INTERNATIONAL MONETARY FUND

MEXICO

Selected Issues

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I. MEXICO: A CLOSER LOOK AT GLOBAL SPILLOVER CHANNELS[1]

Mexico is a highly open economy with strong real and financial links to the rest of the world. It has close linkages to the U.S. through trade and remittances, and thus is particularly sensitive to U.S. developments. In turn, Mexico's open capital account, good macroeconomic fundamentals and liquid foreign exchange markets have led to a close integration with global financial markets, resulting in substantial portfolio flows. This warrants close vigilance to the risks of spillovers from global turbulence.

A. Introduction

1. **Mexico is a highly open emerging market with strong linkages to the rest of the world.** This chapter discusses and illustrates these linkages, and provides some examples of possible spillovers to Mexico of global shocks through the real and/or financial channels. Section B provides a description of Mexico's main linkages and potential channels of transmission. Section C illustrates the relative importance of real sector and financial shocks on Mexico's GDP, and the sensitivity of Mexico's asset prices to global developments. Section D concludes.

B. Mexico's Linkages with the U.S. and the Rest of the World

2. **Mexico has three key direct external linkages: (i) substantial trade with the United States— particularly in manufacturing; (ii) large remittance flows from the U.S. and (iii) highly open and liquid financial markets.** Mexico has significant trade ties with the U.S., and Mexican manufacturing firms are highly integrated into the U.S. supply chain.[2] Mexico also receives significant remittance flows from the U.S. In addition, Mexico's deep and liquid foreign exchange and domestic government bond markets make it susceptible to risks of financial contagion from global developments. These linkages are discussed in more detail below.

Trade channel

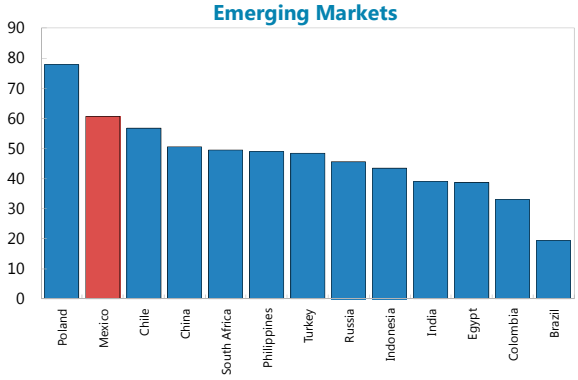
3. **The U.S. is Mexico's largest trading partner.** Exports to the U.S. are about a quarter of GDP and account for 80 percent of Mexico's total exports. Approximately 80 percent of total exports are in manufactured goods (95 percent of total non-oil exports). Trade openness has risen significantly over the last 30 years, particularly after Mexico joined

[1] Prepared by Gilda Fernandez.

[2] Trade to other regions has grown quickly in recent years, but given the gradual process of diversification, trade exposure to the U.S. is still high.

NAFTA in 1994. Mexico's share in the U.S. manufacturing market temporarily declined after China joined the WTO but it has recovered since 2005.[3]

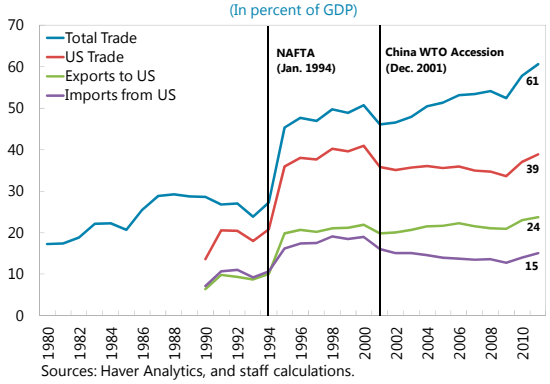
Figure 1. Trade to GDP: Mexico vs. Selected Emerging Markets



Sources: IFS, Haver Analytics, country authorities, and staff calculations.

Figure 2. Mexico: Trade with World and U.S.

(In percent of GDP)



Sources: Haver Analytics, and staff calculations.

4. **Through the trade channel, Mexico's output fluctuations have been closely linked to that of the U.S.** Several papers in the literature provide robust evidence that output fluctuations have become closely synchronized with the U.S. cycle after Mexico joined NAFTA in 1994.[4] This empirical evidence includes simple correlation coefficients, variance decompositions from bivariate vector autoregressions (VARs) of Mexico's GDP and exports with U.S. output, and results from cointegration tests between Mexico and U.S. GDP.[5] For instance, bivariate VAR results show that U.S. GDP explains about 30 percent of the variability of Mexico's real GDP. Results also show that the strongest links are related to trade and manufacturing, underscoring Mexico's manufacturing exports integration with the

Table 1. Top Mexico Export Destinations 1/

(percent share to total exports, as of December 2011)

Country	Share
United States	77.3
Canada	2.6
China	2.2
Brazil	1.9
Colombia	1.4
Spain	1.2
India	1.1
Germany	1.0

1/ includes only countries with shares greater than or equal to 1 percent.
Source: EMED database and staff calculations.

Table 2. Mexico and US GDP Cointegration Post-NAFTA

Sample: 1994.1-2011.4 (Post-NAFTA)
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.135	16.594	15.495	0.034
At most 1 *	0.082	6.152	3.841	0.013

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

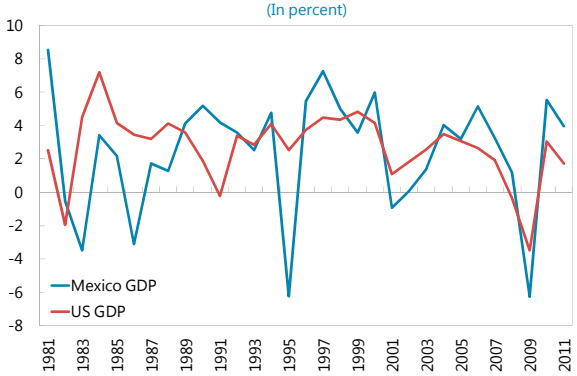
[3] See "What Explains Mexico's Recovery of U.S. Market Share?," Chapter 2 of the Selected Issues Paper.

[4] The fact that Mexico has not had home-grown crises since 1994 has probably contributed to the higher correlation with the U.S. business cycle.

[5] See, *inter alia*, "*How has NAFTA Affected the Mexican Economy: Review and Evidence*," M. Ayhan Kose, Guy M. Meredith, and Christopher M. Towe, IMF Working Paper 04/59, April 2004; "*External Shocks and Business Cycle Fluctuations in Mexico: How Important are U.S. Factors*?" Sebastian Sosa, IMF Working Paper 08/100, April 2008l; "*A Note on Mexico and U.S. Manufacturing Industries' Long-term Relationship*," Daniel Chiquiar and Manuel Ramos-Francia, Banco de Mexico Working Paper 2008– 08; and "*Mexico's Business Cycles and Synchronization with the USA in the Post-NAFTA Years*," William Miles and Chu-Ping C. Vijverberg, Review of Development Economics, 15(4), 638–650, 2011.

U.S. manufacturing supply chain, particularly for the automobile industry.

Figure 3. Annual GDP Growth Rates
(In percent)



Sources: Haver Analytics

Table 3. Matrix of Correlation Coefficients 1/
(year-on-year growth rates)

	pre-NAFTA	post-NAFTA
US/Mex real GDP	0.02	0.87
US/Mex industrial production	0.23	0.65
US/Mex manufacturing	0.11	0.75
US imports/Mex exports	-0.04	0.92
US/Mex consumption	-0.26	0.76
US consumption/Mex exports	-0.24	0.68
US/Mex investment	0.16	0.75
US/Mex construction 2/	...	0.73

Sources: Haver Analytics and staff calculations.
1/ All variables are in real terms, except construction.
2/ Sample is from 2007-2011.

Table 4. Variance Decompositions from Bivariate VARs: Mexico Real GDP

US variables	Pre-NAFTA	Post-NAFTA
Industrial Production	19.6	24.4
Manufacturing	13.9	28.1
Retail Sales	5.6	20.9
Auto Sales	7.9	22.3
Construction 1/	...	15.6
GDP	15.0	29.8
Gov. Cons.	9.7	0.2
P. Cons.	6.3	15.2
Imports	15.8	29.5
Exports	8.0	29.0
P. Inv.	17.9	23.8

Sources: Haver Analytics and staff estimates.
1/ Sample from 2006-2011 only.

Table 5. Variance Decompositions from Bivariate VARs: Mexico Real Exports

US Variables	Pre-NAFTA	Post-NAFTA
Industrial Production	7.5	43.8
Manufacturing	0.8	46.4
Retail Sales	0.4	25.7
Auto Sales	19.7	33.8
Construction 1/	...	11.9
GDP	3.0	40.4
Gov. Cons.	0.2	0.6
P. Cons.	1.3	17.1
Imports	1.2	44.4
Exports	6.7	49.9
P. Inv.	0.8	36.6

Sources: Haver Analytics and staff estimates.
1/ Sample from 2006-2011 only.

5. **Trade ties with the U.S. are expected to remain strong.** In the past 10 years, some diversification in terms of Mexico's export markets has occurred, but it still remains limited. For example, real export growth to Europe and emerging and developing countries has been very strong over the last decade, but exports to these countries remain a small share of total exports. Mexico's export sector is expected to remain an important engine for growth. This is supported by continued FDI into the manufacturing sector, improved relative labor costs particularly with respect to China, and relatively high oil prices over the medium term, increasing transportation costs.[6]

[6] Announced FDI plans in Mexico through August 2012 amount to about US$6.5 billion, mainly in the automotive industry.

Table 6. Mexico: Real Export Growth by Region

	Emerging and Developing Countries	Advanced Countries			
		EU	G7	US	Total
2002	7.0	-1.0	-3.9	-3.9	-3.3
2003	1.2	5.6	-2.3	-2.7	-2.3
2004	15.6	4.9	8.5	8.9	8.6
2005	32.8	29.6	8.0	7.3	8.5
2006	27.8	15.8	11.5	11.3	12.0
2007	25.1	25.4	2.7	1.3	3.1
2008	17.9	13.4	0.0	-0.5	0.5
2009	-27.8	-35.4	-24.0	-24.7	-24.3
2010	36.1	19.0	23.5	23.8	24.3
2011	28.7	28.0	11.2	11.3	12.0
Average real growth, 2002-2011	**16.4**	**10.5**	**3.5**	**3.2**	**3.9**
Real exports in percent of Mexico GDP					
2011	5.0	2.6	39.8	36.9	42.4

Sources: EMED database, country authorities, and staff calculations.

