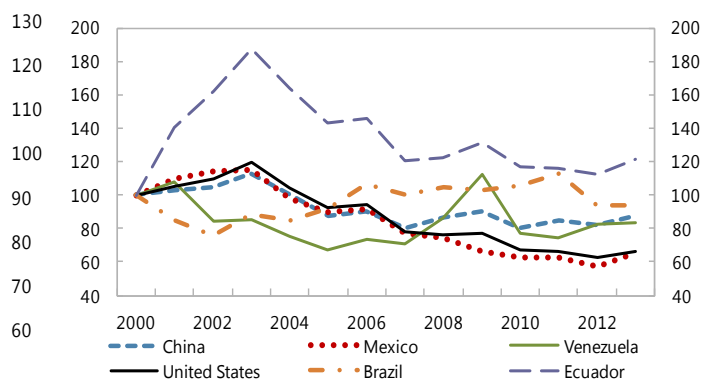
Sources: WEO; and IMF staff calculations.

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[4] The weights were calculated using United Nations COMTRADE database for 2007, 2009, and 2012, the years that COMTRADE database seems to have the most comprehensive coverage on Colombia. For this calculation, we included SITC industry code 0 (food and live animals), 5 (chemicals and related products), 6 (Manufactured goods chiefly classified by material), and 7 (machinery and transport equipment).

11.   External demand for Colombia's manufacturing goods fell sharply in 2009 and dropped modestly again in 2013. Average real GDP growth weighted by main trading partners of manufacturing exports declined sharply in 2009. Although it recovered and reached 4 percent in 2011 and 2012, the growth rate is still less than the average growth of 6 percent observed between 2004 and 2008 (the weak growth of 2002 and 2003 was caused by Venezuela). The external demand growth fell again to 2 percent in 2013.

External Demand Growth for Manufacturing Sector
(Export weighted real GDP growth of trading partners)

Sources: COMTRADE; WEO; and IMF staff calculations.
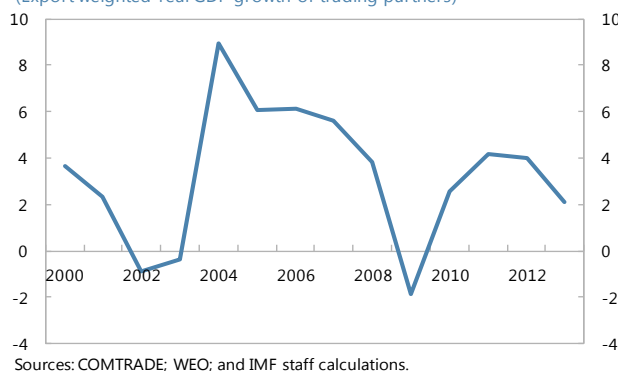
C.   Structural Changes Related to International Trade

12.   Manufacturing exports have declined since 2008. Manufacturing sector seems to be exporting less and producing more for domestic consumption today compared to several years ago. Manufacturing exports in percent of GDP has declined from around 40 percent in 2008 to 26 percent in 2013. Similarly, manufacturing exports in percent of total exports have declined from close to 40 percent in mid-2000s to roughly 20 percent in 2013.

Manufacturing Exports
(In percent of manufacturing GDP, 4-quarter MA)

Source: Departamento Administrativo Nacional de Estadística (DANE).
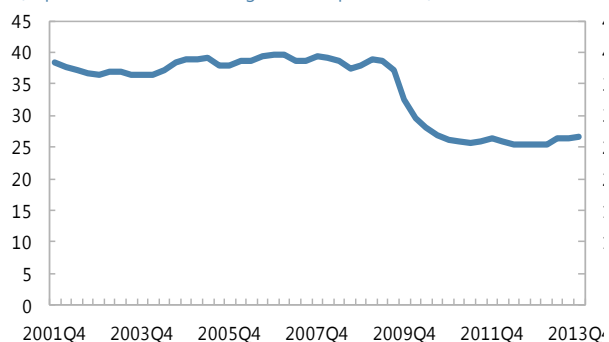
Manufacturing Exports
(In percent of total exports)
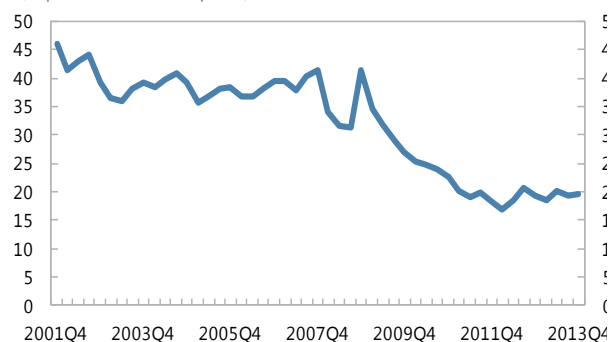
13.   Significant portion of the decline in manufacturing exports in recent years seems to be related to Venezuela. According to COMTRADE database, manufacturing exports (excluding food, beverages and tobacco products) to Venezuela declined from US$4 billion (35 percent of the total) in 2007 to US$1 billion (13 percent of the total) in 2012.[5] The sharp decline largely reflects the deterioration in Colombia's trade relationship with Venezuela since 2008. The industries that were particularly affected by the trade disruption with Venezuela include electrical machinery, road

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[5] Even though COMTRADE database seems to have the most comprehensive coverage on Colombia for 2007, 2009 and 2012, there could be some discrepancies between the official data due to some unreported categories. In particular, the data for 2012 seems incomplete for a small number of manufacturing categories.

vehicles, textiles, and medical and pharmaceutical products.[6] Since then, however, part of the decline has been offset by an increase in exports to other countries in the region, including Brazil, Ecuador and Peru. Exports to the U.S. have declined from US$1.7 billion in 2007 to US$1 billion in 2012, possibly due to the real appreciation of Colombia's peso vis-à-vis the U.S. dollar. While significant, the magnitude of decline is small in comparison with the drop in exports caused by the trade disruption with Venezuela.

Manufacturing Exports by Trading Partners
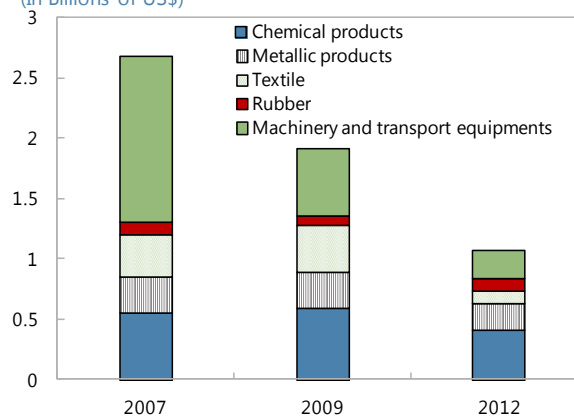(In Billions of US$)
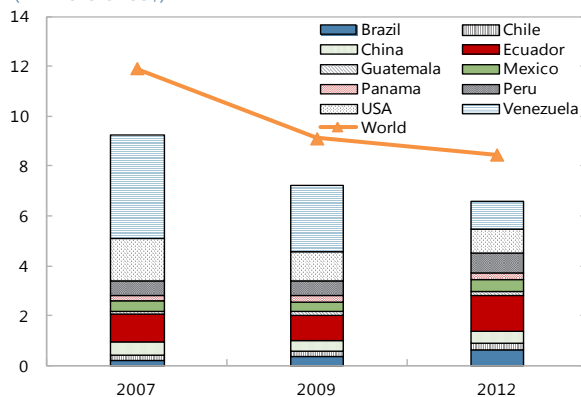
Legend: Brazil, Chile, China, Ecuador, Guatemala, Mexico, Panama, Peru, USA, Venezuela, World

Source: COMTRADE.
Note: Excludes food, beverages and tobacco products.

Selected Manufacturing Exports to Venezuela
(In Billions of US$)

Legend: Chemical products, Metallic products, Textile, Rubber, Machinery and transport equipments
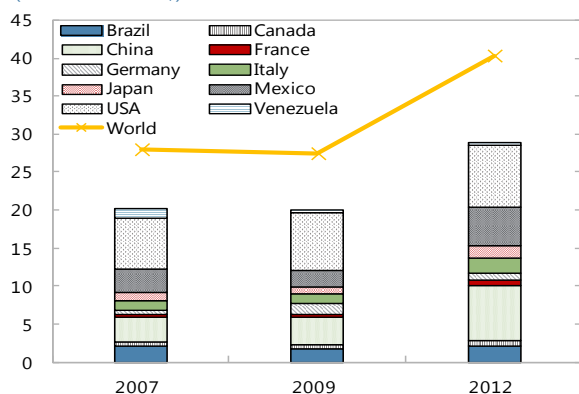
Sources: COMTRADE; and IMF staff estimates.

14.   Manufacturing imports have increased significantly since 2009, especially from China and Mexico. According to the COMTRADE database, manufacturing imports from China more than doubled since 2007, from US$3 billion (8 percent of the total) in 2007 to roughly US$8 billion (18 percent of the total) in 2012. Increased imports from China are associated especially with machinery and transport equipment, but also with chemical products, rubber and plastic products, metallic and non-metallic mineral products and textiles. Imports from Mexico also increased during the same period, from US$3 billion in 2007 to US$5 billion in 2012. The increase is mostly associated with machinery and equipment. It is noteworthy that, despite the significant appreciation of the bilateral real exchange rate, the increase in imports from the US was smaller than the increase in imports from China.[7]

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[6] The research by Carranza, González and Serna (2014) shows that the manufacturing industries that had high level of exports Venezuela were, on average, relatively poor performers even before the trade disruption. In contrast, manufacturing industries that exported to other countries have demonstrated robust growth in recent years.
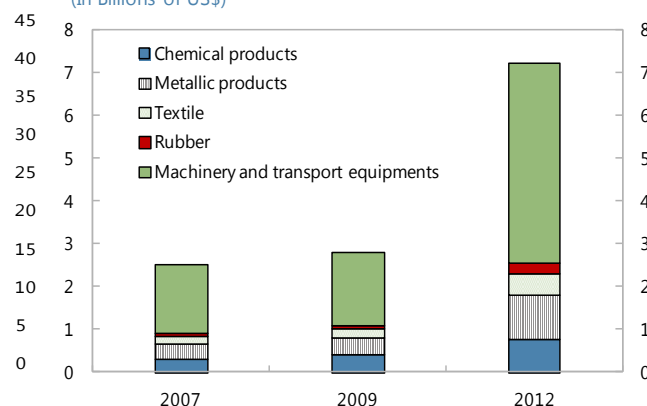
[7] Based on COMTRADE database, manufacturing imports (excluding food, beverages and tobacco products) from the U.S. increased from $6.7 billion in 2007 to $8.2 billion in 2012.

Manufacturing Imports by Trading Partners
(In Billions of US$)

Source: COMTRADE.
Note: Excludes food, beverages and tobacco products.

Selected Manufacturing Imports from China
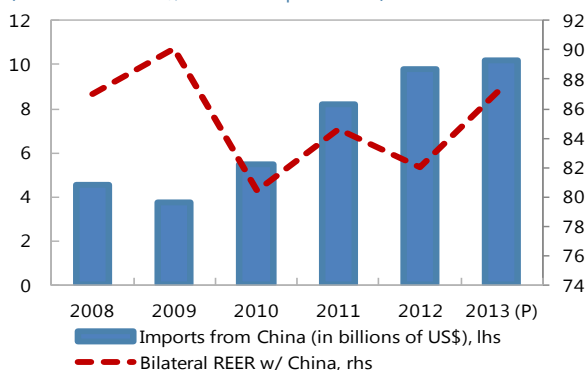(In Billions of US$)

Sources: COMTRADE; and IMF staff estimates.

15.   Increased imports from China appear unrelated to the real exchange rate dynamics.
To investigate if the recent increase in imports from China is driven by the real exchange rate
appreciation, the bilateral real effective exchange rate vis-à-vis the Chinese currency is plotted
against total imports from China. The figure highlights that the recent surge in imports did not
accompany steady real appreciation of the Colombian peso vis-à-vis the Chinese currency.
Therefore, higher imports are more likely to be associated with the increased access by Colombia to
Chinese manufacturing products rather than the exchange rate.

Total Imports from China
(In billions of US$, REER + depreciation)

Sources: Haver Analytics; WEO; and IMF staff estimates.

Total Imports from Mexico
(In billions of US$, REER + depreciation)
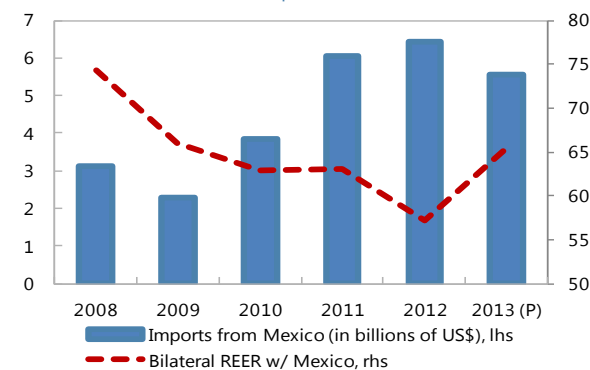
Sources: Haver Analytics; WEO; and IMF staff estimates.

**16.   Increased imports from Mexico seem to be partly driven by the real exchange rate
appreciation.** Unlike the case of China, the bilateral real effective exchange rate vis-à-vis the
Mexican peso has steadily appreciated since 2008, except in 2013. Accordingly, it seems likely that
increased manufacturing imports from Mexico are at least partially driven by exchange rate
dynamics, rather than increased access by Colombia to Mexican manufacturing products. The
renewal of the Free Trade Agreement with Mexico in 2011 may also have contributed to the higher
volume of imports from Mexico after 2011.

D. International Comparison

17.   Colombia's experience does not seem particularly unusual in the international context. In recent years, many countries in the region, including Brazil, Chile, Mexico, Paraguay, Uruguay and Venezuela, have experienced a reduction in the share of the manufacturing sector. Some Asian countries, such as Indonesia, Malaysia, and the Philippines, have also experienced a decline in the share of manufacturing, although Asian countries generally have a higher share of manufacturing in comparison with Latin American countries. In contrast, some Asian countries such as Korea, Taiwan, and Vietnam have experienced very strong growth in the manufacturing sector relative to real GDP.

Manufacturing Sector: Asian Countries
(In percent of real GDP)
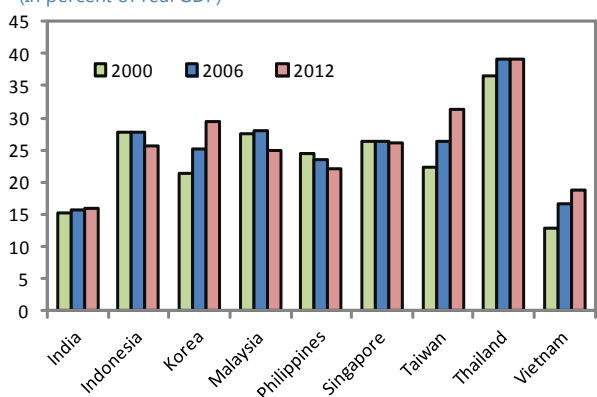
Manufacturing Sector: Latin American Countries
(In percent of real GDP 1/)

Source: Haver Analytics.

1/ For Brazil, nominal GDP is used.

E. Firm-level Analysis: Model

18.   A simple model is developed to shed light on the key relationship between profit growth and REER at the firm level. Consider a simple short-run model where firms have only one input of production: intermediate in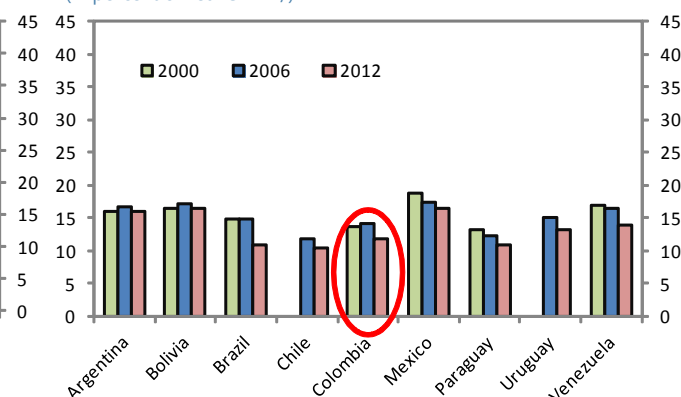puts, m_t. For simplicity, it is assumed that firms sell the pre-determined fraction s of the output $f(m_t)$ to the domestic market at the price p_t^d and export the rest $(1-s)$ to the world market at the price p_t^w and the nominal exchange rate, E_t. The profit maximizing firms decide the optimal level of output by choosing m_t^* that would solve the following problem:

$$\max_{m_t} p_t^d \cdot s \cdot f(m_t) + p_t^w \cdot E_t \cdot (1-s) \cdot f(m_t) - c(e_t) \cdot m_t$$

$$s.t. \ \ p_t^d = \varphi(d_t, e_t) \text{ and } p_t^w = \lambda(d_t^w) \qquad (1)$$

The production function has the standard property (i.e., $f'(m_t) > 0$ and $f''(m_t) < 0$). The domestic price p_t^d positively depends on domestic demand d_t as well as real exchange rate e_t, where $e_t = E_t \cdot p_t^w / p_t^d$. Real appreciation (lower e_t) would drive down the price of imported substitutes in domestic currency, pressuring the domestic price to fall (i.e., $\varphi_e'(\cdot) > 0$). The world market price p_t^w positively depends on the global demand d_t^w. It is further assumed that all intermediate inputs are

produced abroad and their costs depend on real exchange rate. Real depreciation (higher e_t) would increase the costs of intermediate inputs (i.e., $c'(e_t) > 0$). Profit maximizing firms would choose the optimal level of m_t to equate the marginal increase in revenues from production with the marginal cost.

19.   The effect of real deprecation on firms' profits is given by the following equation:

$$\partial \pi_t / \partial e_t = \underbrace{\varphi'_e(d_t, e_t) \cdot s \cdot f(m_t^*)}_{(+) \text{ import substitution}} + \underbrace{(p_t^d + \varphi'_e(d_t, e_t) \cdot e_t) \cdot (1-s) \cdot f(m_t^*)}_{(+) \text{ higher export revenues}} - \underbrace{c'(e_t) \cdot m_t^*}_{(+) \text{ higher costs}} \quad (2)$$

The first term explains the rise in profits associated with import substitution. Real depreciation would raise the price of imported substitutes, making domestic products more profitable in the domestic market. The second term explains the rise in profits associated with higher export revenue through real depreciation. The last term explains the higher costs of imported intermediate inputs.

For firms that only produce for domestic market (i.e., $s = 1$), the effect of real depreciation is given by the following equation:

$$\partial \pi_t / \partial e_t = \underbrace{\varphi'_e(d_t, e_t) \cdot f(m_t)}_{(+) \text{ import substitution}} - \underbrace{c'(e_t) \cdot m_t}_{(+) \text{ higher costs}} \quad (3)$$

For these firms, the effect of real deprecation is negative if the pass-through of real exchange rate to domestic price is low (i.e., $\varphi'_e(\cdot)$ is small).

F.   Firm-level Analysis: Empirical Evidence

20.   A firm-level database is used to investigate the fundamental relationship between firms' performance and certain key economic variables. Colombia's Superintendence of Corporations collects a large amount of data on financial and income statements from private corporations that satisfy certain threshold asset levels, and make some of this information publicly available.[8] The database used for this analysis is an annual unbalanced panel data from 2000 to 2012 for about 4,850 manufacturing firms. The database does not cover large publicly listed companies that are generally most export intensive.[9] In the subsequent analysis, the firm-level data was complemented with various industry and aggregate time series data.

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[8] See footnote 2 for more information.

[9] The omission of these large firms may generate biases in the results, although the number of listed manufacturing companies is fairly small to date (i.e., less than 10 as of April 2014).

21.   The following regression specification is used to investigate the factors affecting the profitability of manufacturing firms:

$$Profit\ Growth_{i,k,t}$$
$$= \alpha + \beta_1 REER_{k,t} + \beta_2 ExtD_{k,t} + \beta_3 DomD_t + \beta_4 R_t + Structural\ trade\ dummies_{k,t}$$
$$+ u_{i,k,t}$$

The regressions include firm-level fixed effects.

- $Profit\ Growth_{i,k,t}$: The real growth of profits of firm i that belongs to industry k in year t. The operational profits are deflated by manufacturing producer price index (PPI).

- $REER_{k,t}$: The growth of export-weighted real effective exchange rate (REER) of industry k in year t. Industry k is classified at the 2-digit level of ISIC (International Standard Industrial Classification).[10]

- $ExtD_{k,t}$: Export-weighted real GDP growth of trading partners for industry k in year t.

- $DomD_t$: Colombia's real GDP growth in year t.

- R_t: Colombia's interest rate in year t.[11]

- $Structural\ trade\ dummies_{k,t}$: Structural trade dummies include the trade dummy with Venezuela (which takes the value of 1 if industry k faced reduced exports to Venezuela after 2008), and the trade dummy with China (which takes the value of 1 if industry k faced increased competition from China after 2008).[12]

In the second regression, U.S. real GDP growth is added. In the third regression, we also included the growth of import-weighted REER for each industry in order to investigate the import substitution effects through REER. The observations with very large real growth of profits (300 percent in absolute terms) are excluded from the regressions, as those large movements are unlikely to be explained by the simple specification given above.[13]

22.   The coefficient on REER is significant, but has an unexpected sign (Table 1). If real appreciation has contributed to the contraction of the manufacturing industry through reduced competitiveness, one would expect a positive coefficient on REER (i.e., the depreciation promotes

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[10] Export weights are calculated using COMTRADE database. Since the trade data from COMTRADE were based on SITC (Standard International Trade Classification), while the firm-level manufacturing database was based on ISIC (International Standard Industrial Classification), the industry codes were mapped at 2-digit level.

[11] The central bank's policy rate (overnight lending rate) is used.

[12] The Venezuela dummy includes apparel, leather products, electrical machinery, road vehicles, furniture and medical and pharmaceutical products. The China dummy includes textiles, chemicals and chemical products, rubber and plastic products, basic metals, metallic and non-metallic mineral products, and machinery and transport equipment.

[13] Such observations consist roughly 9 percent of available sample observations. As a robustness check, quantile regressions—which are more robust to outliers—were run with all observations using similar specifications. The results of quantile regressions are generally similar.

profitability growth). However, the negative sign in the regressions indicates that real appreciation increases manufacturing firms' profit growth on average. In fact, real profits grew by 0.3 percent on average in response to the appreciation of REER by 1 percent. This relationship may be caused by the presence of imported intermediate inputs, to the extent that export-weighted REER (at ISIC 2-digit level) is correlated with the REER for intermediate inputs.[14]

23.   **The effect of domestic demand is positive and significant**. The results of the first regression show that on average 1 percent increase in Colombia's real GDP increases profit growth by 2.7 percent. The results also show that the effect of external demand is generally positive, but weak as the coefficients are not significant. The weak correlation may be caused by the construction of the external demand index as the weights are not variable over time.[15] Surprisingly, the effect of the domestic interest rate is positive and significant. Given that the results may be driven by certain omitted variables, the growth rate of U.S. real GDP is included in the second regression. However, the coefficient on the interest rate remained positive and significant.

24.   **Structural changes in trade seem to have affected firms' profit growth**. The structural trade dummies both have negative and significant coefficients. Based on the first regression, the profit growth after 2008 was on average 12 percent lower for those industries that were affected by trade disruption with Venezuela. Similarly, the profit growth after 2008 was, on average 8 percent lower for those industries that faced higher competition from Chinese imports.

25.   **There is no strong evidence that import-weighted REER reduced manufacturing firms' profits.** In the third regression, import-weighted REER was used in the regression. If the profitability of manufacturing firms has fallen as a result of competition with cheaper imported substitutes (due to real appreciation), the coefficient on this variable should be positive. However, the coefficient is negative and significant. Therefore, we cannot conclude that REER appreciation has reduced manufacturing firms' profitability via import substitution channel.

26.   **External revenues responded positively to REER depreciation and external demand**. The same regressions were run by using real external revenue growth as a dependent variable (Table 2).[16] The results show the expected positive relationship between REER and external revenue growth: real external revenue grew by 0.3–0.5 percent in response to 1 percent REER depreciation. Similarly, real external revenue grew by roughly 3 percent in response to 1 percent growth in external demand. To investigate why REER depreciation affects profit growth negatively despite its positive impact on external revenues, a simple regression was run just using external revenue

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[14] Ideally, we would like to separate the effect of the imported intermediate inputs from the effect of export revenues or the effect of import substitution, as described in the previous section. Unfortunately, this was not possible due to the lack of data on imported inputs and the corresponding exchange rate.

[15] Export destinations could change in response to the demand growth of the external markets. Unfortunately, missing observations made it difficult to construct the variable weights at the 2-digit level.

[16] External revenues reported to the Superintendence of Corporations may include revenue unrelated to exports, and could be subject to some measurement errors.

growth and domestic demand growth (Table 3). The results show that external revenue growth affects profit growth positively, and the coefficient is significant, but the magnitude is small. As a result, the positive impact of REER depreciation through higher external revenue may be dwarfed by negative effects through other channels, such as the higher cost of imported material inputs.

27.   Companies with higher share of external revenues suffered greater losses with REER appreciation. Even though REER appreciation does not seem to have reduced the profit growth of Colombian manufacturing companies on average, it could have prevented the growth of export oriented companies. To investigate this issue, the export share (i.e., the average share of external revenues in total revenues) for each firm was interacted with REER (Table 4). The positive and significant coefficients confirm that the benefits of REER depreciation are larger for firms that are more export oriented. However, the magnitude of the coefficient is relatively small, suggesting once again that the impact of REER on firms' profitability through this channel is rather limited.

28.   The results hold for most industries, although there is some heterogeneity across industries.[17] For most industries, the coefficient of REER is negative. For some industries—including textiles, publishing and printing, rubber and plastic products, fabricated metals, machinery and equipment, motor vehicles, and furniture—the coefficient on REER is negative and significant. The coefficient on REER is positive for some industries, but insignificant in almost all cases. The only industry with a positive and significant REER coefficient is manufacturers of basic metals.

29.   Policies to improve the competitiveness of the manufacturing sector should aim at productivity enhancement. A firm level analysis using a large number of manufacturing companies found that much of the weakness in manufacturing performance in recent years was unrelated to the developments of REER. At the same time, manufacturing firms have become more domestically oriented, partly due to structural changes induced by international trade. While real exchange rate depreciation would certainly benefit export oriented manufacturing firms, policies to improve the overall competitiveness of the manufacturing sector should focus on productivity enhancing measures, including labor market reforms and infrastructure improvements.

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[17] For detailed information on the heterogeneity of performance across industries, see the research by Carranza, González, Moreno and Serna (2013) and Carranza, González and Serna (2014).

Table 1. OLS Panel Regression Results for Manufacturing Firms, 2000–2012 (A)

Dependent variable: Profit Growth

	(1)	(2)	(3)
REER (export-weighted)	-0.339***	-0.342***	
	(0.0597)	(0.0637)	
External Demand	0.0513	0.0673	-0.228
	(0.240)	(0.266)	(0.259)
Domestic Demand	2.731***	2.737***	3.368***
	(0.442)	(0.444)	(0.452)
R	1.100***	1.081***	0.773***
	(0.306)	(0.334)	(0.287)
U.S. growth		-0.0665	
		(0.484)	
Dummy (Venezuela)	-12.45***	-12.53***	-13.80***
	(2.401)	(2.458)	(2.376)
Dummy (China)	-6.760***	-6.855***	-7.571***
	(1.902)	(2.024)	(1.884)
REER (import-weighted)			-0.436***
			(0.0811)
Constant	-6.771**	-6.605**	-6.846**
	(3.106)	(3.333)	(3.120)
Observations	29,699	29,699	29,699
R-squared	0.147	0.147	0.147

Notes:
Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
All regressions include firm-level fixed effects. The observations with very large real growth of profits (above 300 percent in absolute terms) are excluded.

Table 2. OLS Panel Regression Results for Manufacturing Firms, 2000–2012 (B)

Dependent variable: External Revenue Growth

	(1)	(2)	(3)
REER (export-weighted)	0.289**	0.535***	
	(0.144)	(0.155)	
External Demand	2.919***	2.210***	3.549***
	(0.502)	(0.530)	(0.582)
Domestic Demand	-2.477**	-3.433***	-3.495***
	(1.039)	(1.063)	(1.114)
R	-0.499	0.476	-0.505
	(0.851)	(0.881)	(0.797)
U.S. growth		4.689***	
		(1.119)	
Dummy (Venezuela)	-23.27***	-17.49***	-21.89***
	(5.407)	(5.575)	(5.314)
Dummy (China)	-14.48***	-6.938	-13.63***
	(4.323)	(4.679)	(4.248)
REER (import-weighted)			0.588***
			(0.205)
Constant	25.97***	16.36*	28.81***
	(8.233)	(8.538)	(8.276)
Observations	10,509	10,509	10,509
R-squared	0.200	0.202	0.200

Notes:
Standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$
All regressions include firm-level fixed effects. The observations with very large real growth of external revenues (above 1000 percent) are excluded.

**Table 3. OLS Panel Regression Results for
Manufacturing Firms, 2000–2012 (C)**

(Includes Only Firms with Positive External Revenues)

Dependent variable: Profit Growth	
Domestic Demand Growth	3.737***
	(0.517)
External Revenue Growth	0.050***
	(0.00816)
Constant	-9.794***
	(2.476)
Observations	9,424
R-squared	0.196

Notes:
Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
All regressions include firm-level fixed effects. The
observations with very large real growth of profits (above
300 percent in absolute terms) and external revenues
(above 1000 percent) are excluded.

Table 4. OLS Panel Regression Results for Manufacturing Firms, 2000–2012 (D)

Dependent variable: Profit Growth

	(1)	(2)	(3)
REER (export-weighted)	-0.350***	-0.353***	
	(0.0598)	(0.0639)	
External Demand	0.0527	0.0679	-0.224
	(0.240)	(0.266)	(0.259)
Domestic Demand	2.728***	2.734***	3.364***
	(0.442)	(0.444)	(0.452)
R	1.097***	1.079***	0.768***
	(0.306)	(0.334)	(0.287)
U.S. growth		-0.0635	
		(0.484)	
Dummy (Venezuela)	-12.47***	-12.54***	-13.82***
	(2.401)	(2.458)	(2.376)
Dummy (China)	-6.770***	-6.861***	-7.587***
	(1.902)	(2.024)	(1.884)
Ex Share * REER (export-weighted)	0.000926**	0.000926**	
	(0.000378)	(0.000378)	
REER (import-weighted)			-0.448***
			(0.0816)
Ex Share * REER (import-weighted)			0.00107
			(0.000775)
Constant	-6.737**	-6.578**	-6.795**
	(3.105)	(3.333)	(3.121)
Observations	29,699	29,699	29,699
R-squared	0.148	0.148	0.147

Notes:

Standard errors in parentheses.

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

All regressions include firm-level fixed effects. The observations with very large real growth of profits (above 300 percent in absolute terms) and external revenues (above 1000 percent) are excluded.

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SELECTED FINANCIAL SECTOR ISSUES[1]

A. Overview

1.   A Financial System Stability Assessment (FSSA) was conducted in 2013 in Colombia.[2] The financial system was found to be sound and reasonably resilient to shocks; banks were well capitalized, profitable, and moderately efficient. While there was some scope for improving central bank's stress testing methodology, some of the main challenges reflected risks related to assets and liability concentration, and expansion of bank's conglomerates abroad with challenges for consolidated and cross-border supervision. Increasing house prices were also found to be a source of fragility, yet exposure of banks and households was considered moderate.