Table 7. Announced Plans for Future FDI in Mexico, 2012 (in million US dollars)

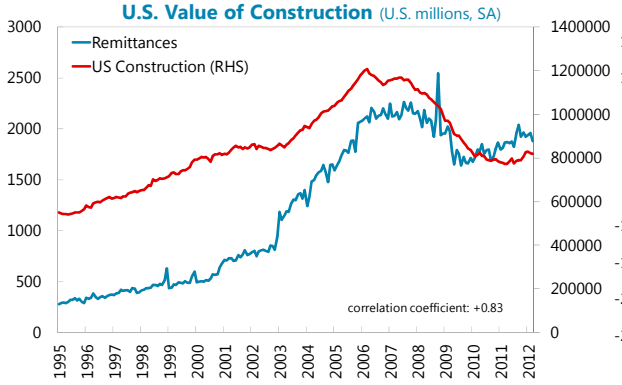
Company	Amount
Ford	1,300
Audi	1,300
Ternium	1,000
General Motors	900
Honda	800
Mazda	500
Daimler Trucks	300
Jatco	200
Yorozu	70
Denso	50
Nippon Steel	40
Hennings Automotive	14
Total	**6,474**

Source: Newspaper articles.

Remittances

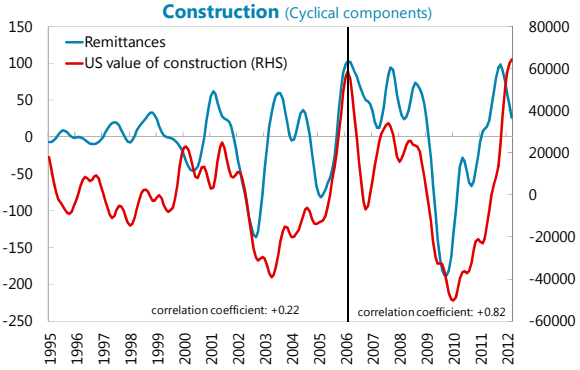
6. **Remittances from the U.S., particularly from workers in the construction sector, represent an important source of income for Mexico.** At about 2 percent of GDP in 2011, remittances have been highly correlated with U.S. construction activity, particularly since 2006, following the downfall of the U.S. construction sector.

Figure 4. Mexico: Workers' Remittances vs. U.S. Value of Construction (U.S. millions, SA)



Sources: Haver Analytics, and staff calculations.

Figure 5. Mexico: Workers' Remittances vs. Value of Construction (Cyclical components)

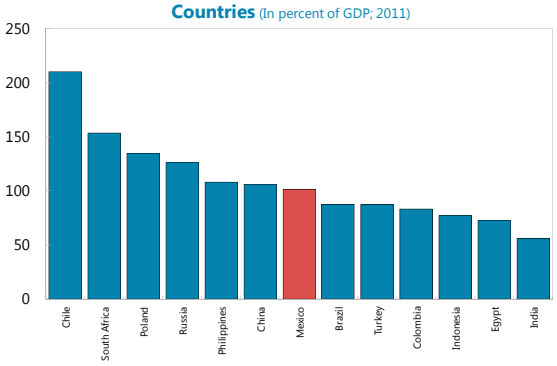


Sources: Haver Analytics, and staff calculations.

Financial Channel

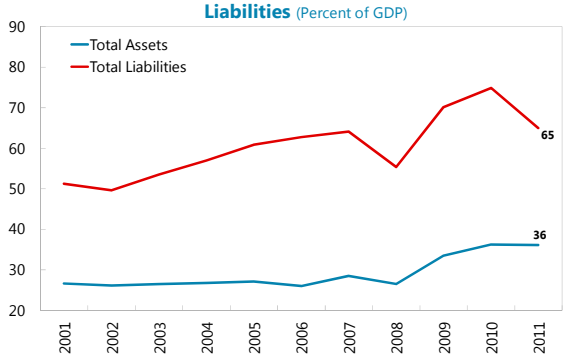
7. **Mexico is highly financially integrated with the rest of the world.** Mexico's stock of foreign assets and liabilities in percent of GDP, a common measure of financial integration, was about 112 percent in mid-2012. Mexico is a net recipient of foreign capital, with its foreign liabilities at 72 percent of GDP, doubling over the last 30 years.

Figure 6. Financial Integration: Mexico vs. Selected Comparator Countries (In percent of GDP; 2011)



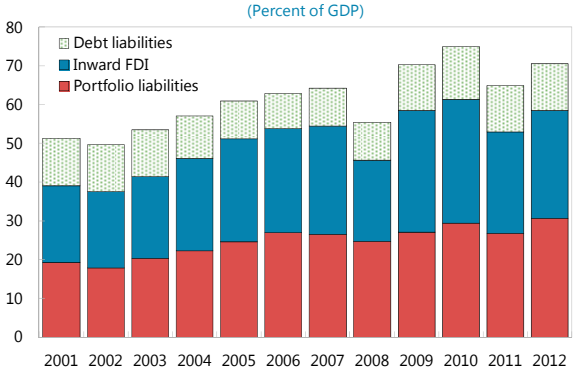
Sources: IFS

Figure 7. Mexico Financial Integration: Foreign Assets and Liabilities (Percent of GDP)



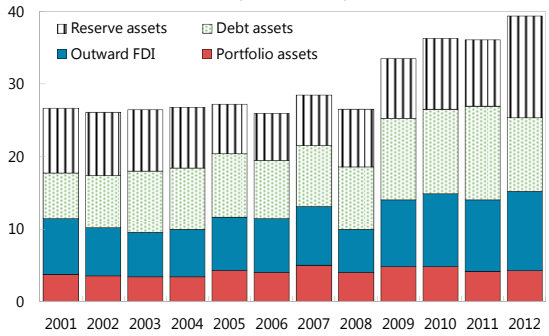
Sources: Mexican Authorities, and staff calculations.

Figure 8. Foreign Liabilities Position
(Percent of GDP)



Sources: Banxico

Figure 9. Foreign Asset Position
(Percent of GDP)



Sources: Banxico

8. **The composition of Mexico's foreign assets and liabilities has evolved.** Foreign portfolio liabilities have increased rapidly since 2009, reaching more than 30 percent of GDP in mid-2012 and represent the most important source of potential financial spillovers for Mexico. Inward FDI has also increased, reaching 28.5 percent sof GDP. On the asset side, Mexico has built up reserves (broadly maintaining coverage in terms of balance sheet exposures) and increased foreign investments abroad.

9. **Close to half of the FDI in Mexico comes from the U.S., mostly in the automotive industry.** Another 11 percent comes from Spain, mostly banking- and tourism-related. In terms of outward FDI, the U.S. is the top destination (46.2 percent) followed by Brazil (15.5 percent).

Table 8. Mexico: Top Ten Sources of FDI, 2010

Country	billion US$	share of total	percent of GDP
United States	197	60	19.0
Netherlands	37	11	3.6
Spain	36	11	3.5
United Kingdom	10	3	1.0
Canada	8	2	0.8
Germany	8	2	0.8
Switzerland	5	2	0.5
France	4	1	0.4
Japan	3	1	0.3
Virgin Islands, British	3	1	0.3
Others	17	5	1.6
Total	**330**	**100.0**	**31.9**

Source: CDIS, country authorities, and staff calculations.

Table 9. Mexico: Top Ten Destinations of FDI, 2010

Country	billion US$	share of total	percent of GDP
United States	48	46.3	4.7
Brazil	16	15.6	1.6
Netherlands	8	7.7	0.8
Colombia	4	4.2	0.4
Spain	4	3.6	0.4
Dominican Republic	3	2.5	0.2
Netherlands Antilles	2	1.9	0.2
Hungary	2	1.7	0.2
Chile	2	1.5	0.2
Guatemala	1	0.9	0.1
Others	14	13.5	1.4
Total	**104**	**100.0**	**10.0**

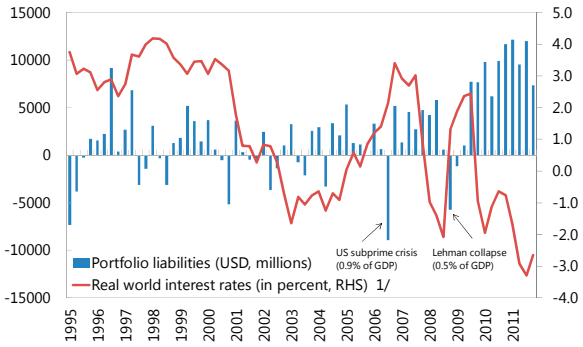
Source: CDIS, country authorities, and staff calculations.

Table 10. Mexico: Stock of Portfolio Liabilities by Region

	2007	2008	2009	2010
	(% share to total)			
Advanced	96	95	97	96
US	62	59	59	54
EU	27	29	29	31
G7	78	75	75	74
LATAM and Caribbean	2	3	2	3

Sources: CPIS and staff calculations.

Figure 10. Mexico: Portfolio Liabilities vs. Real World Interest Rates

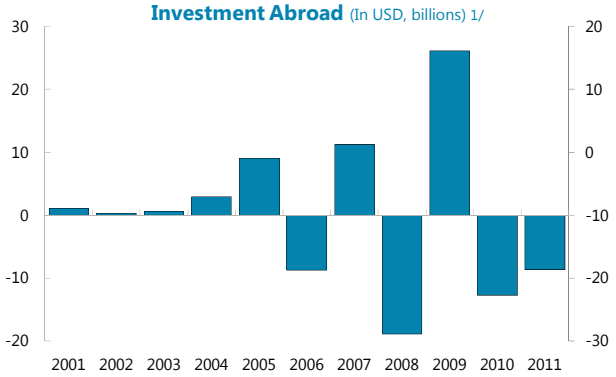


Sources: Haver Analytics, country authorities, and staff estimates.
1/ Real world interest rate estimated as the difference between LIBPR and US CPI.

10. **Since 2010, portfolio inflows have gained substantial momentum, due to both domestic and external factors.** Domestic pull factors include Mexico's strong fundamentals and sound macroeconomic management, deep and liquid exchange rate and bond markets, and highly open capital account. The inclusion of Mexico in Citigroup's WBGI was also a significant contributor to a stock increase in portfolio investment since 2010. External factors have been dominated by the lax monetary conditions in advanced economies and investors' consequent search for yields. Recurrent bouts of unsettled conditions in Europe have also affected external conditions for Mexico. The U.S. is also Mexico's main source and destination of portfolio investment. Over half of portfolio liabilities are with U.S. residents and another one third are with Europe.

11. **Experience during the U.S. subprime crisis and the collapse of Lehmann shows that portfolio flows in Mexico can be volatile.** Portfolio outflows during these periods ranged between 0.5 and 1 percent of GDP in one quarter. In turn, outflows associated with residents' portfolio investments abroad have also been volatile and substantial, reaching about 25 percent of the stock in 2009.