2.   This note attempts to provide an update on selected topics from the FSSA that remain of primary interest today. A year into implementation of FSSA recommendations the situation could be considered broadly unchanged. House prices and mortgages have kept increasing despite overall slowing of credit growth. Legal protection of supervisors and regulation of some non-bank institutions remain a challenge. The Financial Superintendence of Colombia (SFC) authority over financial holding companies or industrial members of a conglomerate is still limited. Yet, progress was made in some areas, notably the introduction of new and improved capital requirements measure and efforts to obtain more information of Colombian banks' exposures in Central America. The following sections document the evolution of authorities' efforts to making the financial system stronger and more resilient to existing and future challenges.

B. Supervision of Complex Conglomerates and Cross-Border Supervision

Background

3.   Large and complex financial conglomerates dominate Colombia's financial system. Ten holdings constituted about 80 percent of total financial sector assets at end-2011. Bancolombia alone accounted for 25 percent of banking system assets in 2013. Concentration is similar to Latin America and the Caribbean (LAC) region averages and is also reflected in banks' credit portfolios, in which a small share of debtor account for the bulk of the loans. Banks' concentration is also believed to be a deterrent to financial inclusion (see "Financial Inclusion, Growth and Inequality" section).

4.   Since 2007, major Colombian conglomerates have been expanding into Central America through mergers and acquisitions. In 2013, they had 162 branches in 21 countries in LAC, representing substantial shares in total assets of destination countries' banking system assets. Operations in Panama are the largest also in terms of local banking system's assets. In terms of banking conglomerates, Bancolombia's operations are the largest, closely followed by those of

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[1] Prepared by Izabela Karpowicz and Mohamed Norat.

[2] Colombia: Financial System Stability Assessment, 2013, IMF Country Report No. 13/50, International Monetary Fund

Banco de Bogotá. The total value of bank's investments abroad from 2007 to 2013 amounted to almost 7 billion U.S. dollars.

Conglomerate	Bank	Assets
	Millions of U.S. dollars	
Banco de Bogotá	Total	18,126
	Banco Bac San Jose, S.A.	3,804
	Banco de América Central S.A. (El Salvador)	5,854
	Banco Reformador	1,377
	Banco de Bogotá S.A.	888
	Banco Corficolombiana Panamá S.A.	122
	Bac Bank Inc.	290
	Bac International Bank, Inc.	3,726
	BBVA Panamá	2,065
Bancolombia	Total	19,367
	Banco Agrícola S.A.	3,996
	Bancolombia Panamá	4,972
	Banistmo S.A.	10,399
Banco de Occidente de Colombia	Banco de Occidente Panamá S.A	874
Davivienda	Banco Davivienda S.A.	5,986
Helm	Helm Bank Panamá	837
Total		45,190

Country	Assets	Share 1/
	Millions of U.S. dollars	Percent
Costa Rica	5,372	12.9
El Salvador	7,582	53.3
Guatemala	2,153	7.7
Honduras	3,584	21.1
Nicaragua	1,174	22.4
Panamá 2/	25,325	25.9
Total	45,190	
In million of U.S dollars		
1/ Share of assets in the host country banking system.		
2/ As of September 30, 2013.		

Issues

5.   **The consolidated supervision of financial conglomerates has been enhanced since the creation of the SFC**. Improvements in the legal framework have empowered the SFC to conduct onsite examinations and obtain necessary information from non-financial corporations that form part of mixed conglomerates, order the consolidation of financial statements of companies of these conglomerates, exchange information with foreign supervisors and authorize investments in the capital of foreign entities. Supervisory procedures are in place and a dedicated team is responsible for the supervision of both financial and mixed conglomerates. However, expansion abroad poses challenges for consolidated and transnational supervision with implications for risk management. The SFC has no enforcement powers over the non-financial institutions that form part of a mixed conglomerate, which creates opportunities to bypass prudential norms.

Main FSSA Recommendations

- **Put in place a Pillar 2, Basel II supervisory framework.** This would give the SFC explicit authority to tailor prudential norms to the risk profile of each financial institution, especially the systemic ones. This is important because, as Colombian banks' businesses expand domestically and abroad, it will be important for the SFC to ensure banks have appropriate capital and liquidity buffers around an expanded loan portfolio to manage present and future risks.

- **Approve a law that gives SFC full supervisory and regulatory powers over the holding company of a financial conglomerate.** Such a law should provide a clear definition of financial group to reduce possible legal gaps that may arise from the difficulty in demonstrating commonality of purpose, especially for horizontally integrated groups.

Actions

6.   **The SFC has established an effective network of cooperation for the purposes of consolidated supervision of the financial conglomerates that operate in Colombia.** The SFC has signed bilateral and multilateral memoranda of understanding with most of the home and host supervisors of conglomerates (16 countries) and engages in regular exchanges of information with these agencies. The SFC has organized the college of supervisors for Bancolombia, Banco de Bogotá, and Davivienda with the participation of six foreign supervisory agencies, which has held five meetings since January 2012. The SFC has also become a member of the Central American Council of Banking Supervisors (CCSB), which is an effective forum for the coordination with the most of the host supervisors of the three largest Colombian groups. The Council holds quarterly meetings during which it exchanges information related to balance sheets, financial statements and financial indicators, capital adequacy, related debtors, resident and non-resident debtors, supervisory details, and portfolios classified by risks. In addition, the Liaison Committee holds three meetings per year and monitors supervision activities. Over the past year the SFC performed two on-site inspections to conglomerates operating in El Salvador and Costa Rica.

7.   **The SFC is developing a comprehensive monitoring framework for risk-based supervision (RBS) with the help of the Toronto Centre.** The migration of the SFC to RBS was born from the need to: have a holistic view of the risks of each institution, be it individual or conglomerate, foreign or domestic; have one voice against the industry; increase efficiency in the allocation of SFC resources focusing on key areas of risk; and being more forward looking. The framework follows closely the RBS methodology of the Office of the Superintendent of Financial Institutions (OSFI) and Basel international supervisory standards. The methodology is fully developed for credit institutions and insurance companies and it still under development for brokers, trust funds and the stock exchange. The full implementation began in 2014, and the goal this year is to have the full roll-out of the methodology to all entities prudentially supervised by the SFC.

8.   **The Central Bank has enhanced reporting of foreign currency (FX) and liquidity risks.** In December 2013, the Central Bank implemented a monthly regulatory report detailing exposure to exchange rate risk by the FX market intermediaries and short-term exposure in each currency. The report also presents the net positions (assets minus liabilities) in each currency on both parents and their subsidiaries. In addition, to assess short-term liquidity exposure, the report includes information on liquid assets and short-term liquidity requirements in each currency.

Challenges

9.   **The effectiveness of consolidated supervision remains a work in progress.** The 2013 FSSA found that individual banks that were part of large conglomerates were not subject to

consolidated prudential requirements. While banks are required to meet capital ratios and liquidity ratios both at individual as well as consolidated basis, prudential control over all members of a mixed conglomerate is incomplete and uneven. It will be important going forward that the prudential requirements (capital adequacy, liquidity, leverage) remain robust at the consolidated and conglomerate level.

10.   There is a need to ensure consistency of information on banks obtained from the host countries, including information on risks. Additionally, it will be important to further enhance granular reporting of cross-border liquidity and currency risk of Colombian banks' in home and host jurisdictions. SFC's technical cooperation on supervisory standards in supervisory colleges in the region and the CCSB is a welcome engagement. But, above all, a willingness of home and host supervisors to act upon emerging cross-border risks will ensure regional financial stability. Finally, it would be crucial to ensure no information gaps appear over time to enable the Central Bank to perform its lender of last resort functions.

C.   The New Capital Requirements

11.   By putting greater emphasis on common shares and legal reserves, the new capital requirement regime has strengthened the quality of the core capital. Starting in August 2013, new deductions on capital include (i) committed assets, such as pension liabilities (unamortized actuarial value calculation) and net deferred assets, and (ii) intangible assets, such as goodwill. Some additional instruments are also recognized as equity, including:
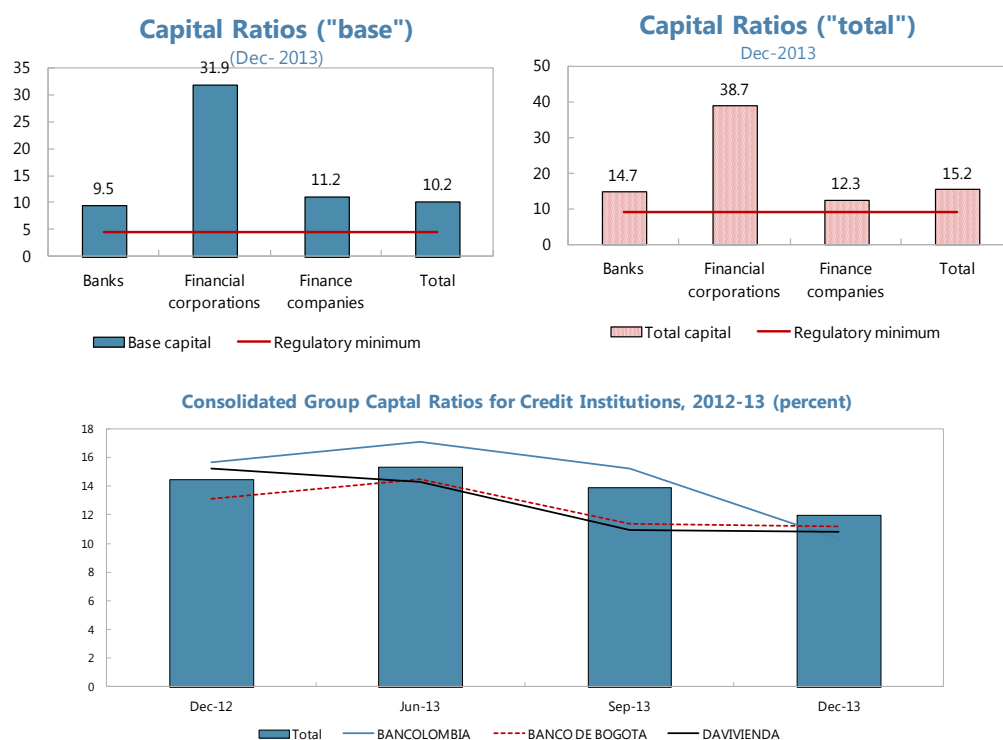
- voluntary reserves (conditional on a commitment to keep these reserves for at least 5 years and upon approval of SFC up to a maximum of 10 percent of the regulatory capital);

- current profits (conditional on the commitment to capitalize or increase legal reserves prior to SFC approval); and

- the valuation of investments in debt available for sale and equity (with a haircut), but not the valuation of real estate.

The consolidated solvency ratio must be met by all credit institutions (quarterly) and are calculated on consolidated financial statements of all financial institutions, by netting out all the equity of the financial group. Moreover, in the consolidation process only the participation of minority investors who are unrelated parties is recognized as minority interest and thus adds to capital. Unconsolidated investments are not deducted from capital. These new regulations will maintain the minimum regulatory capital at 9 percent of risk weighted assets and create a new measure, the ratio of "base" capital to risk weighted assets at a minimum of 4.5 percent. The regulation excludes future intangibles and goodwill from the calculation of base capital.

12.   As expected, following the introduction of the improved capital measure, capital ratios have declined across banks and other financial institutions. During 2013, banks, financial corporations and finance companies increased their capital by COP 9.8 billion that reached a

technical worth of COP 53 billion by end-year. However, aggregate capital ratios fell from 17.2 percent in July 2013 to 15.2 percent at end-year. Regulatory Tier 1 capital to risk-weighted assets declined from 12.6 percent to 10.2 percent over the same period.[3] At the consolidated group level capital adequacy has also fallen bringing to light the weakness of the previous capital adequacy framework.

Capital Ratios ("base")
(Dec- 2013)

Capital Ratios ("total")
Dec-2013

Consolidated Group Captal Ratios for Credit Institutions, 2012-13 (percent)

13.   For internationally active Colombian banks it would be important to move over time to the Basel III capital measure. New capital regulation better defines Tier 1 capital. However, it includes a broader recognition of Tier 2 (subordinated debt) as capital and is not as strict in terms of deduction of future intangibles and goodwill from base capital calculations relative to Basel III capital standards. Internationally active banks are more likely to need higher loss absorbency to reflect higher and more complex cross-border risks.
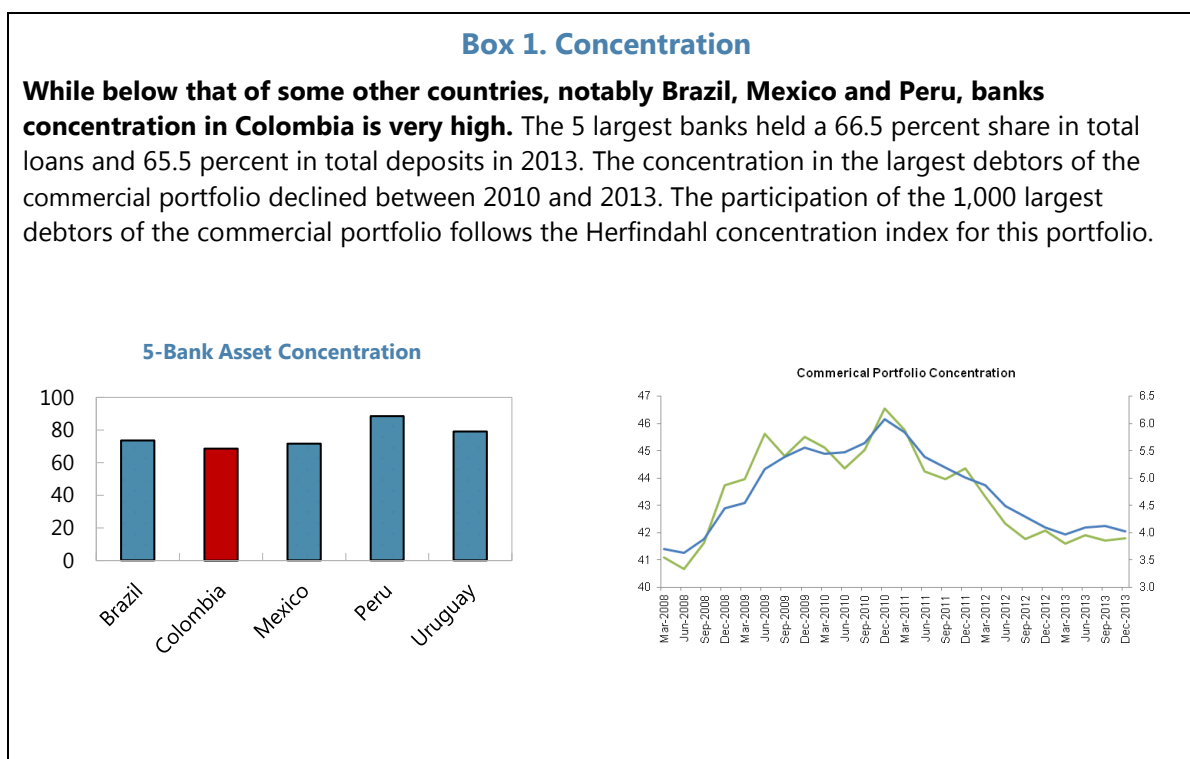
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[3] The numbers do not include Colombian banks' holdings abroad. The capital ratios under the new capital scheme apply to banks, financial corporations, and finance companies. The old definition of capital included, besides these institutions, also financial cooperatives and special official institutions.

D.   The SFC's Stress Tests

14.   The stress tests described here are conducted by the SFC. The SFC has identified the following main risks for the financial sector and the economy as a whole that can easily translate into financial sector stress:

- Increase in interest rates on U.S. bonds and effect on interest rates of Colombia;

- Increased volatility in financial markets, affecting Colombia's asset prices;

- Increased risk aversion and decreased foreign investment;

- Exchange rate depreciation.