Figure 11. Annual Change in Residents' Portfolio Investment Abroad (In USD, billions) 1/



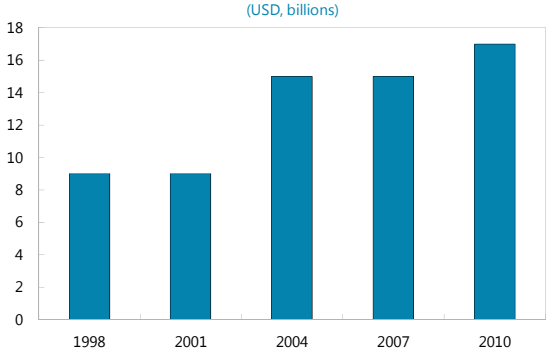
Note: 1/ A positive value denotes an FX outflow in the BOP

12. **Financial integration in Mexico is associated with liquid foreign exchange and local sovereign debt markets:**

Foreign exchange market. Mexico has a deep and liquid foreign exchange market. The Mexican peso is traded globally onshore and offshore. Based on the 2010 BIS Triennial Central Bank Survey, the daily average foreign exchange market turnover in Mexico was estimated at US$17 billion (almost double the amount recorded in 1998). The bulk of these operations consisted of cross-border trades involving peso/US dollar transactions conducted by dealers abroad. The depth and liquidity of the foreign exchange market, in the context of Mexico's floating exchange rate regime, has allowed market participants worldwide to use the peso to take positions in reaction to external developments. As such, a large part of Mexico's currency volatility in recent years has reflected global sentiments rather than country-specific factors.

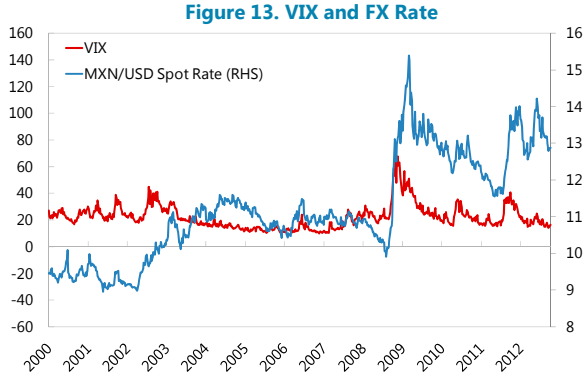
Local government debt markets. In recent years, the deepening of the foreign exchange market has been accompanied by a substantial increase in foreign investment in domestic currency-denominated government bonds, reaching 32 percent of the total stock. Following Mexico's inclusion in the WGBI, the pool of investors in the government bond market has shifted to long-term institutional investors. During recent periods of global volatility, investors have opted to hedge foreign exchange exposures but not to divest from government paper. As a result, the exchange rate has shown significant volatility during periods of heightened global stress but domestic interest rates have remained stable.

Figure 12. Daily Foreign Exchange Market Turnover



Sources: BIS Triennial Central Bank Survey, December 2010.

Figure 13. VIX and FX Rate



Sources: Bloomberg and Haver Analytics.

Table 11. Mexico: Stock of Domestic Public Sector Debt Held by Foreigners (end-September 2012)

	Local Currency Debt (issued domestically, end-September 2012 in billions USD)			
	Outstanding	Held by Foreigners		
	(billions USD)	billions USD	percent of total	percent of 2011 GDP
Total	332.91	108.1	32.5	9.4
Short-Term (Cetes)	66.01	29.6	44.9	2.6
Long Term1/	266.91	78.5	29.4	6.8

Sources: Country authorities and staff calculations.

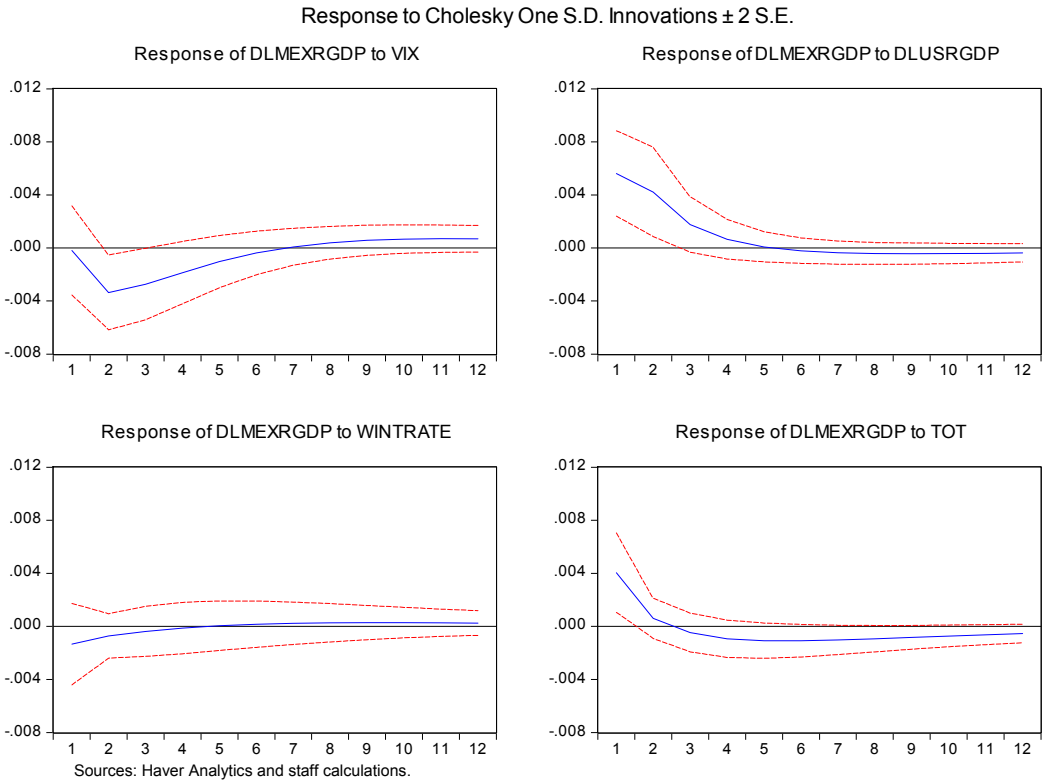
1/ Other Federal Government Bonds; IPAB bonds and BREMS are not included

C. Sensitivity of Mexico's Growth and Asset Prices to Global Shocks

13. **U.S. shocks explain a large share of Mexico's macroeconomic fluctuations after NAFTA**. To illustrate the relative importance of real and financial channels on growth, a multivariate VAR was estimated using the VIX, U.S. GDP, world interest rates, terms of trade and Mexico real GDP (with quarterly data from 1994 to 2011).[7] Results from impulse response functions indicate that Mexico's output is most affected by shocks to U.S. output. For instance, a one standard deviation increase in U.S. GDP (0.7 percentage points) would result in a 0.6 percentage point increase in Mexico's GDP. In turn, a one standard deviation increase in the terms of trade would increase output by 0.4 percentage point. A one standard deviation increase in the VIX would result in a 0.3 percentage point decline in Mexico's real GDP after one quarter.

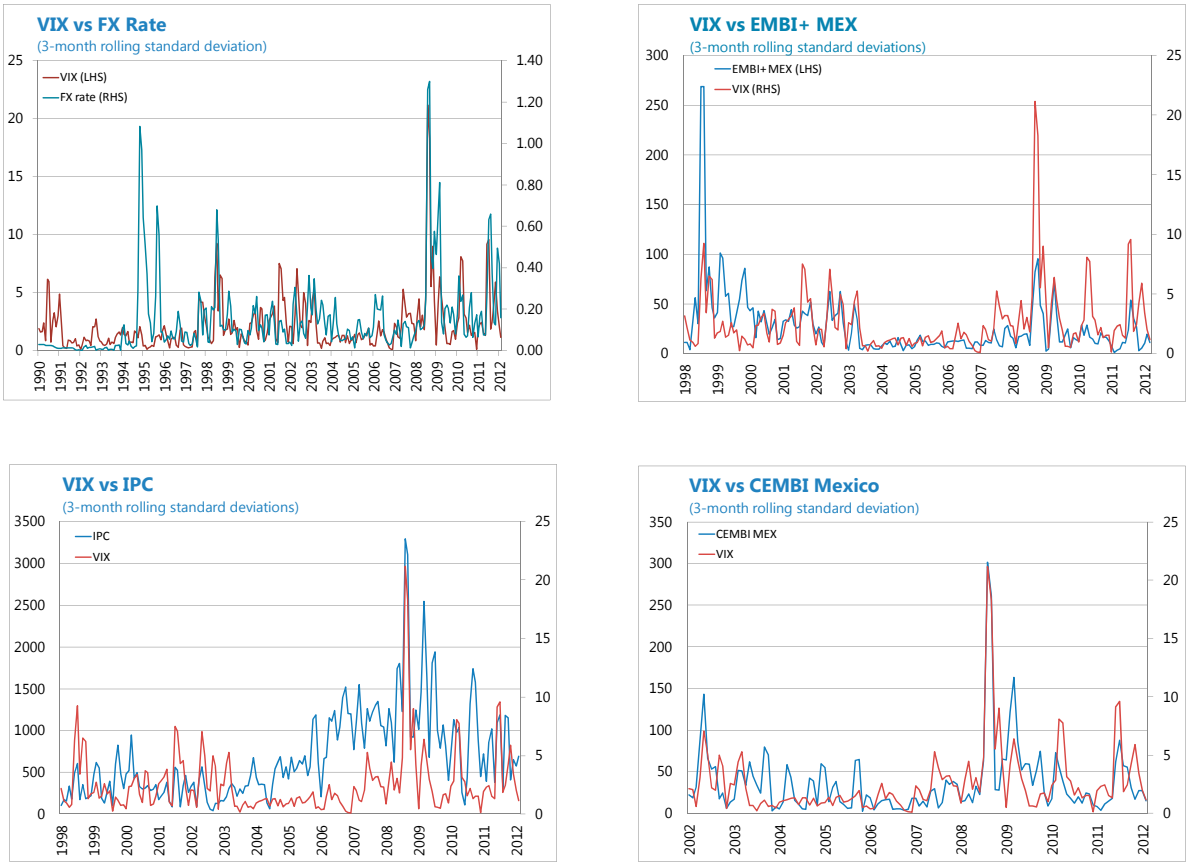
[7] The real world interest rate was estimated as the difference between the LIBOR and U.S. inflation.

Figure 14. Response of real GDP to selected indicators
(Multivariate VAR)



14. **Spikes in the volatility of Mexico's asset prices are closely associated with periods of global stress**. To examine the sensitivity of Mexico's asset prices to global market developments, four markets were considered: the foreign exchange market, stock market, sovereign debt market, and the corporate debt market. The 3-month rolling standard deviation of asset prices in each of these markets was calculated and compared to the 3-month rolling standard deviation of the VIX, which was used as an indicator of global stress. Results show that spikes in the volatility of Mexico's asset prices in all four markets are closely correlated with periods of global stress.

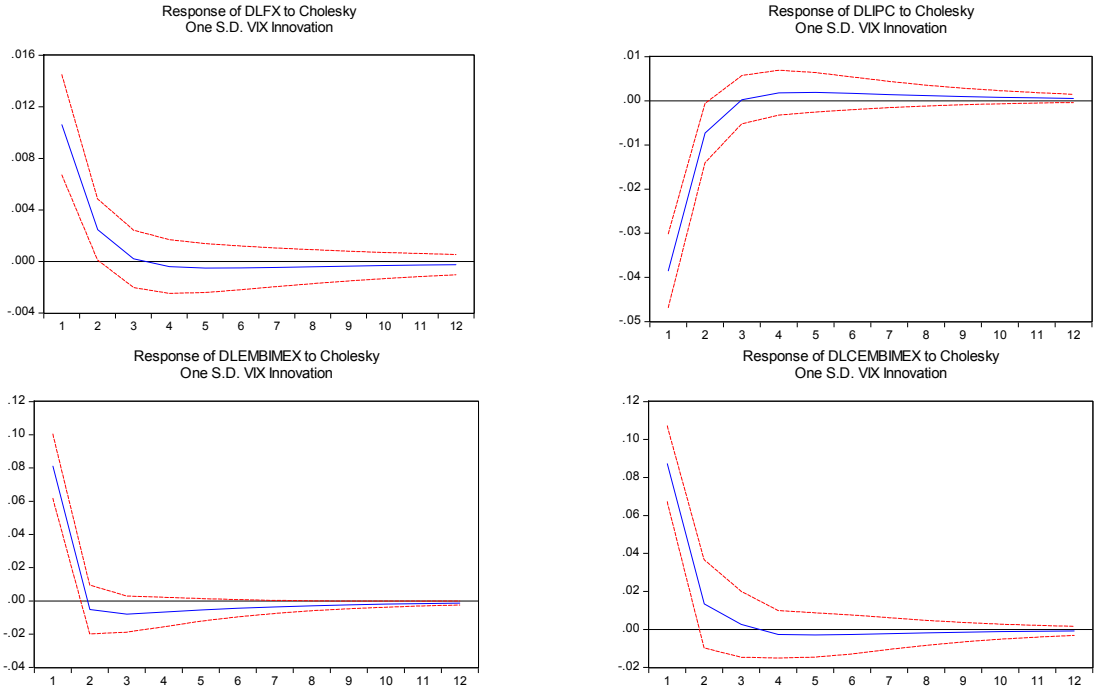
Figure 15. Response of Market Prices to Shocks in Global Financial Conditions



Sources: Haver Analytics and staff calculations.

15. **Results of bivariate VARs illustrate the sensitivity of asset prices to global stress**. For example, impulse response functions show that a one standard deviation shock in the VIX is estimated to result in a 1 percent depreciation, a 4 percent decline in stock prices, an 8 percent increase in EMBI Mexico spreads (about 10 basis points), and an almost 9 percent increase in the CEMBI Mexico spreads (over 30 basis points).

Figure 16. Impulse Response to One Standard Deviation Innovations in the VIX [1/]
(Bivariate VARs)



Sources: Haver Analytics, Bloomberg, and staff calculations.
1/ One standard deviation of the VIX = 8.4

D. Conclusion

16. **Over the last two decades, Mexico has become highly globally integrated through trade and financial channels**. Increased integration has been very beneficial, supporting productivity and growth, particularly in the manufacturing sector, but it has also heightened the sensitivity of output and financial markets to global developments. Thanks to its strong fundamentals and robust policy frameworks, including the flexible exchange rate and foreign exchange buffers, Mexico is well positioned to weather global volatility.

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II. What Explains Mexico's Recovery of U.S. Market Share?[1]

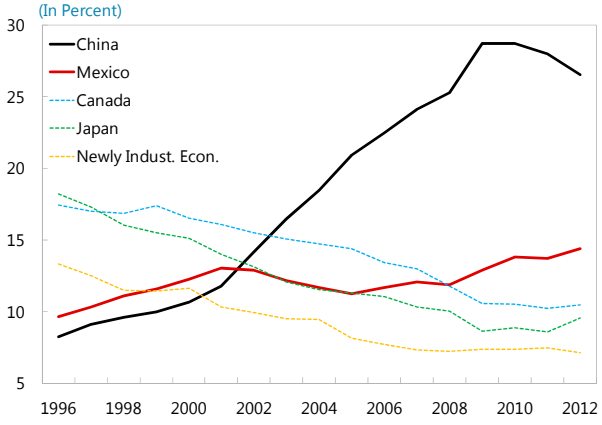
Mexico's market share in the U.S. manufacturing market has staged a strong recovery since 2005. By mid-2012, Mexico's share of U.S. manufactured imports reached near 15 percent, surpassing its post-NAFTA peak. In contrast with earlier trends, Mexico's gains in the 2010–2012 period coincided with a fall of China's market share. Recent gains in market share may have been driven in part by improved relative unit labor costs in dollars. Other factors could include the reemergence of a location advantage due to higher oil prices and a change in inventory management among U.S. firms, and a reassessment of benefits of relocating to Mexico (including the protection of proprietary technologies). As a result, global manufacturers are increasingly relocating to Mexico (near-shoring of production), particularly in the automotive, aerospace and electronics and appliances sectors.

A. Background and Recent Developments

1. **Mexico's manufacturing sector, a key engine of growth, is highly integrated with the U.S. manufacturing supply chain.** Approximately 80 percent of total Mexican exports go to the U.S. (representing almost 22 percent of GDP), most of which come from the manufacturing sector. Following its entry into NAFTA, Mexico's participation in the U.S. manufacturing market grew from less than 10 percent of U.S. manufacturing imports in 1996 to close to 15 percent in mid-2012 (Figure 1), with industries increasingly vertically-integrated with those of the U.S., particularly in the automobile sector.

2. **China's entry to the World Trade Organization (WTO) in 2001 transitorily undercut Mexico's export share in the U.S. market.** China's low-cost manufacturing base and ample production capacity had a major impact on Mexico's exports to the U.S. in the wake of its entry to the WTO. Between 2001 and 2005, Chinese manufacturing exports to the U.S. expanded at an average annual rate of 24 percent, while Mexico's export growth decelerated sharply to 4 percent on average over the same period.[2] As a result, China's share of U.S. manufacturing imports almost doubled by 2005, eroding the

Figure 1. Share of US Manufacturing Imports by Origin
(In Percent)



[1] Prepared by Herman Kamil and Jeremy Zook. Enrique Flores and Esteban Vesperoni also contributed to the project.

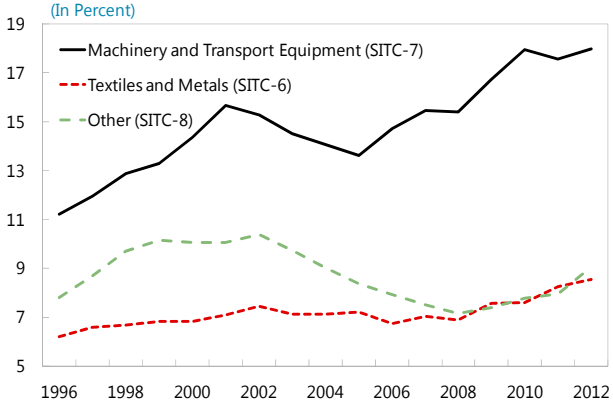
[2] The relocation of manufacturing activities (including from the Maquila industry) from North America to China, and Asia more generally, also explained the low export growth.

previous gains of market share by Mexico (Figure 1). China's crowding out of Mexican exports in the U.S. market was the result of a loss of comparative advantage in several labor-intensive manufacturing sectors in which it had previously specialized, including apparel, office machinery, furniture and photographic and optical equipment sectors (Chiquiar, Fragoso and Ramos-Francia, 2008).[3]

3. **Since 2005 Mexico has regained ground in the U.S. import market, particularly after the recent global crisis.**[4] Mexican manufacturing exports clawed back their share of the U.S. import market over the last seven years, rising 3 percentage points to a historically-high 14.4 percent by mid-2012. Between 2005 and 2010, Mexico's increased presence in the U.S. import market paralleled a market share gain by China, while Japan's and Canada's continued to decline. Since 2010, however, Mexico's gains in the U.S. import market coincided with a decline in China's market participation (Figure 1).[5]

4. **The recovery in Mexico's market share has been driven by exports of electronics, telecommunications, and transport equipment.** Since 2005, Mexico's share of U.S. imports of transport and communications products increased steadily to 18 percent, accounting for 76 percent of total Mexican manufacturing exports in the first half of 2012. The recovery in market share of other manufacturing goods, however, took place only after 2009 (Figure 2). Analyzing trade flows at a more disaggregated level (2-digit Standard International Trade Classification) shows that Mexico's market share gains were generalized, in 20 of the 26 manufacturing import categories, jointly accounting for 80 percent of total Mexican exports (Table 1). [6]

Figure 2. Mexico's Market Share of US Imports within each Manufacturing Category
(In Percent)



[3] Several studies have used sectoral flow data to assess the impact from Chinese exports on Mexican and other Latin American producers (Freund and Ozden, 2006; Hanson and Robertson, 2007; Lederman *et al*., 2008; Devlin *et al*., 2006; Lall *et al*., 2005). More recently, Iacovone, Rauch and Winders (forthcoming) provide evidence on the impact of Chinese competition on Mexican manufacturing firms between 1996 and 2004.

[4] Based on revealed comparative advantage measures, Chiquiar and Ramos-Francia (2008) provide evidence that the Mexican manufacturing sector reacted to the increase in China's competition by shifting resources towards sectors where it remained competitive. This allowed the effect of China's entry to the WTO to be only temporary.

[5] In contrast, during the period 2001-2004, Mexico lost market share in U.S. imports in 13 of the 26 sectors.