To assess credit risk, liquidity risk, market risk and exchange rate risk the SFC conducts three stress testing methodologies, including inputs by the Central Bank on loan delinquency, devaluation of TES instruments and the foreign currency portfolio.[4]

Box 1. Concentration

While below that of some other countries, notably Brazil, Mexico and Peru, banks concentration in Colombia is very high. The 5 largest banks held a 66.5 percent share in total loans and 65.5 percent in total deposits in 2013. The concentration in the largest debtors of the commercial portfolio declined between 2010 and 2013. The participation of the 1,000 largest debtors of the commercial portfolio follows the Herfindahl concentration index for this portfolio.

5-Bank Asset Concentration

Commerical Portfolio Concentration

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[4] The Central Bank's credit risk stress tests include a VEC model estimation which involves macroeconomic projections and financial data. In particular, it assumes 2-year stressed paths for GDP growth, unemployment, interest rates and housing prices, and tests the response of banks' profits and capital.

- **Concentration risk is assessed by simulating a credit shock in three steps.** The first two stress tests assume a decline in debt rating of the 100 largest debtors of the banks, while the third test reduces the rating of the top 5 debtors to default. In each scenario the additional required provisioning and profitability is calculated. This test is conducted top-down, from the largest debtors of the system to bank level effects.

- **Liquidity shock is simulated based on the episode of market volatility that took place between May and August 2013.** The internal liquidity ratio (ILR) of credit institutions is calculated by simulating two market type risk shocks: the first shock assumed a 28.6 percent devaluation of the government bonds (TES) portfolio entities corresponding to the 80th percentile of variations that occurred between April 26 and May 31, 2013; the second shock assumes in addition an increase in loan delinquency by 13.8 percent, corresponding to the highest growth of this indicator in the past 10 years.

- **To assess market risk and exchange rate risk three scenarios are elaborated assuming an increase in interest rates of fixed income securities by 100, 200, and 400 bps.** In addition, a 9 percent devaluation of the foreign currency portfolio and a 14.7 percent devaluation of variable income securities are assumed.

15.   **Based on these stress tests the SFC concluded that**:

  o **Credit risk**: The concentration in the largest debtors of the system has been declining, reducing the vulnerability of credit institutions. The current level of individual and countercyclical provisions enables banks to better respond to the shock.

  o **Liquidity risk**: The enforcement of the liquidity rule (introduced in June 2012) allows entities to fulfill adequately their obligations over a period of 1–30 days.

  o **Market risk and exchange rate risk**: Before the dismantling of QE3 and its likely effect on portfolio value, credit institutions are able to adequately support the impact of tapering, given strong solvency levels and the higher quality capital since August 2013.

Box 2. SFC's Stress Test Results

Credit shock: Compared to the baseline scenario, for the total of 18 banks, additional provisions under the stress scenario would amount to 8.7 percent, 70.3 percent and 70.4 percent in the first, second and third tests, respectively. The bank with the largest increase in its provisions in the first test would have to increase then to 19.4 percent, while under the second and third tests the maximum increase in provisioning would be 160.7 and 178.8 percent, respectively. Compared to the baseline scenario, for the total of 18 banks, the return on assets (ROA) decrease by 0.3 percentage points in the first test and 2.1 percentage points in the second and third test. Under the first test the banking system ROA ends up at 2 percent. In the second test the ROA declines from 2.2 percent to 0.10 percent, and a similar result is observed in the third exercise that leads to a decrease by 2.1 percentage points.

Comment: While the system level credit shock (rating downgrade) results in a manageable increase in provisions and reductions in profitability, with increased severity of the credit shocks the increase in provisions and profitability reductions are more significant with some banks much more adversely impacted. Identifying the impact on solvency due to these credit shocks would also provide a clear sense of bank vulnerabilities and the extent of bank assumptions and actions to offset such shocks.

Liquidity shock: Two market risk type shocks were incorporated, first an impairment of 28.6 percent of the portfolio of TES securities corresponding to the 80th percentile of changes between April 26–May 31, 2013. Second, in addition to the first shock, 13.8 percent of delinquent loans were incorporated (a historical high over the last 10 years). Only one bank fails the combined TES and portfolio shocks, presenting an ILR at 30 days of 80.7 percent as opposed to 100 percent required in the regulation. In addition to this, four more institutions showed significant variations in ILRs in monetary terms.

Comment: This finding suggests that while system liquidity remains presumably fine due to large deposit bases and lower run-off and draw-down rates, some banks with below average deposit funding, or those that are reliant to a greater degree on wholesale funding, could be exposed to short-term liquidity risks.

Market risk and exchange rate risk:

Impact 1: Portfolio deterioration – this incorporates the combined market and exchange risk impact of three scenarios. Scenario 1 looks at an increase in 100bps in the yield of fixed income securities plus a devaluation of 9 percent of the entire portfolio in other currencies (other than Latam) including impairment of equity of 14.7 percent (maximum daily variation). Scenario 2 and 3 are the same except for larger yield changes of 200bps and 400bps.

Impact 2: Portfolio deterioration affects solvency via a: reduction in the additional equity (16.6 percent of earnings (committed), 100 percent of the depreciation available for the sale of debt and equity), a reduction in the value-at-risk (VaR), and potential variation in APNR for equity (financial corporations) depending on the effect of domestic vs. foreign currency.

Impact 3: it is assumed that the 30 days ILR would be affected mainly through a reduction in the adjusted liquid assets.

Comment: Market and exchange rate risk tests at system level appear not to adversely affect both solvency and liquidity. However, the impact on individual banks is not known from these tests given that impact and variation of solvency and liquidity is much greater for the adverse scenarios.

The findings from the stress tests should be utilized to question and investigate the bank's own risk management practices (including stress tests and risk controls). In particular, the loss forecasting and provisioning on specific portfolios should be examined, and the business models of banks should be questioned by looking closely at their income and profit projections, their liquidity and funding profiles, and concentration risk. Stress tests could be improved by combining adverse macroeconomic scenarios with these various scenario shocks that are of a prolonged (multi-year) nature. This may better help supervisors to identify banks with weaker solvency and liquidity profiles, and supervisors could then use firm specific prudential enhancements for capital and liquidity to rectify bank-specific vulnerabilities.

Challenges

16.   While stress testing is undertaken by the central bank and the supervisor, it is not clear whether these are fully coordinated to account fully for cross-border and longer-term liquidity risks. It is not clear whether top-down and bottom-up exercises by banks are fully coordinated for both capital and liquidity purposes. This restricts authorities' abilities to question banks own stress testing capabilities. Moreover, there is no requirement for Colombian banks to abide by longer-term liquidity measures. Development of longer-term liquidity metrics would be useful to assess the resilience of Colombian banks to longer term funding concerns and asset-liability mismatches from liquidity stress. The adoption by authorities of the Basel III liquidity metrics that started in 2012, especially the liquid coverage ratio (LCR) and the net stable funding ratio (NSFR), goes some way in addressing these issues.

17.   The development of low-growth tail risk scenarios, joint testing and linking solvency, liquidity and contagion stress testing would be a useful enhancement. Currently tail risks are determined by large (beyond) historical moves in asset prices, credit deterioration, or liquidity shocks. However, tail-risks may also endure and may not necessarily be larger than previous historical shocks. These shocks, embedded within multi-year low-growth scenarios provide useful processes to see how banks can suffer losses in the downturn, and be restricted in recovering income and revenues in the upturn. The Colombian authorities currently lack comprehensive, consistent, and comparable data on a cross-border basis for its banks and large financial and mixed conglomerates to stress test their exposures fully. Improved and joint stress-test exercises between home and host supervisors and central banks may be helpful for such entities. Contagion stress testing should also be implemented both for banks and nonbank sectors, but also connecting these two together and linking contagion risk stress testing more completely with solvency and liquidity stress testing.

18.   Stress testing should be linked to capital and liquidity planning for banks. Using stress testing linked to capital and liquidity planning for banks as a robust supervisory tool would help provide transparency to supervisory bank-specific actions on capital and liquidity. It would also help improve banks' own stress testing and risk management processes.

E. Housing Prices and Housing Finance

19.   Housing prices have increased substantially in recent years. House prices have nearly doubled in real terms over the last decade and are 20 percent above the peak in 1996, driven mainly by prices in the capital and two other cities. House prices increase equally for subsidized and commercial housing and there are some indications that Colombia may be undergoing a bubble.[5]

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[5] Gómez-González, José E., Jair N. Ojeda-Joya, Catalina Rey-Guerra, and Natalia Sicard, 2013, "Testing for Bubbles in Housing Markets: New Results Using a New Method", Borradores de Economia N.753/2013, Banco de la Republica. There are also papers that claim otherwise: Hernandez, G. and Piraquive, G. (2014), "Evolución de los precios de la vivienda en Colombia", Archivos de Economía, No. 407, Departamento Nacional de Planeación; and Salazar, N., Steiner, R., Becerra, A. and Ramírez, J., (2012), "¿Qué tan desalineados están los precios de la vivienda en Colombia?", FEDESARROLLO.

Nevertheless, adjusted by household income level purchasing power remains high, though the return on housing investment through rental flows has fallen.[6]

Price Index of Homes, 2006=100

Real House Price Index, 1990=100
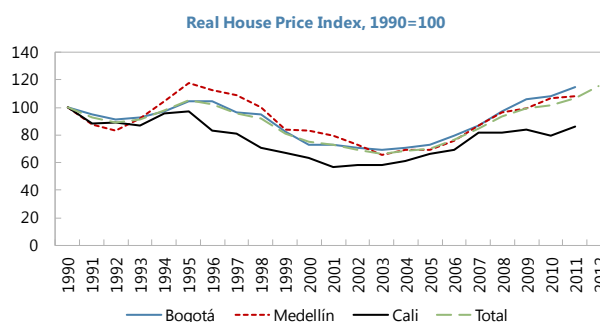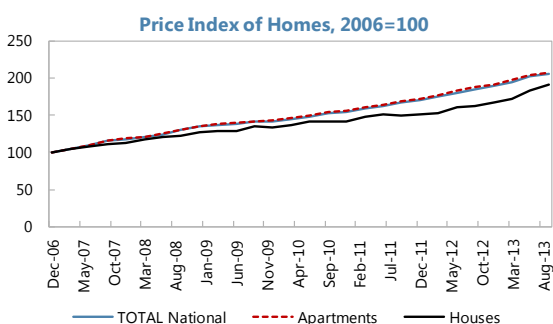
20. **Various factors affect prices of new homes.** On the supply side, the trend in the prices of new housing at a national level is partly explained by rising construction costs and the long process of obtaining building permits, although an increase in the quality of housing may also play a role.

However, the price of land seems to be the main factor behind the downward price rigidity, in particular in cities with the biggest restrictions on land (such as Bogota, Bucaramanga and Medellin). A chronic shortage of serviced land has brought the housing deficit at the national level to over an estimated one million units and mostly affects poorer households. On the other hand, demand has been boosted by demographic trends, income growth, as well as the government's subsidy program.

Sales Price to Construction Price Index
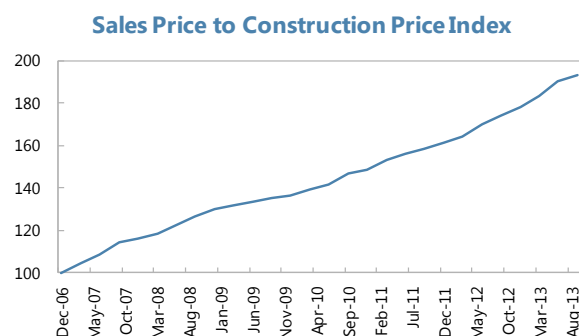
21. **The government support to housing includes a number of benefits and programs.** Financial subsidies are given for (i) demand support: upfront subsidies up to 4 minimum wage incomes, accessible to 80 percent of households; buy down interest subsidy (up to 8 minimum wage); non means-tested tax exemption on savings for housing accounts and on interest payments on mortgages; (ii) supply stimulation (various tax incentives for VIS developments); and (iii) the extension of social housing (VIS)[7] loans and residential leasing through tax relieves. In addition, a June 2012 housing law created a program to build and distribute 100,000 new units for free to non bankable—poor or vulnerable—households. Local governments often supplement the national schemes.

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[6] BBVA Research "Colombia Real Estate Outlook 2013". Families dedicate 24.7 percent of their disposable income for the first payment of their mortgage, under the legal limit of 30 percent.

[7] VIS is defined as a house or apartment whose value is below 135 monthly minimum wages (approximately equivalent to $47,000 dollars).

22.   More recently an interest rate subsidy was implemented as a counter-cyclical measure to spur construction. In April 2013 a subsidy program targeting middle-income earners— called Plan to Boost Productivity and Employment (PIPE)—extended coverage of the interest rate on new homes with a value above that of VIS but below COP 198 million. The government provided a subsidy of 250 basis points, with the financial system undertaking a further 250 basis points cut. Implementation rate of this program is high (Box 3).

Real House Price Index, 1990=100
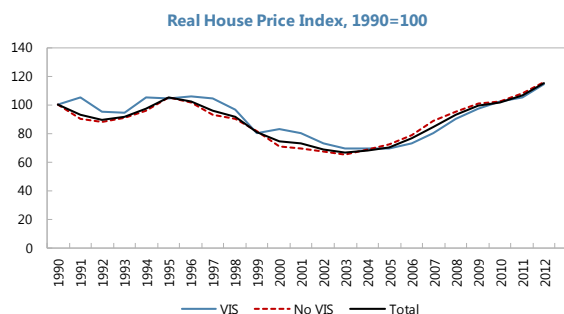
23.   Mortgages have increased more recently but credit risks appear to be largely under control. In 2013 and early 2014, the housing portfolio had the highest annual growth in total loans. In January 2014 the real annual growth of this portfolio was 25.7 percent. Slightly more than 1/3 of the mortgage portfolio was for non-subsidized housing at end-2013. The level of provisioning for mortgage housing is generally lower than the balance due, because collateral quality is high. However, vulnerabilities are mitigated by a low stock of mortgages in banks' portfolios (about 9 percent of total at end-2013), and prudent debt-to-income and loan-to-value ratios

Credit Institutions Mortgage Portfolio
(Percent change, unless otherwise indicated)

(LTVs) of households (LTVs are about 55 percent on average). The Central Bank sets caps on housing finance interest rates which are referenced to the lowest rates prevailing for other type of lending, while the maximum rates for loans to VIS are below those for non social loans (non VIS). Lending norms are prudent (first mortgage, LTVs, affordability), and loans are generally extended at fixed rate. Borrowers have the right to prepay at no cost which they generally do. The average loan life is about 7 years. Housing loans extended in 2013 showed less deterioration compared to those made in 2008 and 2012.
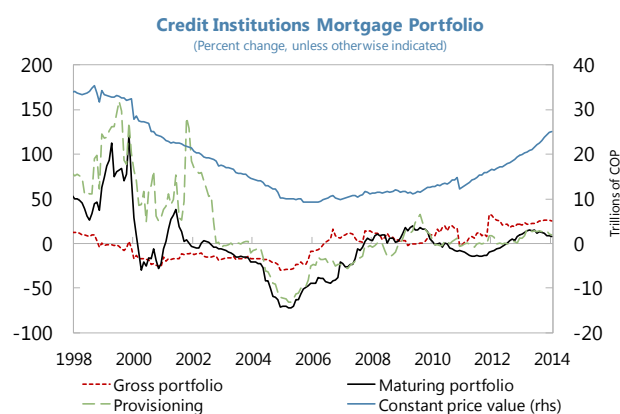
Box 3. Interest Rate Subsidy Programs

Law 546 of 1999 established the Reserve Fund for the Stabilization of the Portfolio Mortgage (FRECH), designed to facilitate conditions for financing housing mortgages indexed to the CPI. The Law granted the following resources to the Fund:

- Revenues from a national tax introduced by the Law, amounting to 50 percent of the monthly remuneration of reserves. This was retained by the Central Bank at the time of payment to credit institutions. The amount transferred amounted to COP 153.6 billion.