[6] Among the sectors that lost market share, the most important is electrical machinery, apparatus and appliances, which accounted for 14 percent of Mexican exports in 2012, and lost 1.1 percentage points in

(continued)

5. **In turn, the automotive sector has been the most important contributor to the increase in aggregate market share, explaining half of the increase between 2005 and 2012**. Mexico's market share in U.S. imports of autos, auto-parts and accessories (excluding trucks) increased almost 9 percentage points over this period (Table 1), particularly since 2009 (Figure 3). By 2012, Mexico has become the second-biggest foreign supplier of autos and auto-parts to the U.S., behind Canada, exporting over one fifth of the total U.S. imports. The automotive sector accounts for one quarter of all Mexican manufacturing exports to the U.S. The large increase in production capacity and exports has been underpinned by a continued flow of foreign direct investment into the sector. [7]

Figure 3. Auto and other Manufactured Goods Exports
(in millions of dollars; Index June 2008=100)

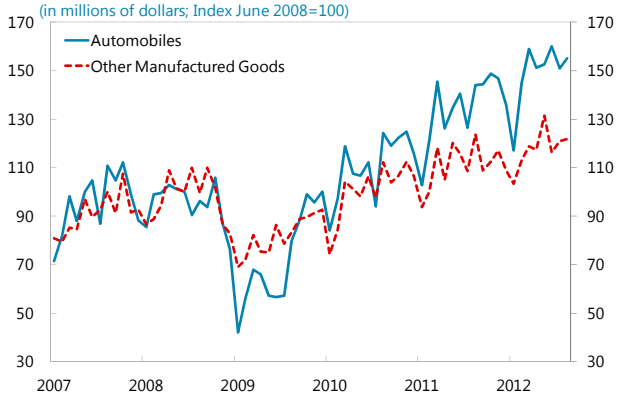


Table 1. Sectors with the Biggest Gain in US import Market Share: 2005-2012

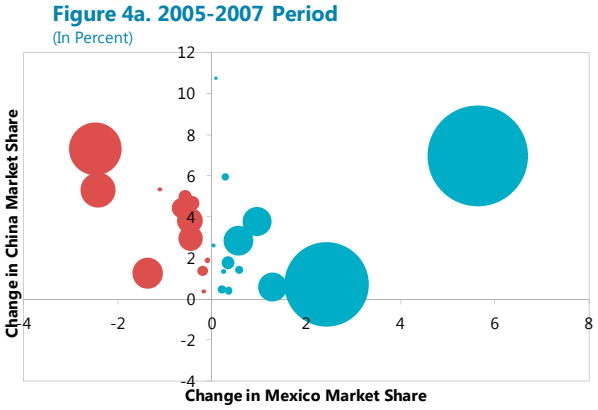
SITC	Category	Change in US Import Share (2005-2012)	Share of Total Mexican Exports (2005)	Share of Total Mexican Exports (2012)
68	Non-ferrous metals	9.4	1.3	3.0
78	Road vehicles	8.6	21.6	25.6
75	Office machines and automatic data-processing machines	7.4	5.7	8.6
82	Furniture, and parts thereof; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings	3.7	3.5	3.2
74	General industrial machinery and equipment, n.e.s, and machine parts, n.e.s,	3.4	5.4	6.9
81	Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures and fittings, n.e.s.	3.0	1.0	0.8
87	Professional, scientific and controlling instruments and apparatus, n.e.s.	2.8	4.3	4.6
61	Leather, leather manufactures, n.e.s., and dressed furskins	2.7	0.1	0.1
76	Telcommunications and sound-recording and reproducing apparatus and equipment	2.6	15.2	13.4
79	Other transport equipment	2.5	0.2	0.5
72	Machinery specialized for particular industries	2.2	1.0	1.4
71	Power-generating machinery and equipment	1.9	5.4	5.7

market share over this period. The biggest decline occurred in the U.S. import market share of apparel and clothing products, which fell 8 percentage points from its peak of 14 percent at the beginning of the last decade.

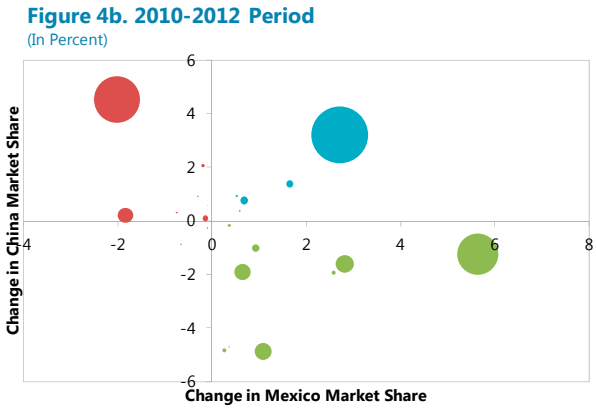
[7] Mexico was the third-largest investment destination for the automotive sector in the world, receiving US$5.6bn during 2007–10, above Japan and the BRICs, according to PROMEXICO. While the industry has been largely dominated by U.S. manufacturers in the past, more recently, companies from other countries, particularly Asia, have opened or expanded operations in Mexico. See Martin (2012) for a detailed analysis of FDI flows into Mexico's manufacturing sector in recent years.

B. Evolution of U.S. Market Share: Mexico and China

6. **Mexico's gains in U.S. market share have increasingly occurred in sectors where China reduced its share.** Figure 4a and 4b show the changes in Mexico's market share in U.S. imports (horizontal axis) against those of China (vertical axis) in each of the 2-digit sectors, for the periods 2005–2007 and 2010–2012.[8] In each panel, the North-West quadrant (red) indicates those sectors in which China's market share increased while Mexico's fell, while the South-East quadrant (green) plots those sectors, if any, in which Mexico's share increased and China's fell. The size of the bubbles is proportional to each sector's contribution to the overall change in market share in each period. During 2005–2007 all the observations lie in the Northern quadrants, indicating that there was no sector in which Mexico increased and China simultaneously decreased market share. Moreover, during this period Mexico was losing participation in several sectors in which China was gaining participation. In contrast, in 2010–2012 there are several sectors (marked green) in which Mexico's share increased while China's fell. In addition, the number and relative importance of sectors in which China's share went up and Mexico's down (i.e., the number and size of red bubbles) declined in the most recent period.[9]



Sources: IMF staff estimates based on U.S. International Trade Commission data



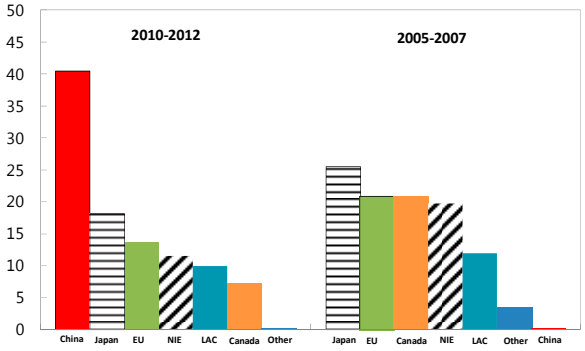
Sources: IMF staff estimates based on U.S. International Trade Commission data

[8] We exclude the period 2008–2009 to avoid temporary effects associated to the global crisis.

[9] Among the sectors in which Mexico lost and China gained market share during 2010–2012, the most relevant for Mexico was "Telecommunications and sound-recording and reproducing apparatus and equipment", which lost 1.1 percentage points over the period. This sector accounted for 13 percent of Mexican exports in 2012.

7. **During 2010–2012, 40 percent of the dollar gains in sectors where Mexico increased its market share came from sectors where China's share fell.** Using an extension of the constant market shares methodology developed in Chami Batista (2008), we calculate the fraction of Mexico's increase in market share that can be associated with China's reduction, controlling for changes in the shares of the other competitors.[10] During 2010–2012, 40 percent of Mexico's dollar gains in those sectors where it increased market share could be attributed to China's reduction (Figure 5).[11] Table 2 presents those sectors showing the largest fraction of market share gains accruing from China.[12] In contrast, during 2005–2007, half of Mexico's increase in market share was explained by reductions by Canada and Japan, but none coming from China.

Figure 5. Gains in Mexico's market share attributed to each competitor



Sources: IMF staff estimates based on data from USITC

Table 2. Sectors in which the largest fraction of market share gain accrued from China (2010-2012)

SITC	Sector Description	Mexico's change in US import share	Change in share attributed to China	Percent of total change due to China
85	Footwear	0.4	0.3	96.3
83	Travel goods, handbags and similar containers	0.5	0.4	84.0
77	Electrical machinery, apparatus and appliances	0.6	0.5	82.9
81	Prefabricated buildings; sanitary, plumbing, heating and lighting fixtures	2.6	1.9	73.1
89	Miscellaneous manufactured articles	1.1	0.7	68.8
82	Furniture, and parts thereof; bedding, mattresses	2.8	1.7	59.1
61	Leather, leather manufactures, and dressed furskins	1.3	0.6	50.3
69	Manufactures of metals	0.9	0.5	50.1
75	Office machines and automatic data-processing machines	2.7	1.1	42.2

Source: IMF staff estimates based on data from USITC

[10] The gain in market share of one exporting country that is attributed to one of its competitors is proportional to the difference between the rates of growth of the value of exports of the two countries over the period. See the Appendix for a description of the method. Calculations were performed at the 2-digit level of aggregation.

[11] Part of this reduction in China's market share may be due to a shift in China's exports towards a different set of goods.

[12] See also Oviedo (2012) for an analysis of the sectors in which Mexico gained competitiveness during the period 2010–2012.

8. **During 2010–2012, Mexico's changes in market share relative to China's were larger in sectors with higher labor-to-capital intensity**. Using revealed factor intensity indices at the 5-digit SITC product level constructed by Shirotori *et al* (2010), a linear regression was estimated of the relative change in market share of Mexico vis-à-vis China for a given product on its degree of labor-to-capital intensity and human capital intensity.[13] For 2010–2012, results show that sectors with higher labor-to-capital intensity saw a bigger relative increase in market share for Mexico compared to China (Table 3). This appears consistent with the notion that Mexico's recent gains in market share vis-à-vis China may have been driven in part by improved relative labor costs. In contrast, over the period 2005–2007, there is no systematic relationship between relative market share changes and factor intensity. The estimated value of the constant in the model indicates that, during 2010–2012, Mexico's increase in market share was on average higher than China's across goods.

Table 3. Change in Mexico market share vis a vis China and factor intensity
(OLS estimates at the 5-digit SITC level)

	2005-2007	2010-2012
constant	-0.221 ***	0.323 ***
	(-0.079)	(-0.078)
log(labor-to-capital intensity)	-0.013	0.033 ***
	(0.012)	(0.011)
log(human capital intensity)	0.142	0.028
	(0.042)	(0.035)
Number of observations	1762	1808
R-Square	0.005	0.012

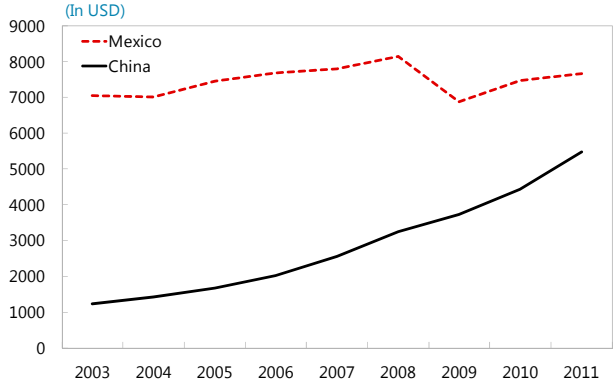
C. What Explains Mexico's Increased Competitiveness?