- COP 150 billion from central bank profits in 1999.

- Revenues from the difference between the interest rate adjusted for the inflation index (UVR) and interest rate DTF, when the first is greater than the second, that should be provided by credit institutions that have mortgage loans denominated in UVR and liabilities denominated in DTF.

- Revenues from the Fund.

- Revenues from credits that were contracted for this purpose. The Central Bank, as fiscal agent of the Government, may contract credits the repayment of which will be dedicated to the Fund.

The Central Bank is authorized to provide a conditional subsidy to facilitate financing of new housing using the resources of the Fund. The subsidy is a swap calculated on the agreed interest rate on new loans for new homes granted by credit institutions to individual borrowers that meet certain conditions, only during the first seven years of loan life. The size of the interest rate subsidy depends on the value of the home. The interest rate subsidy also applies to obligations incurred under the system of residential leasing.

In 2011, the program was expanded and the budget increased to COP 100 billion to cover loans granted through March 2012, while in 2013 new resources were allocated to FRECH to higher value housing, corresponding to 2.5 percent of the interest rate under the Plan to Promote Employment and Productivity (PIPE). These resources were included in an account called countercyclical FRECH – 2013 financed from the general budget.[8] Implementation of these programs was very high in 2013.

In 2014, the Ministry of Housing introduced an interest rate subsidy for household beneficiaries of the "Program of Priority Interest for Savers". This program provides a subsidy amounting to 5 percentage points of the interest rate on loans for the purchase of priority urban housing (up to COP 41.3 million). Some 86,000 subsidies of this type are expected to be granted and disbursed in 2014-15 with the program budget amounting to COP 739 billion.

F.   Prudential Measures in Place

24.   Four institutions constitute the financial stability committee—the central bank, the SFC, the Ministry of Finance, and the Deposit Insurance Agency. The Ministry of Finance is the regulator for the entire financial system, and the SFC is the primary supervisor for the financial system. The central bank is responsible for the normal functioning of the economy's internal and external payments, regulates the foreign exchange system and is the lender of last resort. The

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[8] For the countercyclical FRECH, the following conditions on the loan's interest rate must be met for the subsidy: the intermediary must guarantee an interest rate that does not exceed 9.5 pp for housing between 135 monthly minimum wages (MMW) and 235 MMW (the limit on the interest rate is 6.5 pp if the loan is indexed to the UVR). For housing whose value is between 235 MMW and 335 MMW, interest rates guaranteed by the financial institutions does not exceed 10.5 pp (7.5 pp if indexed to the UVR).

deposit insurance agency implements decisions taken by the SFC on intervened deposit-taking institutions. This committee has recently redoubled efforts to coordinate and facilitate information exchange. Each of the four institutions retains its supervisory responsibility to identify risk, implement and enforce policies, and report to Congress.

25.   Colombia has used a large number of prudential measures in the past. The ones still in place at this time are also numerous and apply to all deposit-taking corporations and other financial intermediaries, except insurance corporations and pension funds.

- **Loan-to-value ratio (LTV)limits** were introduced in 1999, following the banking crisis and apply to mortgage borrowers. The objective is to limit households' leverage and financial institutions' exposure to housing price movements. There are two limits in place: the LTV ratio for a loans targeted towards the financing of VIS is of 80 percent. All other mortgage loans have a LTV ratio of 70 percent. While there is no specific indicator for assessing the effectiveness of this instrument, since the implementation of the LTV ratios, households' leverage has declined. For instance, the financial burden indicator, defined as the ratio between interest and capital payments on mortgage loans to income, has shown a significant reduction since 2000. In addition, the level of the LTV ratio post-2000 has also been consistently below the regulatory maximum and is close to 55 percent in 2013.

- **Debt-to-income (DTI) limits** were introduced in 1999 and apply to mortgage borrowers. They limit the monthly debt service to 30 percent of disposable income.[9] The DTI ratios are not adjusted counter cyclically and are applied only to new flows. All credit institutions are subject to this regulation.

- **Limits on foreign-currency loans** have been in place since 1993 and their purpose is to limit currency and liquidity mismatches by limiting the currency and the maturity of foreign currency loans granted by credit institutions. Credit institutions are allowed to borrow externally only to on-lend locally in FX currency, with equal or shorter maturity. Hence, credit institutions operate as intermediaries between the borrower and a foreign institution. Financial institutions are also allowed to use foreign currency funding to create synthetic hedges for their derivatives portfolio. They are not, however, allowed to take FX currency-denominated deposits.

- **Dynamic loan-loss provisioning** is aimed at ensuring stability of financial institutions' own capital, and reducing profit volatility. It is applied to commercial and consumer loans, and differentiated by currency (foreign vs. domestic) and sector (households and corporate) and all commercial banks, financing companies, commercial financing companies, financial cooperatives and all entities supervised by the SFC who are authorized to engage in credit operations are

  subject to this measure. Individual provisions can be calculated with an internal model or with a benchmark model supplied by the SFC, with the latter being more commonly used and where all

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[9] Income is defined as wage income and all other types of certifiable incomes earned (e.g. salaries, retirement income, government transfers) by the individual or the household.

inputs in the calculation of the expected loss are supplied by the supervisor (probability of default and loss given default). Tying the countercyclical buffer triggers to bank-specific variables allows institutions facing difficulties to smooth their provisioning expenses, independent of overall economic conditions. This also implies that the SFC does not have to take a stance with respect to the economic cycle (or any other market condition to trigger the buffers).[10] The methodology for calculating the individual provisions consists of estimating two components: an individual procyclical component, and an individual countercyclical component. Key variables that trigger a countercyclical adjustment are deterioration in the loan portfolio, loan portfolio efficiency, financial fragility, and credit growth. Currently, a benchmark model for micro-credit and mortgage loans is under construction by the SFC.

- **Limits on interbank exposures** address system-wide credit concentration concerns and are applied on an individual counterparty basis. The limit establishes that no intermediary can lend an amount greater than 30 percent of its capital to a particular financial institution. The instrument was introduced in 1993.

- **Concentration limits** address credit concentration risk. The limit establishes that no intermediary can lend an amount greater than 10 percent of its capital to a particular individual, provided the only guarantee is the debtor's own capital. The instrument was introduced in 1993. Institutions are required to report the concentration of their loan portfolio quarterly. In addition, the SFC performs on-site inspections where these, and other limits, are verified. There are two exemptions to the 10 percent limit: (i) an institution can lend up to 25 percent of its capital to a single debtor provided that the individual has sufficient admissible guarantees to hedge all risk exceeding 5 percent of given capital, and (ii) there are certain "special" institutions created to help develop specific sectors of the economy (FINAGRO, BANCOLDEX, FINDETER, FDN and IFI) that work as second-tier banks, and offer special credit lines (called "*redescuento*") to financial institutions, that are channeled to specific sectors. Loans granted by an institution funded by the "*redescuento*" credit lines are not subject to concentration limits.

- **Liquidity requirements** are meant to dampen liquidity risks. Colombia uses a liquidity risk index which is very similar to the LCR proposed in Basel III. Liquid assets correspond to the sum of disposable liquidity and liquid investments, and the latter are adjusted by a liquidity risk haircut. Foreign currency liquid assets have an additional haircut to control for exchange rate risk. Liquidity needs for net cash outflows are calculated as the sum of contractual and net non-contractual expenses minus 75 percent of the minimum value between contractual inflow and the sum of contractual and net non-contractual outflow. The rationale for this is that institutions cannot fully compensate liquidity needs with contractual income, and have to at least consider a net cash outflow of 25 percent of their contractual and net non-contractual expenses. The time

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[10] The formulae for setting the provisioning level differ depending on whether the institution is in a "good phase" or in a "bad phase" (in a "good phase" the accumulation methodology is used, whilst during a "bad" the reduction methodology is used). Four individual indicators on the general financial health of the institution are used to differentiate between an upturn and a downturn and the indicators must be above or below a specified threshold for a period of at least three consecutive months.

horizons considered in the stress scenario for calculating the ratio is of 7 and 30 days and under both stress tests the ratio between liquid assets and the net liquidity requirement must be greater than or equal to 0. Supervisors can restrict market operations of institutions not meeting the liquidity requirement.

- **Limits on open FX positions** address currency risk by controlling derivatives position in the spot market. This measure applies to all types of foreign currency net positions. The limit on net currency FX position, introduced in 1991, is 50 percent of regulatory capital and reserves and cannot be negative, while the net total FX position limit, introduced in 1999, is 20 percent (with a lower limit of -5 percent, introduced in 2004) of capital and reserves.[11]

- **Limit to gross leverage position** applies to dealing (buying and selling) of instruments in foreign currency with maturity equal or higher to one day. Dealing cannot exceed 5½ times the institution´s capital.

- **Transitional provisions** are temporary individual measures that apply to consumer loans of institutions whose balance sheets have reported consumer loans for at least the last twenty-five months and for which the 6-month moving average of the semi-annual difference of the real annual growth rate of nonperforming loans is positive. The provision amounts to 0.5 percent of the outstanding capital of the loan. The additional individual provision stops to apply when the 6-month moving average described above is less than or equal to zero for a period of six consecutive months. The objective of this tool is to limit the deterioration of credit institutions' loans portfolio.

26.   Though Colombia has a wide range of prudential tools to tackle incipient systemic risks, there are challenges. A key challenge remains communicating and coordinating existing macro prudential policies to tackle systemic risks with micro prudential and macroeconomic policies to avoid policy conflicts and unintended impacts.

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[11] The limits on open foreign currency positions were strengthened in 2004 to reduce the volatility of derivatives in the spot market

FINANCIAL INCLUSION, GROWTH, AND INEQUALITY: A MODEL APPLICATION TO COLOMBIA[1]

A. Introduction and Background

1.   **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).

2.   **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).[2] 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). 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.

3.   **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). Statistics on frequency of use of accounts for savings and payments were equally grim.[3] 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.

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[1] Prepared by Izabela Karpowicz. The author would like to thank Era Dabla-Norris and Filiz Unsal (IMF) and Professor Robert Townsend, Yan Ji, Stacy Carlson, and Yu Shi (all MIT) for their helpful suggestions and comments and for assistance with the modeling.

[2] 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.

[3] 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).

Relative to its closest comparators, Colombia's usage of formal finance was slightly below average, while use of informal finance was on the higher end (Figure 4).[4]

4.   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).[5]

5.   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 breath of financial instruments. On the supply side there have been substantive improvements in physical infrastructure, regulatory framework and costs, while demand constraints were adressed 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.

6.   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 on 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.

7.   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 consequences. The model is borrowed from Dabla-Norris et al. (forthcoming, 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

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

[5] 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).

called to complement those aimed at eliminating distortions in Colombia's fiscal policy framework, that have hindered a wider redistribution of economic gains.[6]

8.   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.

B.   Determinants of Financial Inclusion

9.   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.[7] This finding appears robust across regions as well as country income types (Demirguc-Kunt and Klapper, 2012).

10.   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 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.

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[6] 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)

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

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.

Access

11.   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.[8]

- 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 Opportunidades,* and others*)* since 2006 and over 38,000 correspondents were registered as of 2013.

Physical Access of Financial Services

	2006	2008	2012
Commercial bank branches			
per 1,000 km^2	3.7	4.0	4.6
100,000 adults	13.3	14.0	14.9
ATMs			
per 1,000 km^2	...	7.7	11.1
per 100,000 adults	...	27.0	35.8

Sources: IMF Financial Access Survey.

12.   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.[9] The program of interest subsidies on new mortgages granted to over 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.

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[8] 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 the total in 2006.

[9] 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.

13.   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.

Depth

14.   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.

Efficiency

15.   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.[10]

16.   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 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).

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[10] Average interest rate spreads was 7.2 percent in 2012.

Progress and challenges

17.   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 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.

18.   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.[11]

19.   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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[11] 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.[12] 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 CONPNES) that could support an overarching strategy for financial education. A sub-section of the monthly household 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 CONPNES 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.[13]

C.   Model Application[14]

20.   The model is borrowed from Dabla-Norris et al. (2014) and focuses on the financial inclusion of enterprises.[15] This micro-founded, general equilibrium, overlapping generation model features heterogeneous agents who are distinguished from each other by wealth and talent and who can chose 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

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

[13] 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).

[14] 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.

[15] The authors actually refer to financial "deepening". However, while financial deepening often denotes and 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."

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.[16] 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.

21.   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.[17] 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.[18]

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

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[16] Since only highly leveraged firms are monitored, firms face different costs of capital and may chose not to borrow even when credit is available.

[17] However, financial inclusion can also crowd in relatively untalented agents, decreasing TFP.

[18] GDP is calculated as the sum of all individuals' income; TFP is the average entrepreneur's talent weighted by their respective output.

Main Model Variables, 2012
(Percent, unless otherwise indicated) 1/
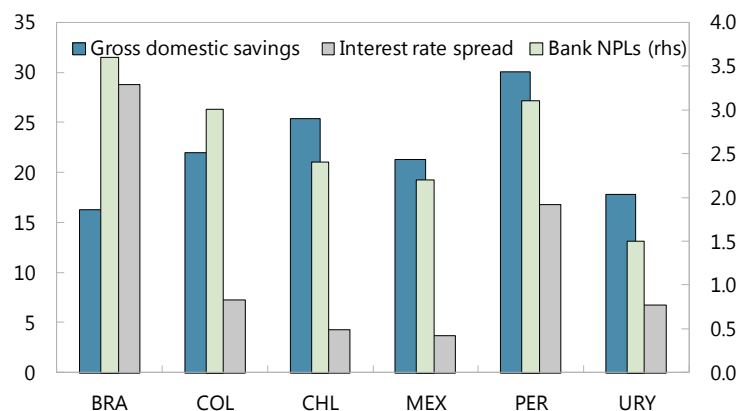
Source: Author's calculations.
1/ Gross domestic savings are expressed in percent of GDP; interest rate spread equals average lending minus deposit rate; Bank NPLs are expressed in percent of total gross loans.

23. **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, ω; the average value of collateral is used to calibrate the degree of financial friction stemming from limited commitment, λ; while the financial participation cost, ψ, intermediation cost, χ, recovery rate, η, probability of failure, p, and the parameter governing the talent distribution, ρ, 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 ψ, λ, and χ. 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, ψ. The second experiment consists of relaxing borrowing constraints in the form of collateral requirements, λ. The third experiment assumes an increase in intermediation efficiency, χ.

Calibration: Data, Model, and Estimated Parameters

Target Moments	Data	Model	Parameter
Savings (%GDP)	20	20	ω=0.2
Collateral (% loan)	169	169	**λ=1.59**
Firms with credit (%)	57.2	57.4	
NPLs (%)	4	4.2	**ψ=0.06**
Top 5% emp. share	52.1	54.9	**χ=0.3**
Top 10% emp. share	65.7	67.3	η=0.37
Top 20% emp. share	80.3	79.1	p=0.17
Top 40% emp. share	92.8	89.3	ρ=3.8
Interest rate spread (%)	6.2	5.0	

Reducing the participation cost

24.   The impact of a decline in the financial participation cost, ψ, from 0.15 to 0 on GDP is favorable. A decrease in the participation cost pushes up GDP through its positive effect on investment for two reasons: (i) a lower ψ 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.

25.   The interest rate spread is very stable when financial participation cost is high, but decreases as ψ approaches zero. This is because a decrease in ψ 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 ψ 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.

26.   As the financial market develops, income inequality decreases. A decrease in ψ is disproportionally 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 ψ approaches 0.3, while the share of non-performing loans (NPLs) declines. The decline in inequality reaches a plateau the process hits other binding constraints to inclusion.