9. **Several factors could have contributed to explain Mexico's increased competitiveness:**

(i) Relative labor costs in dollar terms.

Wages in the manufacturing sector in China have increased at an average annual rate of 14 percent in nominal yuan terms from 2003 to 2011, and close to 20 percent annually in dollar terms (Figure 6), given the appreciation of the yuan (Figure 7). In contrast,

Figure 6. Real Dollar Annual Wages: Mexico and China
(In USD)

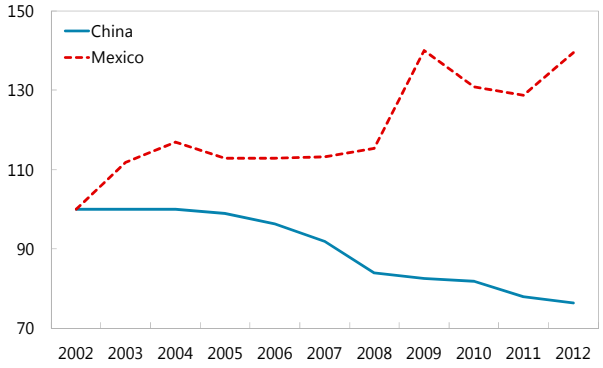


Sources: Barclays and CEIC China Database

[13] The authors construct the indices by calculating, for each good, a weighted average of the factor abundance of the countries that export this good, where the weights are variants of Balassa's (1965) revealed comparative advantage index.

average wages in the Mexican manufacturing sector have remained fairly constant in dollar terms, underpinned by moderate wage growth and a depreciation of the peso (Figure 7).[14] In 2003, average dollar wages in Mexico were six times higher than those in China, whereas in 2011 wages were only 40 percent higher. These developments have reduced the competitive advantage that China had as a low-cost supplier of manufacturing goods to the U.S. in the early part of 2000s.[15]

Figure 7. Nominal Exchange Rate
(Domestic currency per USD; index, 2002=100)

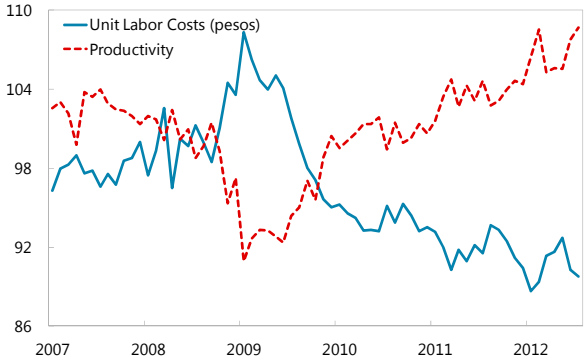


Source: WEO

(ii) Productivity gains in Mexico

Strong productivity increases underpinned by strong investment in the manufacturing sector in Mexico have helped lower unit labor costs and increase the competitiveness of manufacturing production (Figure 8).

Figure 8. Mexico: Unit Labor Costs and Productivity in Manufacturing
(Index, 2008=100)

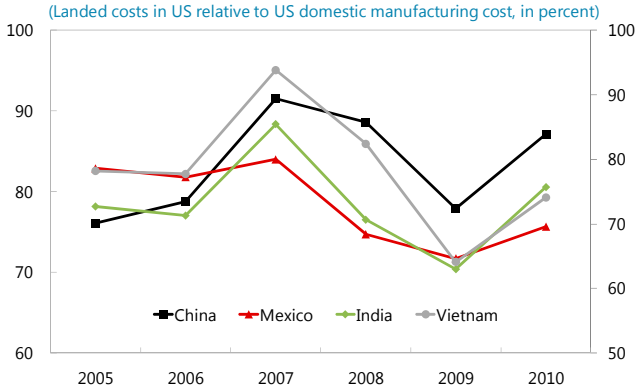


Sources: INEGI

(iii) Oil prices and transportation costs

The benefits of proximity to the U.S., Mexico's key location advantage, have increased with the rise in oil prices and changes in U.S. companies' inventory management. The price of oil increased from US$25 per barrel in early 2000s to over US$100 in October 2012, increasing substantially transoceanic freight costs. This has given Mexico a competitive edge, particularly when it comes to heavy and bulky items. Proximity, as a proxy for speed-to-market, has also gained importance

Figure 9. US Manufacturing-Outsourcing Cost Index
(Landed costs in US relative to US domestic manufacturing cost, in percent)



Source: AlixPartners

[14] Subdued wage growth is in part associated with an increase in labor participation and in the growth rate of the working age population, from a reduction in migration to the U.S. since the mid-2000s (sees Selected Issues Paper "Migration and Labor Markets").

[15] Reliable data on unit labor costs in the Chinese manufacturing sector is not available, preventing an assessment of the evolution of wages in China accounting for changes in productivity.

as U.S. companies increasingly adopted outsourcing of inputs and just-in-time manufacturing. According to the 2011 U.S. Manufacturing-Outsourcing Cost Index, goods produced in Mexico had the lowest landed costs (i.e., the price at a California shipping port) for U.S. importers in 2010 compared to other key low-cost countries (Figure 9).[16] This has coincided with the trend to "near-shoring" (as opposed to "off-shoring") exploiting the advantage of a proximate manufacturing hub to the U.S.

(iv) Protection of proprietary technologies

The strong commitment to the protection of proprietary technologies has also helped Mexico in the relocation of FDI. Mexico has a strong reputation for protection of international intellectual property, patent and trademark rights and is a party to several international treaties, including the World Intellectual Property Organization. This has helped minimize the risk of piracy, counterfeiting and other intellectual property infringements, which is especially important in high-technology sectors as well as sectors with technologies that could be used in military applications. In January 2012 Mexico joined the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies.[17] Joining the Waasenaar Arrangement opened up new possibilities for American and European firms to invest in Mexico in the high-tech sectors, including semiconductors, software, aerospace, lasers, sensors and chemical production.

(v) Openness and commitment to free trade

Mexico's manufacturing base has been buttressed by the economy's openness. Mexico has one of the largest trade agreements networks, with free trade or preferential agreements with 44 countries.[18] It has also shown a strong commitment to free trade, avoiding the use of trade restrictions and providing assurance to companies operating in Mexico of unrestricted access to markets and intermediate inputs. Moreover, Mexico is signatory to international standards and quality agreements facilitating the insertion of local manufacturing companies into the global supply-chains.[19]

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[16] Several cost drivers are factored into the analysis, including wages and productivity, exchange rates, and freight fees, overhead, raw materials, duties, and in-transit inventory (AlixPartners, 2011).

[17] Under the Waasenaar Arrangement, the 41 signatory nations cooperate and adhere to export controls for conventional arms and dual-use goods and technologies.

[18] On June 2012, Mexico was formally invited to join the ongoing negotiations for the Trans-Pacific Partnership (TPP), a proposed free trade agreement involving the United States and eight other countries.

[19] For instance, Mexico is a signatory of the Bilateral Aviation Safety Agreement (BASA), which brings it into the global aerospace supply-chain by allowing aircraft parts to be shipped overseas for assembly without first undergoing an international inspection. This has bolstered Mexico's manufacturing capabilities in the aerospace

(continued)

10. **Several of the factors that have contributed to explain Mexico's increased competitiveness and recouping of market share in the U.S. are likely to be structural.** The locational advantage, improved unit labor costs from enhanced manufacturing productivity and increased labor participation, and trade openness have likely underpinned Mexico's improved competitiveness in the U.S. market in recent years. Structural reform efforts to boost productivity and investment would help sustain the dynamism of manufacturing exports and boost potential GDP growth. These efforts would include, inter alia, measures to further foster competition and labor flexibility, improve education and reinforce domestic security.

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sector: more than 260 aerospace companies now operate in Mexico (mostly in the Tijuana-Mexicali cluster), exporting some $4.3 billion in aircraft and parts in 2011.

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APPENDIX 1. DATA AND METHODOLOGY USED

A.1. Data

The empirical analysis is based on data on the customs dollar value of U.S. manufacturing imports (categories 6, 7, and 8 of the Standard International Trade Classification) by country of origin disaggregated at the 5-digit level. Data is at annual frequency from 1996 through June 2012. The source is the United States International Trade Commission (USITC).

A.2. Competition Between Mexico and China in the U.S. Manufacturing Import Market

Below we describe an extension of the Constant Market Share (CMS) analysis derived by Chami Batista (2008), attributing the gains or losses in import market shares by a given country to each of its competing exporters. The ultimate goal is to determine what fraction of Mexico's dollar value gains in market share in manufacture products came at the expense of China (vis a vis other countries that were also changing their share in the U.S. market over this period).

Assume that there are *n* exporters to the U.S. market **K**, so that:

$$k_H^t = \frac{X_H^t}{M_K^t} \tag{1}$$

are the macro shares of each exporting country **H**=1,….,*n*.

The change in the micro market share of product *i* between time *t* and time *t+1* of exporter **H** can be defined as:

$$\Delta k_{H,i} \equiv k_{H,i}^{t+1} - k_{H,i}^t \equiv \left(\frac{X_{H,i}^{t+1}}{M_{K,i}^{t+1}} - \frac{X_{H,i}^t}{M_{K,i}^t}\right) \tag{2}$$

Dropping the subscript *i* for ease of notation, $\Delta k_{H,J}$ may be defined as the part of the change in the micro share of exporter **H** that can be ascribed to the change in the micro share of exporter **J**, such that:

$$\Delta k_H \equiv \sum_{J\neq H}^{n} \Delta k_{H,J} = \sum_{J\neq H}^{n} \left(\frac{X_J^t}{M_K^t} - \frac{X_J^{t+1}}{M_K^{t+1}}\right) \tag{3}$$

bearing in mind that:

$$\sum_{J}^{n}\left(\frac{X_J^{t+1}}{M_K^{t+1}}-\frac{X_J^{t}}{M_K^{t}}\right)\equiv 0 \tag{4}$$

That is, when exporters compete for a specific market, the changes in a given country's share of the market necessarily come at the expense of all the others' shares together.

Starting from (4), it can be shown that the change in market share of exporter **H** for product *i* that can be attributed to exporter **J** is equal to:

$$\Delta k_{H,J,i} \equiv \Delta k_{H,i}\left(\frac{X_{J,i}^{t}}{M_{K,i}^{t}}\right)-\ \Delta k_{J,i}\left(\frac{X_{H,i}^{t}}{M_{K,i}^{t}}\right) \tag{5}$$

or

$$\Delta k_{H,J,i} \equiv \Delta k_{H,i}k_{J,i}-\ \Delta k_{J,i}k_{H,i} \tag{6}$$

which is equal to the difference between the changes in market shares for a product *i* between **H** and **J**, where each term is weighted by the market share at initial time *t* of the other competitor. Note that the only case where the increase country **H**'s import share to the U.S. will be unambiguously equal to the decrease in market share by country **J** is when country's **J** share of the market for product *i* was 100 percent in period *t* (and consequently the share of country **H** was 0 in the initial period).

Chami Batista (2008) shows that the formulation in (6) satisfies four desirable properties. First, country **H** cannot lose or gain from itself. Second, a gain for exporter **H** from exporter **J** is equal to the loss of exporter **J** to exporter **H**. Third, the sum of the changes in market shares of one exporting country that are attributed to each of its competitors is equal to the overall change in market shares of the country. Fourth, the change in market share of one exporting country that is attributed to one of its competitors is directly related to the difference between the rates of growth of the value of exports of the two countries. It can be shown that (9) can be re-expressed as:

$$\Delta k_{H,J,i} \equiv \frac{(x_{H,i}-x_{J,i})}{1+\hat{m}}k_{H,i}k_{J,i} \tag{7}$$

where $x_{H,i}$ and $x_{H,i}$ is the gross rate of growth in the value of exports of products *i* by country **H** and **J**, respectively, and $\hat{m}$ is the gross rate of growth in the value of imports of product *i* by country **K**.

III. THE CASE FOR TAX REVENUE MOBILIZATION IN MEXICO[1]

A. Introduction

1. **Mexico's current fiscal framework is a sound basis for fiscal sustainability, but over the medium term it will require measures to offset emerging challenges**. Two of the most important challenges are: (i) a decline in oil revenues as a share of GDP as the economy grows (even with oil production increasing to its 2004 peak over the medium term and with oil prices remaining at its current levels); and (ii) the projected increase in health- and pensions-related spending due to aging. More generally, Mexico also needs to further rebuild fiscal buffers as a protection against possible negative shocks from the fragile global economic environment.

2. **The need to anticipate and overcome these challenges creates a strong case for additional domestic revenue mobilization.** The case appears even stronger when looked at from an international perspective: Mexico's low levels of non-oil tax collection compared with OECD countries and regional peers mean that there is space for revenue mobilization to avoid compressing public spending excessively, including public investment and social spending.[2]

3. **This paper summarizes the nature of these challenges and examines the characteristics of Mexico's tax system from an international perspective**. It highlights areas in which the country lags behind comparator countries in terms of tax yields, looks at the distributional impact of the taxes, and quantifies the potential gains from some options to boost tax collection under different scenarios.

B. Macroeconomic Considerations for Revenue Mobilization

4. **Following Mexico's fiscal stimulus in 2009, gradual fiscal consolidation efforts have partly reversed the change in the fiscal position but are yet to restore previous levels of fiscal buffers**. Fiscal adjustment since 2010 has helped stabilize the gross public debt ratio at about 43 percent of GDP, but debt has yet to come down to pre-crisis levels (about 37 percent of GDP). Stepping up consolidation efforts to return to Mexico's primary surplus before the global crisis, would put the debt ratio on a more sustained downward path (which is particularly important in the present juncture of heightened global risk). But rebuilding fiscal buffers, which in the wake of a crisis can be a lengthy process, will be complicated by the need to cope with the projected substantial medium-term decline in oil revenues and the significant upward pressure on health- and pensions- related spending. Pressures on revenues and expenditure, projected at 4–5 percent of GDP over the next

[1] Prepared by Santiago Acosta-Ormaechea.

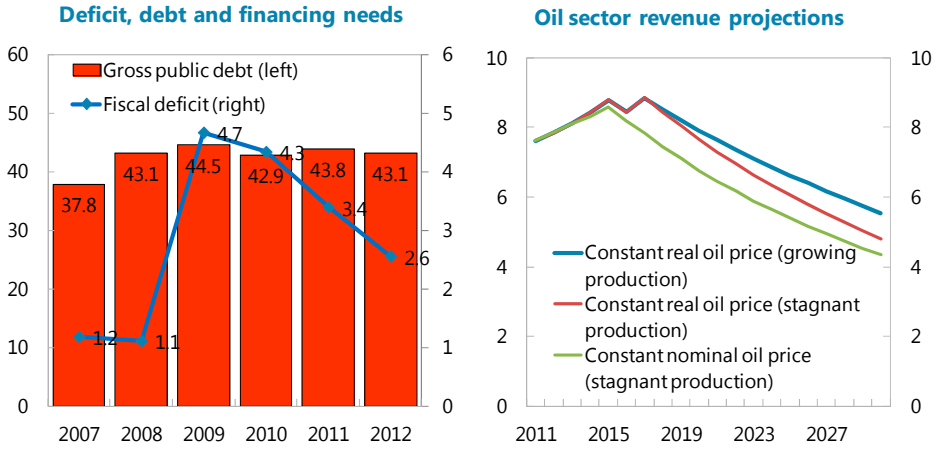
[2] Non-oil tax collection in Mexico was about 10 percent of GDP in 2011.

decades, appear manageable, but revenue mobilization efforts would be necessary in order to avoid an excessive compression in other expenditures.

5. **Oil revenue is projected to decline by 2–3 percent of GDP through 2030, from its current level of 7.6 percent of GDP**. Even if production were to return to its 2004 peak by 2030 (3.4bn barrels per day) and the real price of oil were to remain constant at its 2011 level, oil revenue would drop by about 2.1 percent of GDP over the period.[3] Instead, if production were to remain constant at current levels (2.5bn barrels per day), the contraction in oil revenues would be worse—about 2.8 percent of GDP. At worst, if production stays stagnant and oil prices decline as projected by the IMF's World Economic Outlook through 2017 (remaining constant thereafter), by 2030 oil revenue would fall by 3.3 percent of GDP.[4]

Figure 1. Mexico: Selected Fiscal Sector Indicators

(in percent of GDP)



Source: SHCP and IMF staff calculations.

6. **Health- and pensions-related spending are projected to increase by over 2 percent of GDP through 2030**.[5] The increase in pension costs (about 1.2 percent of GDP) will be driven mostly by population aging (assuming no offsetting factors such as an increase in the retirement age or further reforms to the system). Health care spending is projected to rise by 1 percent of GDP over the same period, also due to aging (which explains about 60 percent of the additional spending) and by the fact that health costs grow faster than GDP as technological medical advances are adopted. Mexico's projected increase in spending—

[3] Projecting oil revenues boils down to assessing the likely paths for oil production and international oil prices. These projections keep real GDP growth at its potential rate, the real exchange rate constant and other key parameters roughly unchanged.

[4] The estimation approach considered here largely follows Lopez-Murphy (2011).

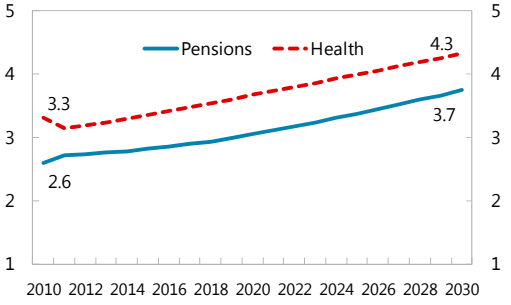
[5] See Escolano et al (2012). These figures refer to the consolidated general government.

both for pensions and health care—is in line with expected medium-term trends in other emerging-market economies (Figure 2).

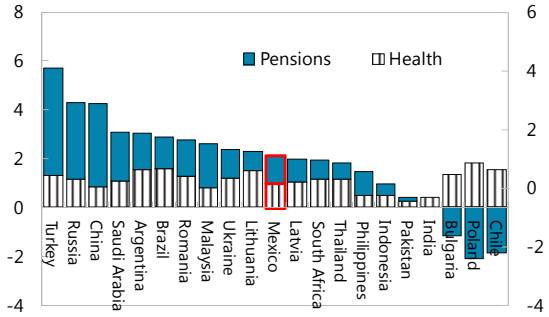
Figure 2. Public Spending in Health and Pensions

(in percent of GDP)

Mexico: health and pensions spending



Selected EMEs: change in health and pensions spending, 2010-2030



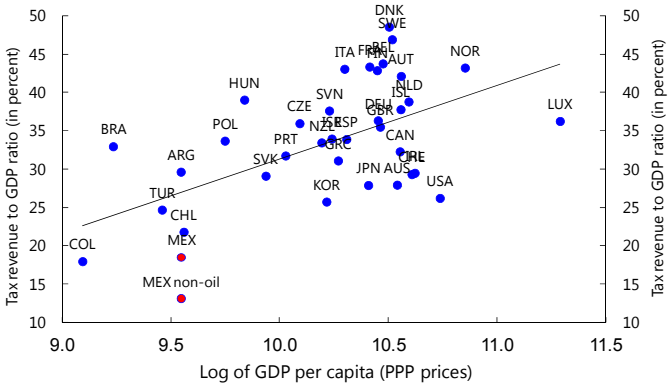
Sources: Escolano et al (2012) and staff calculations.

C. Mexico's Tax System: A Cross-Country Perspective

7. **Revenue collection in Mexico is low by regional and OECD standards**. Although differences in accounting practices across countries make precise comparisons difficult, Mexico's tax revenue appears as an outlier taking into account income levels and collection ratios of comparator countries (Figure 3).[6] At the general government level, Mexico's total tax revenue in 2010 was not much more than half of the OECD average (18 percent of GDP compared with 34 percent).[7] It was also significantly lower than in other LAC5 economies.[8]

Figure 3. Total Tax Revenue and Income Levels

(OECD and Argentina, Brazil and Colombia; 2006-10 unweighted avg)



Note: Data refer to the general government level.
Source: IMF staff calculations based on OECD revenue database and WEO.

[6] Mexico's measured taxes depart from the GFSM 2001 standard in that some revenues are shown net of subsidies (for instance, gasoline and electricity tariffs).

[7] The OECD Revenue Statistics Database, oil-related tax revenue is included in Mexico's total tax revenue.

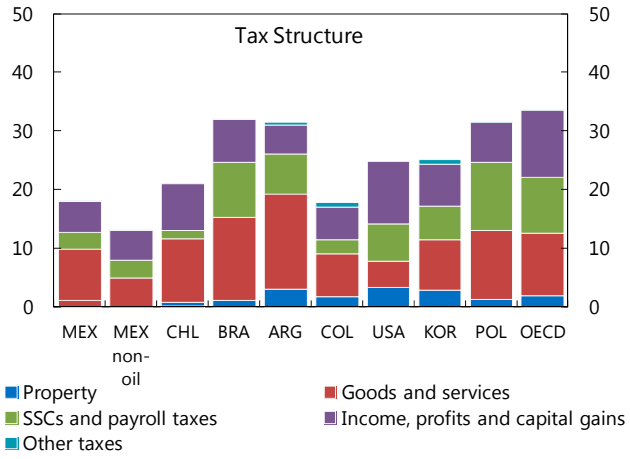
[8] The LAC5 group refers to the 5 largest Latin-American economies: Argentina, Brazil, Chile, Colombia, and Mexico.