Comparative Statics: Reducing Participation Cost-ψ
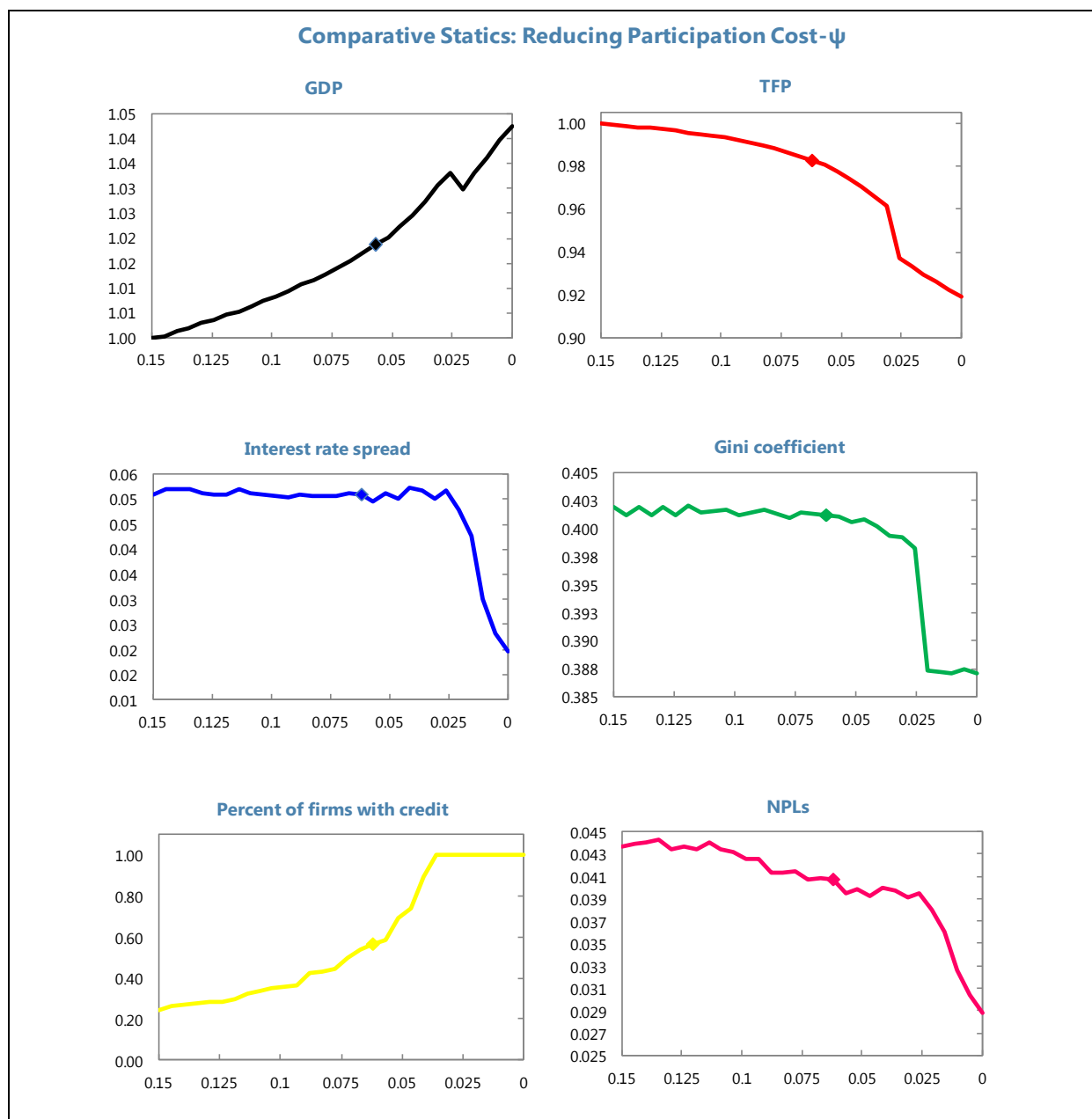
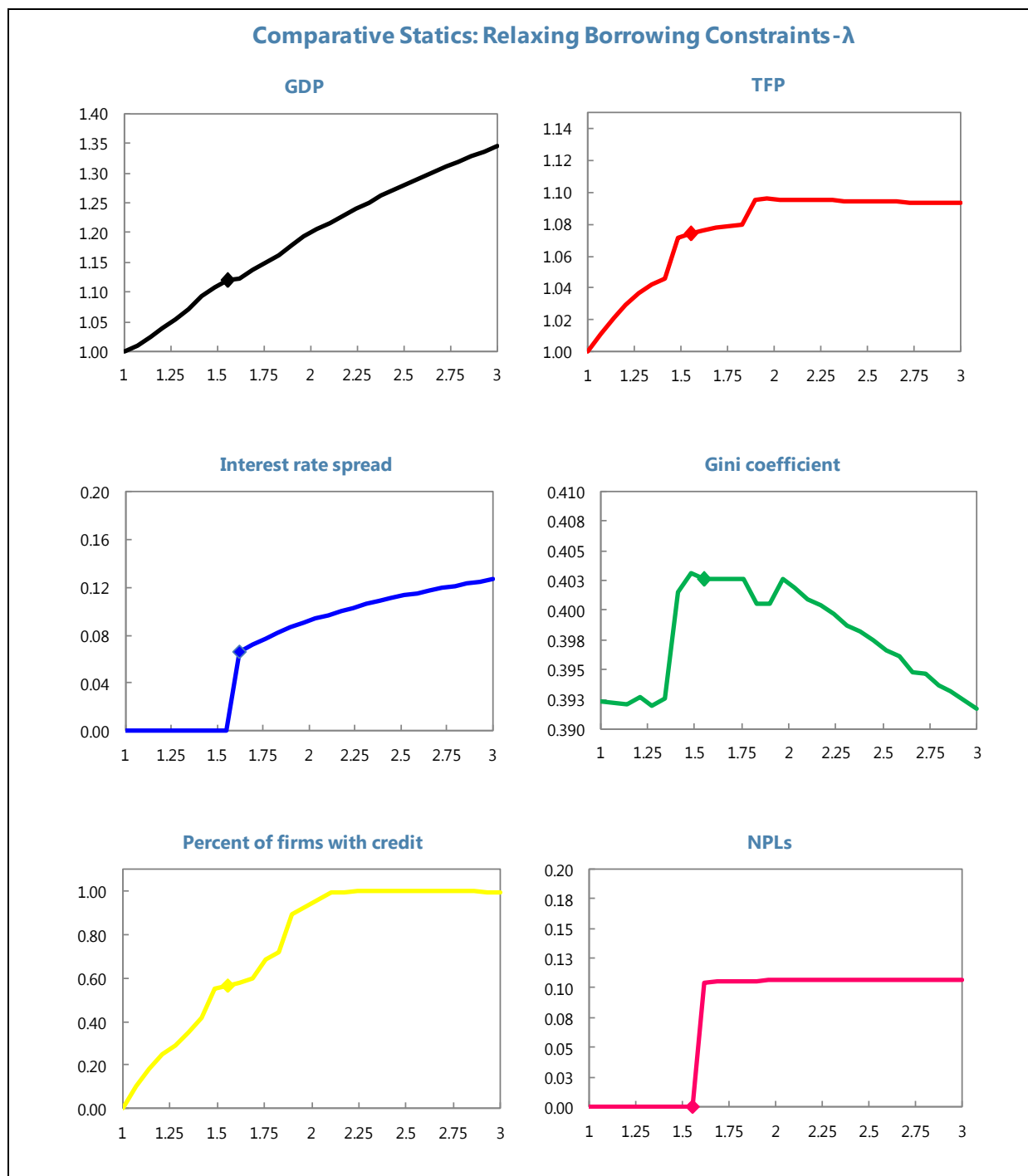**Relaxing borrowing constraints**

27.   Relaxing borrowing constraints by varying λ from 1 to 3 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 λ declines, TFP

increases, implying a more efficient resource allocation across firms.[19] The effect on GDP is very large suggesting that credit constraints are one of the major obstacles to financial development in Colombia.

28.   The interest rate spread increases in this scenario. The spread is zero when λ is low, because firms leverage is low and no default happens even when production fails. As λ 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 λ increases from low levels, talented entrepreneurs leverage more and increase their profits, driving up the Gini coefficient. However, as λ becomes larger, the sharp increase in the interest rate shrinks entrepreneurs' profits, leading to a lower Gini coefficient. The stage in which Columbia is now (i.e. its current value of λ) suggests that inequality should be declining.

29.   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 the door 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.

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[19] 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".

Comparative Statics: Relaxing Borrowing Constraints-λ

GDP

TFP

Interest rate spread

Gini coefficient

Percent of firms with credit

NPLs

Increasing intermediation efficiency

30. **Varying the financial intermediation cost, χ, from 1.2 to 0 pushes up growth and TFP**.
GDP and TFP are responsive to a decrease in χ although less so compared to the case where λ is
lowered. At higher levels of χ, better intermediation efficiency only benefits the highly leveraged
firms which are few (due to the low financial inclusion ratio and tight borrowing constraints). As χ

decreases further TFP increases because the lower intermediation cost facilitates the allocation of capital to more efficient entrepreneurs.

31.   The interest rate spread can be expected to decrease. The spread increases initially for lower levels of χ and decreases sharply as χ approaches zero, displaying an inverted V shape. There are two opposing forces affecting the spread stemming from a decline in χ: 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 χ decreases the interest spread directly. Whether the interest rate spread increases or decreases depends on which effect dominates.

32.   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.

Comparative Statics: Increasing Intermediation Efficiency-χ
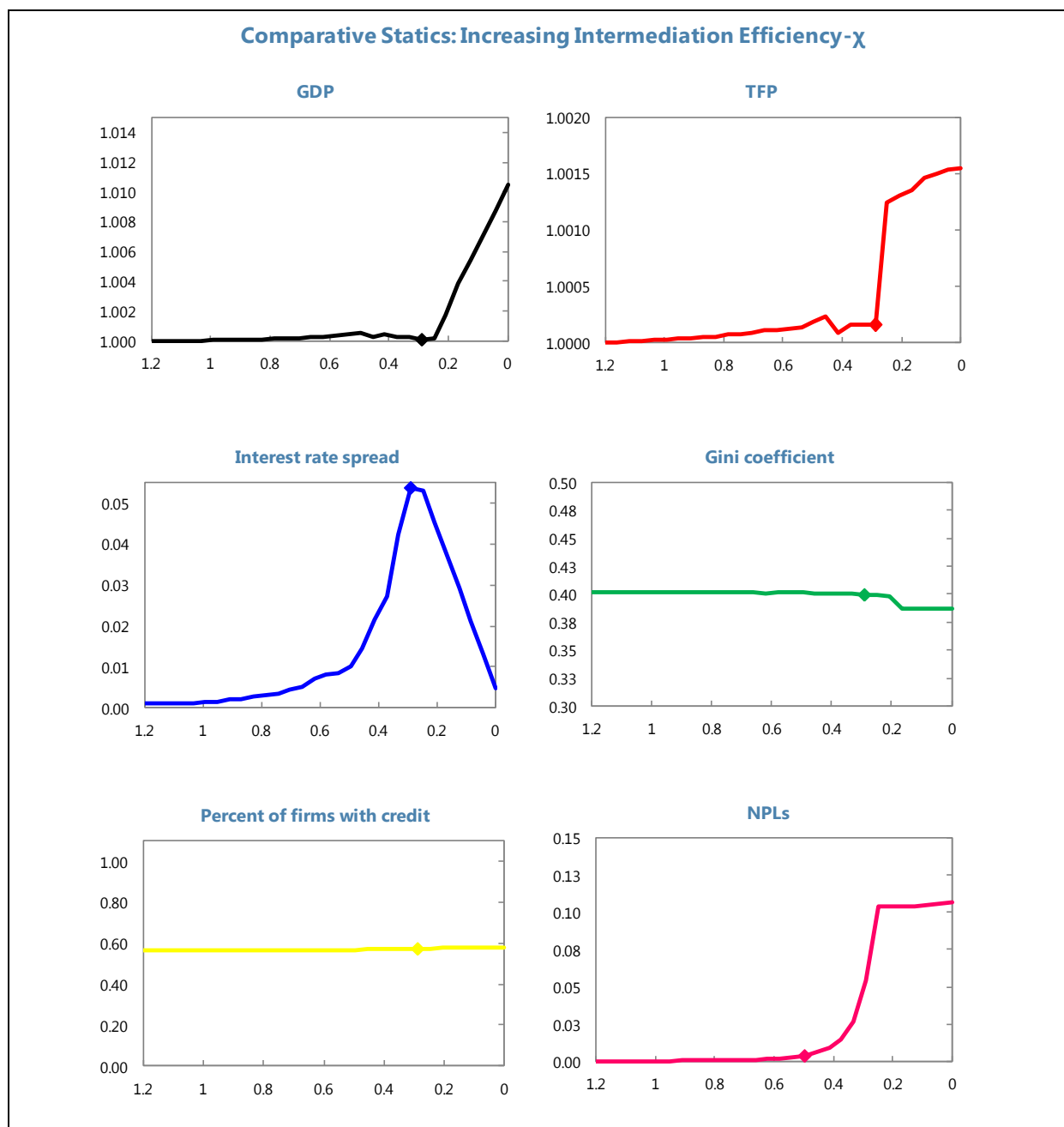
Discussion of results

33.   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."[20]

34.   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 necessary 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.

35.   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 disproportionally more) by entrepreneurs that are already included in the financial system and would not affect inequality.

<div align="center">

The Impact of Financial Inclusion
(Percent)

</div>

	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

36.   These examples are illustrative, as the calibration for the financial inclusion process is chosen arbitrarily. It may well be possible to increase λ 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. Appendix II reports the transitional dynamics of various measures. Starting at year 0, Figures 8–10 show the dynamics reflecting a linear decrease in φ and χ by 50 percent, and an increase in λ by 30 percent over 10 years. The interpretation of results remains with the addition of the time dimension of financial inclusion.

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[20] Inequality does not decrease substantially with lower λ 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.

D. Conclusions

37.   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.

38.   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 contraints 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.

39.   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. 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.

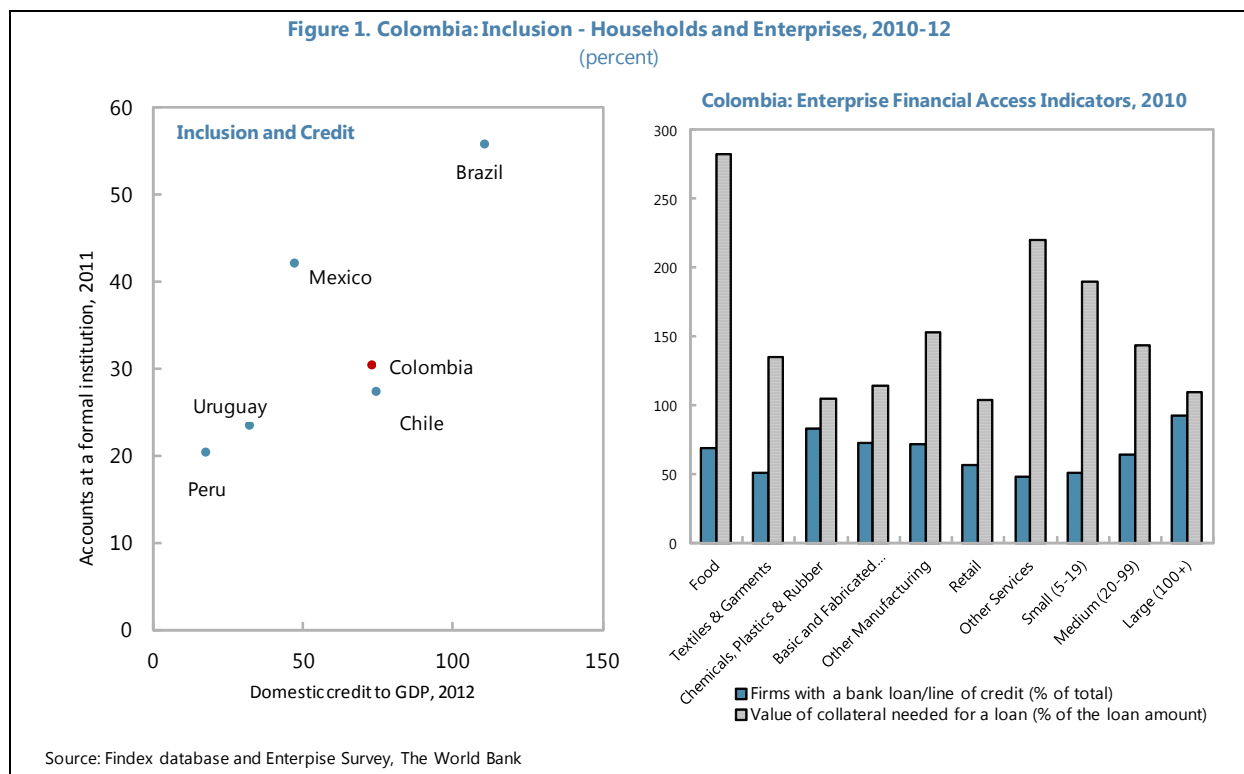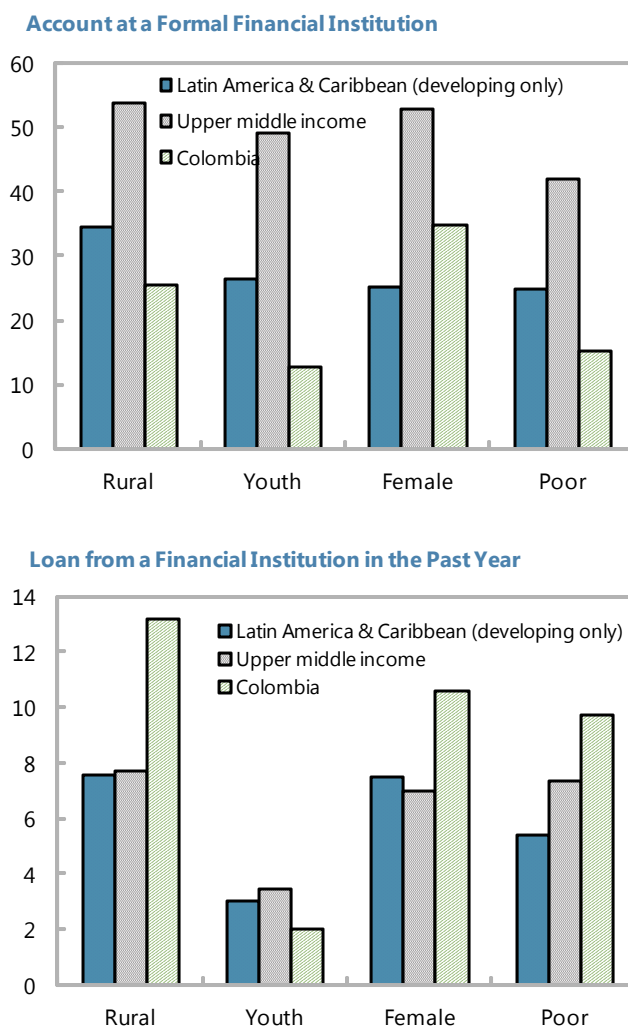# Appendix I. Taking Stock of Financial Inclusion

Figure 1. Colombia: Inclusion - Households and Enterprises, 2010-12
(percent)

Source: Findex database and Enterpise Survey, The World Bank

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
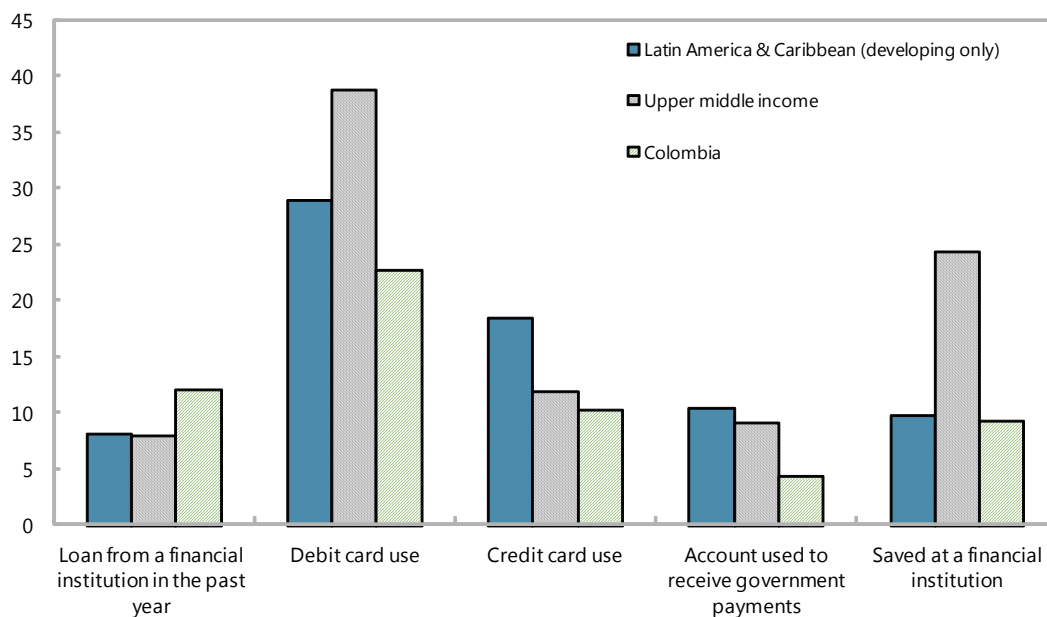
Informal Finance
(Past year)
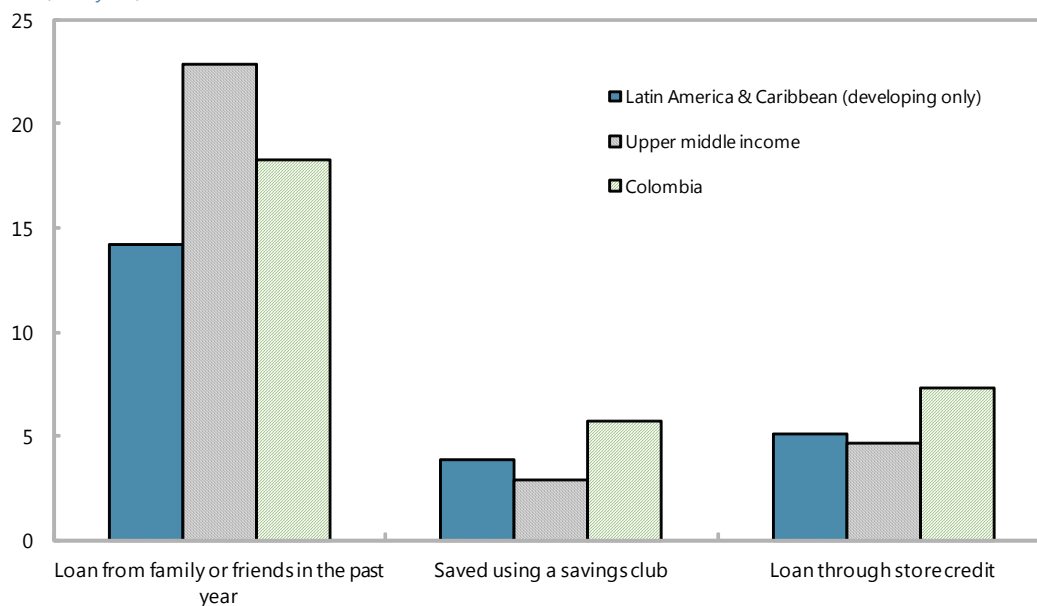
Source: Findex Database, World Bank.

**Figure 4. Colombia: Formal and Informal Finance, 2011
(percent)**
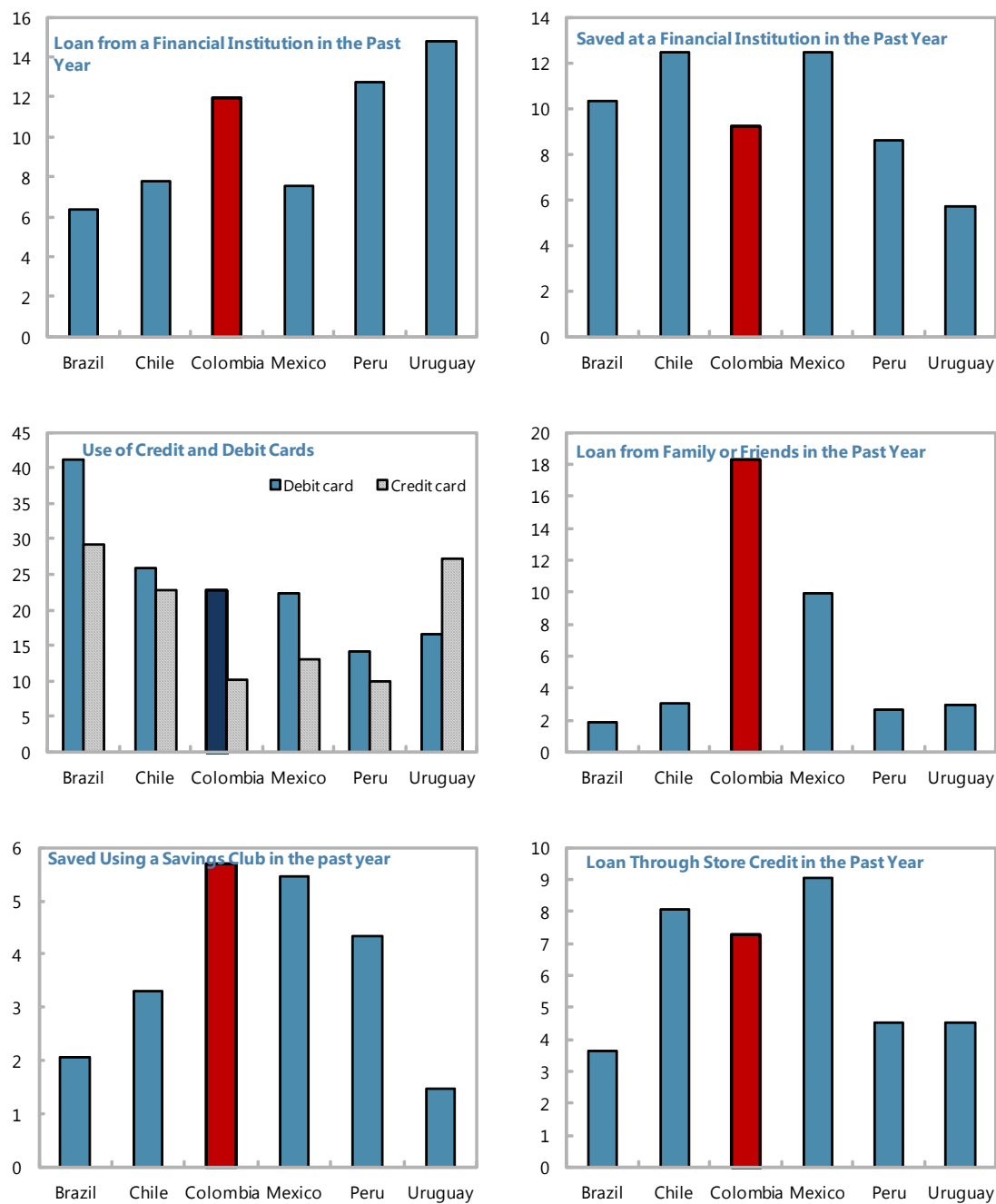
Source: Findex database; The World Bank.

Figure 5. Colombia: Enterprise Survey Indicators, 2006–10
(percent)
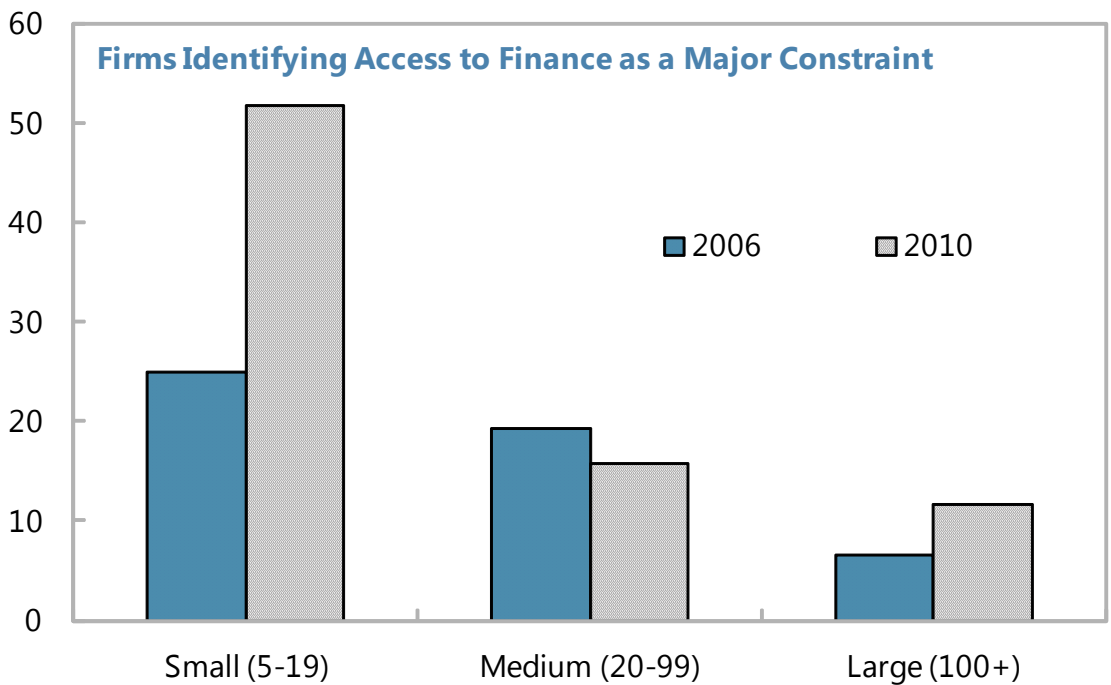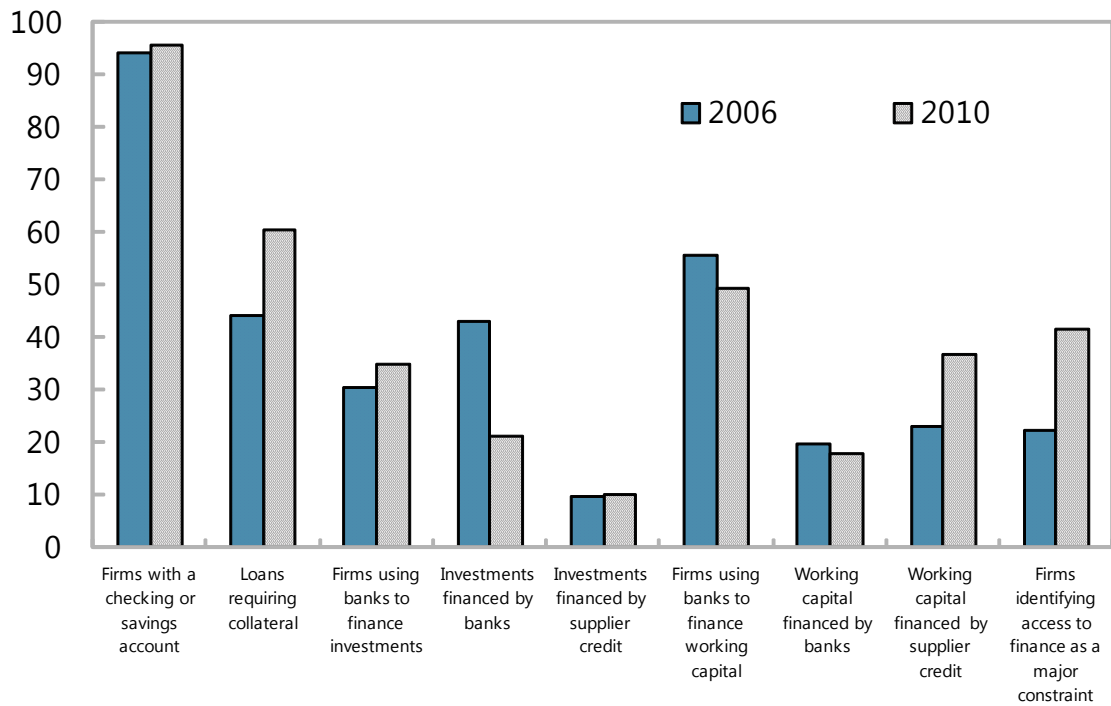
Source: Enterpise Survey, The World Bank.

Figure 6. Colombia: Banks Concentration, Households and Entreprise Inclusion, 2010–12
(percent)

Firms with a bank loan/line of credit (% of total)

Value of collateral needed for a loan (% of the loan amount)
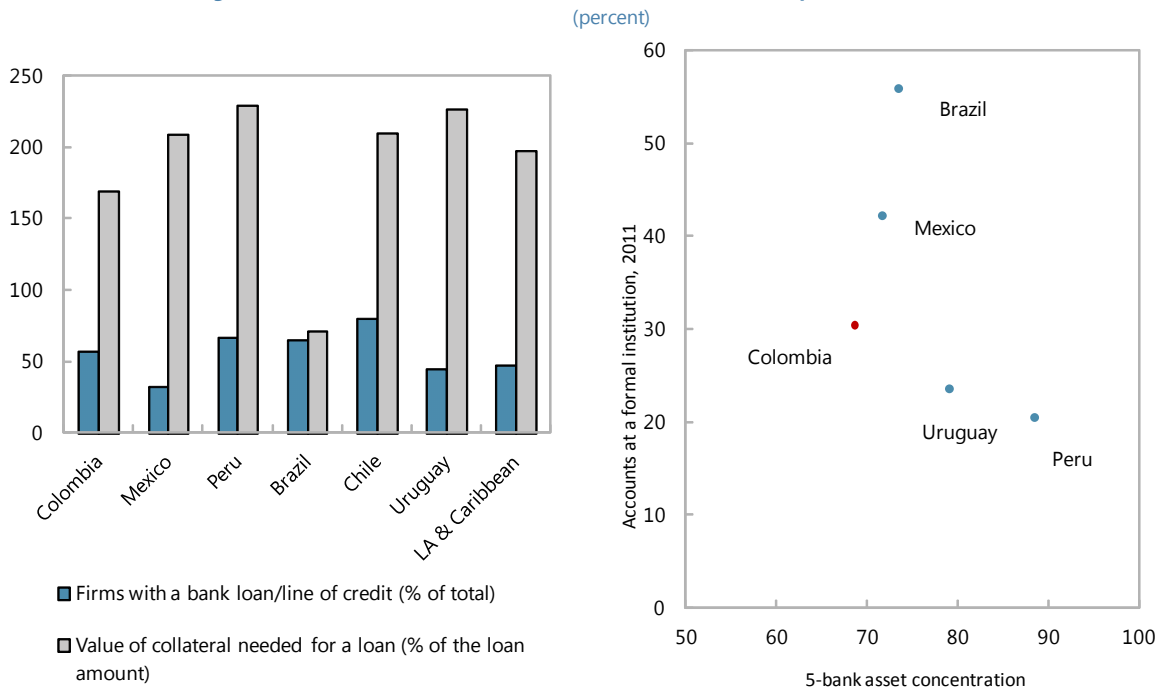
Source: WDI; Findex and Enterprise Survey Banking Data, The World Bank
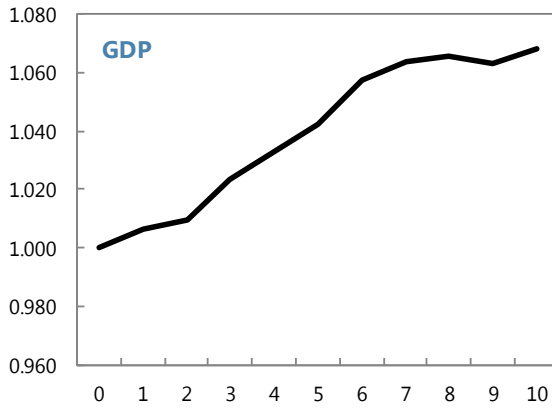
Appendix II. Transitional Dynamics–Growth and Inequality

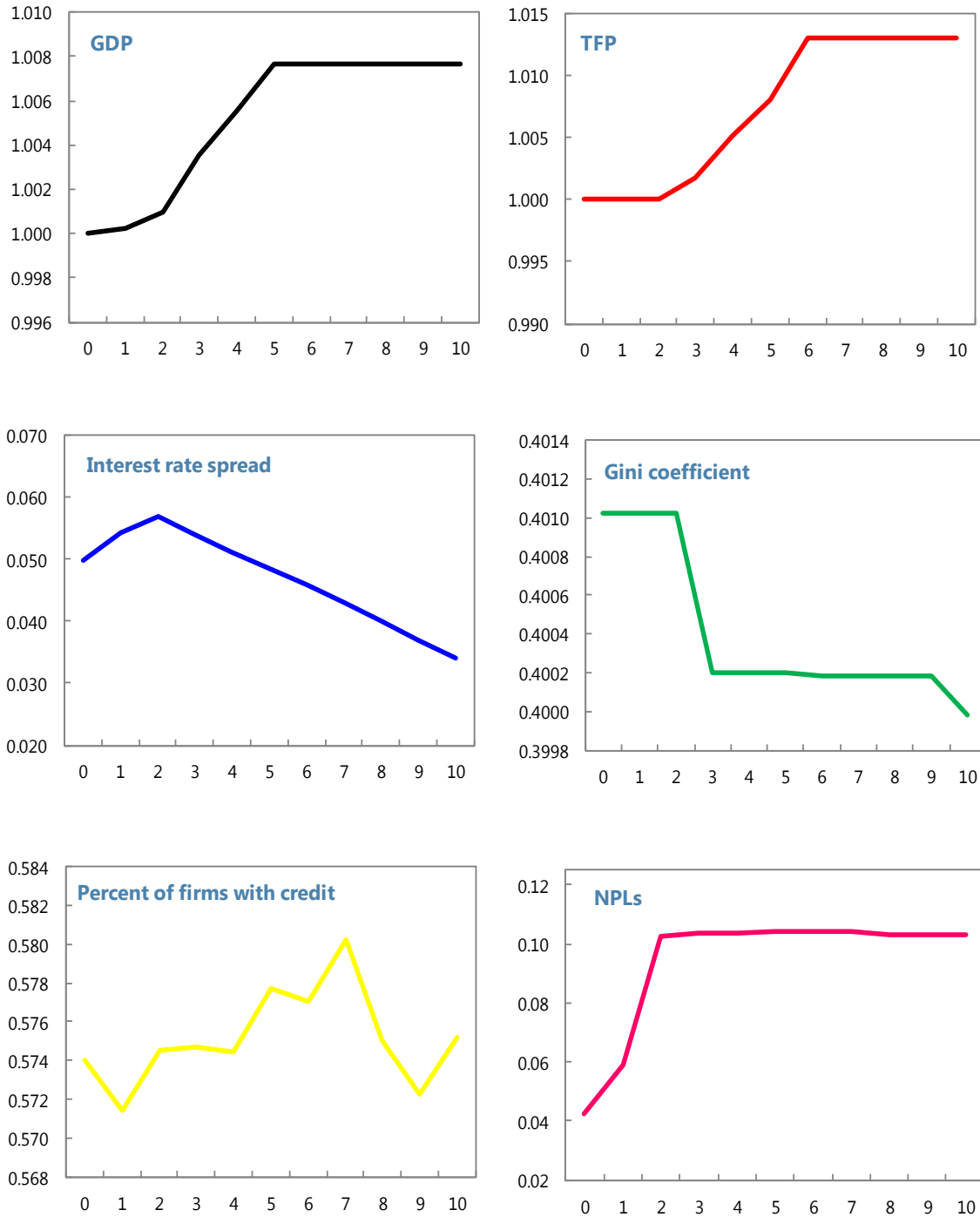## Figure 1. Transitional Dynamics: Relaxing Constraints to Access 1/
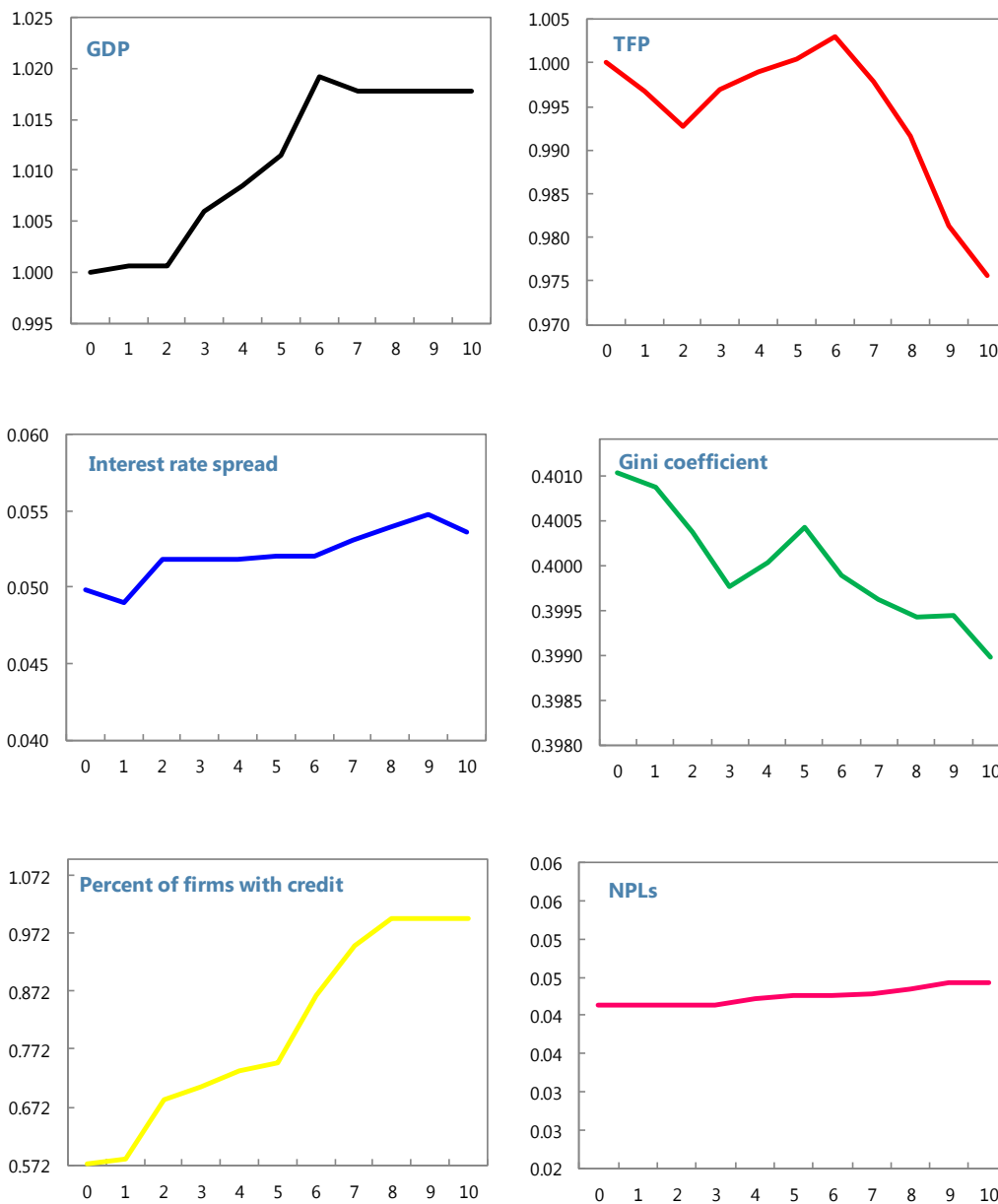
1/ Effect of a 50 percent decrease in the participation cost

Figure 2. Transitional Dynamics: Relaxing Borrowing Constraints 1/
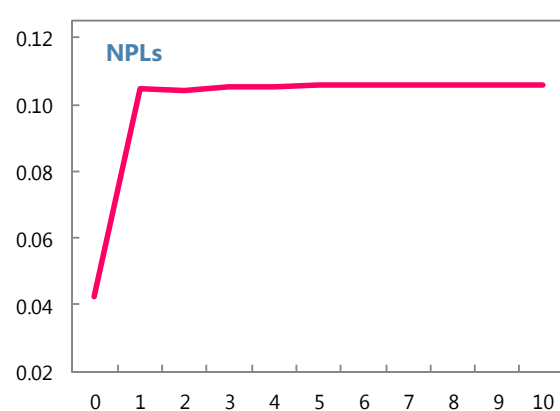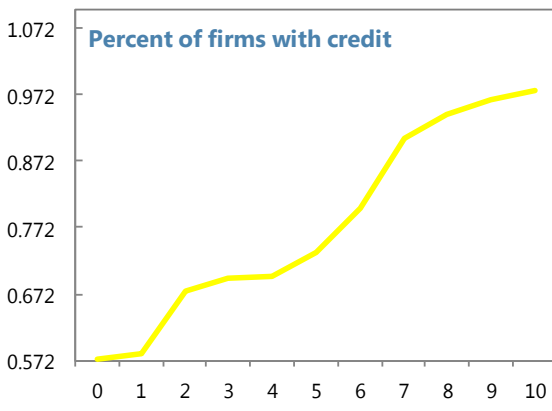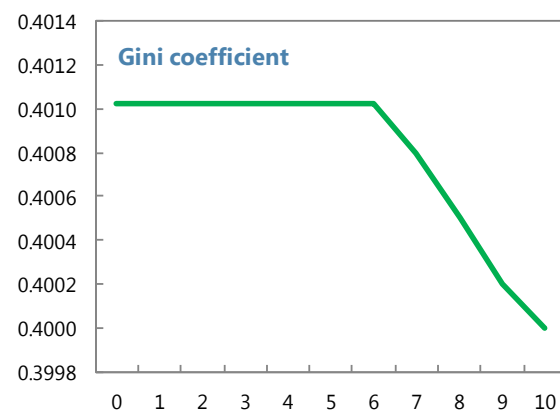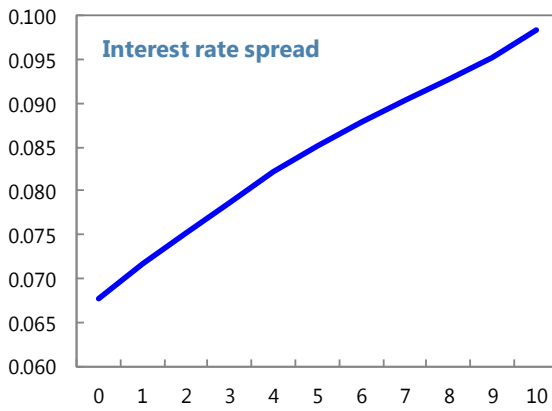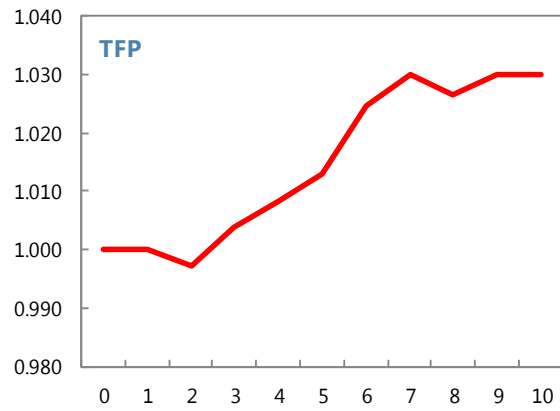
1/ Effect of a relexation of borrowing constraints by 30 percent.

Figure 3. Transitional Dynamics: Increasing Intermediation Efficiency 1/

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

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