If oil revenues are excluded, the difference with comparator countries is even more pronounced.

8. **Mexico's low revenue ratio is explained by several factors**. Some of the difference is due to design choices in tax structures or in public institutions. For instance, taxes on income, profits and capital gains are lower because the PIT and CIT are fully integrated (with full imputation of dividend tax at the personal level). While this reduces the total take of taxes on profits and capital, it has good efficiency properties (low effective taxes on capital). Likewise, unlike countries with traditional pay-as-you-go public pension systems, Mexico does not include employer and employee contributions to pensions in the fiscal accounts—since these are recognized as being part of individual saving. However, Mexico's revenue is also low because of: a relatively low tax compliance rate (in part due to informality in the economy); weaknesses in tax administration; a very low tax collection at the subnational level; and a somewhat narrow tax base (owing to differentiated rates and deductions in key taxes coexisting with special tax regimes) (OECD, 2011).[9]

9. **Amid low income taxes and social security contributions, the tax structure in Mexico depends significantly on indirect taxation.** While tax collection on goods and services in Mexico is broadly in line with OECD countries, income taxes (and social security contributions) represent a substantially lower share of total revenue (Figure 4). This makes overall tax collection in Mexico particularly reliant on indirect taxation compared with OECD and G7 countries—a characteristic also shared by the rest of the LAC5 (Figure 5).[10]

Figure 4. Total Tax Revenue Collection in 2010 1/
(selected countries; in percent of GDP)

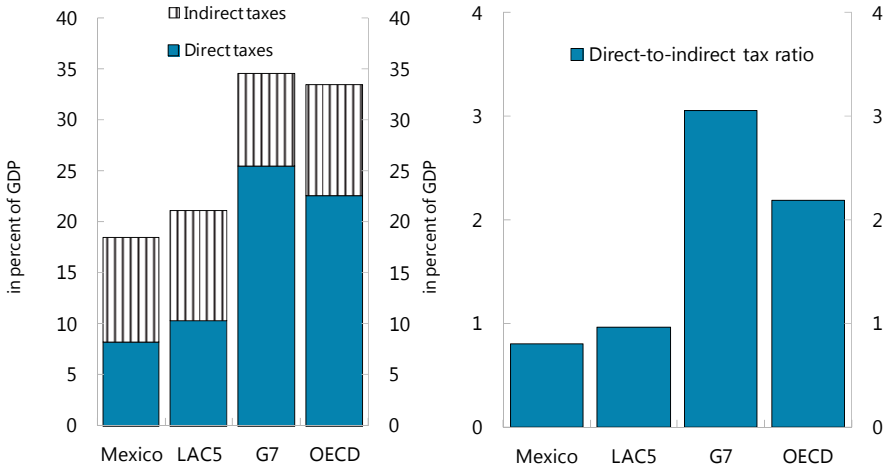


1/ General government level. Data on Argentina, Brazil, Colombia, Poland and OECD average refer to 2009.
Sources: OECD, Revenue Statistics Database and Latin American revenue statistics.

[9] For tax collection at the central government level, differences are less pronounced: Mexico collected about 17 percent of GDP in 2009, whereas the OECD average was about 25 percent of GDP.

[10] Direct taxes in Figure 5 include: taxes on income, profits and capital gains, social security contributions, taxes on payroll and workforce and taxes on property. Indirect taxes, in turn, include: taxes on goods and services and other taxes.

Figure 5. Direct-to-Indirect Tax Ratios Across Country Groups

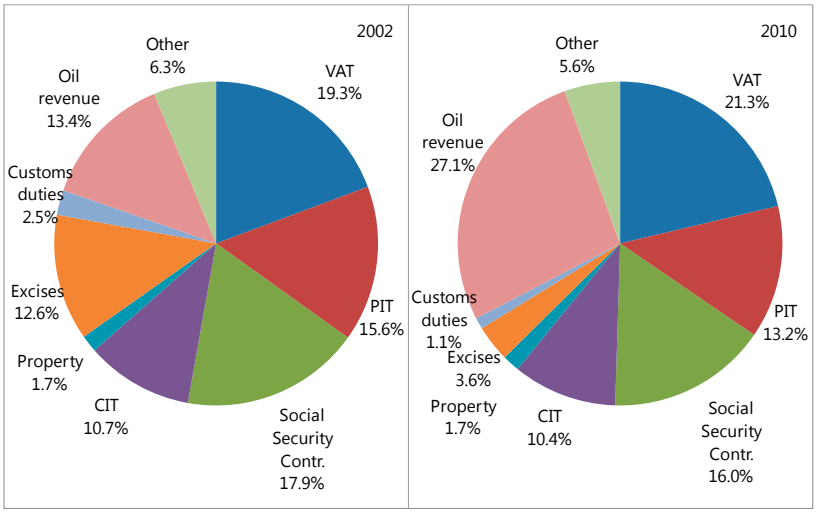


Note: data refer to the general government level.
Source: IMF staff calculations based on OECD revenue statistics database.

10. **The share of oil revenues has increased significantly since 2002, due to the increase in international oil prices (Figure 6).** Despite growing diversification in Mexico's economy, dependence of the public finances on oil production has not declined, missing an opportunity to diversify sources of revenue in line with the rest of the economy.[11] Due to the significant increase in fuel subsidies, the share of excises declined sharply over the period, as these are accounted for as a negative excise.[12] Property taxes, which are collected at the subnational level,

Figure 6. Mexico: Structure of Tax Revenues in 2002 and 2010

(in percent of total tax revenues)



Source: OECD, Revenue Statistics Database.

[11] Despite the changes in the structure of the economy, the contribution of income taxes (PIT and CIT) has remained broadly unchanged in this period, accounting for about one fourth of total revenue. Similarly, VAT continues to account for about one-fifth of total tax revenue.

[12] In 2002 fuel excises generated revenue of about 1.6 percent of GDP, whereas in 2010 they reached -0.6 percent of GDP (negative because of the net impact of the fuel subsidy). Over the period 1980–2005, fuel excises were on average about 1 percent of GDP.

contribute less than 2 percent of total revenue—a share that has remained broadly constant over time.

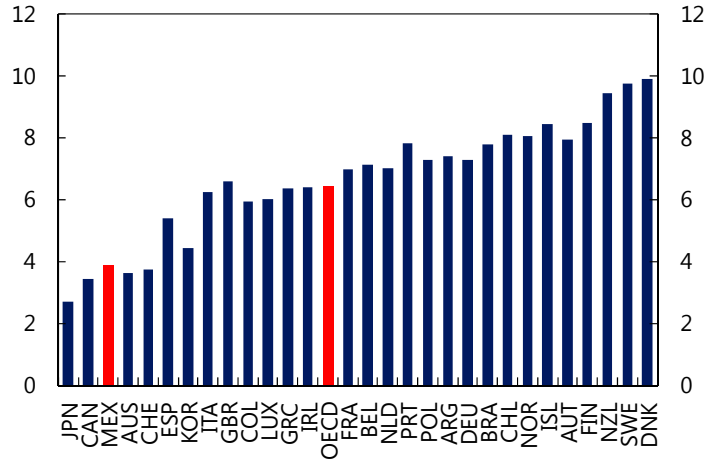
D. Overview of Mexico's Tax System

Value Added Tax (VAT)

11. **Mexico's VAT collection is below OECD and regional standards.** VAT revenue, at 3.9 percent of GDP in 2010, stood significantly below the OECD and LAC5 average collection of around 6.7 percent of GDP.[13] However, Mexico's VAT statutory rate, currently at 16 percent, is not significantly below the OECD's (currently at around 18 percent). Instead, the underperformance of the VAT in Mexico is mostly associated with exemptions and reduced VAT rates which, combined with the informality in the economy, have substantially narrowed the tax base (OECD, 2011).[14] The reduced VAT rate at Mexico's borders, unique among LAC5 or OECD countries, has also contributed to erode the overall VAT base.[15] These special regimes have been reflected in the low VAT revenue ratio (actual collection over theoretical revenues derived from applying the standard rate to all final consumption), which is the lowest among OECD countries.[16]

Figure 7. Selected Countries: VAT collection in 2010 1/

(in percent of GDP)



1/ Data for Argentina, Australia, Brazil, Colombia , Greece, Ireland, Netherlands, Poland, and OECD average refer to 2009.
Sources: OECD, Revenue Statistics Database and Latin American revenue statistics.

[13] Mexico's VAT collection was 3.7 percent of GDP in 2011.

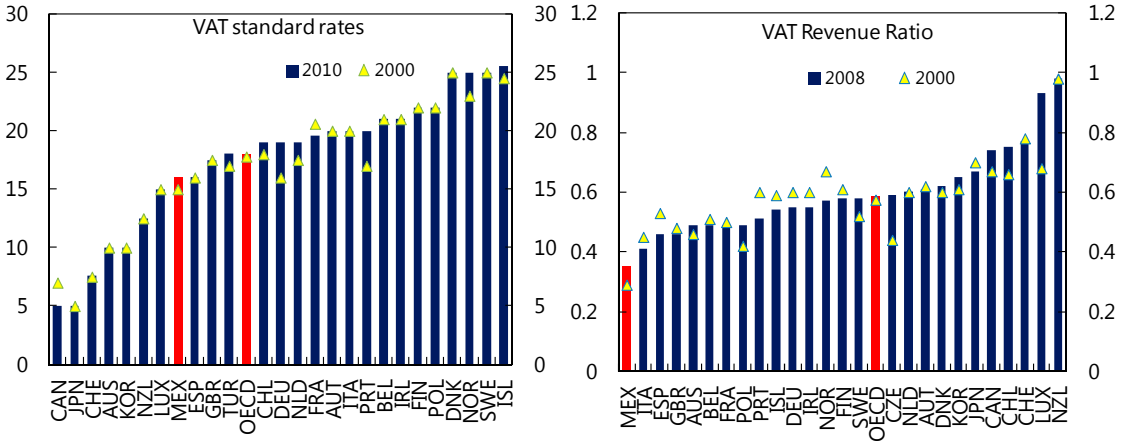
[14] The VAT has zero rates for food and medicines and exemptions for services such as education and health.

[15] Mexico has a differential border rate of 11 percent, which according to official estimates entails a tax expenditure of about 0.13 percent of GDP.

[16] This measure of the effectiveness of the VAT is also referred to as VAT C-efficiency ratio.

Figure 8. Selected OECD Countries: VAT Trends

(in percent)



Source: OECD, 2010, Consumption Tax Trends.

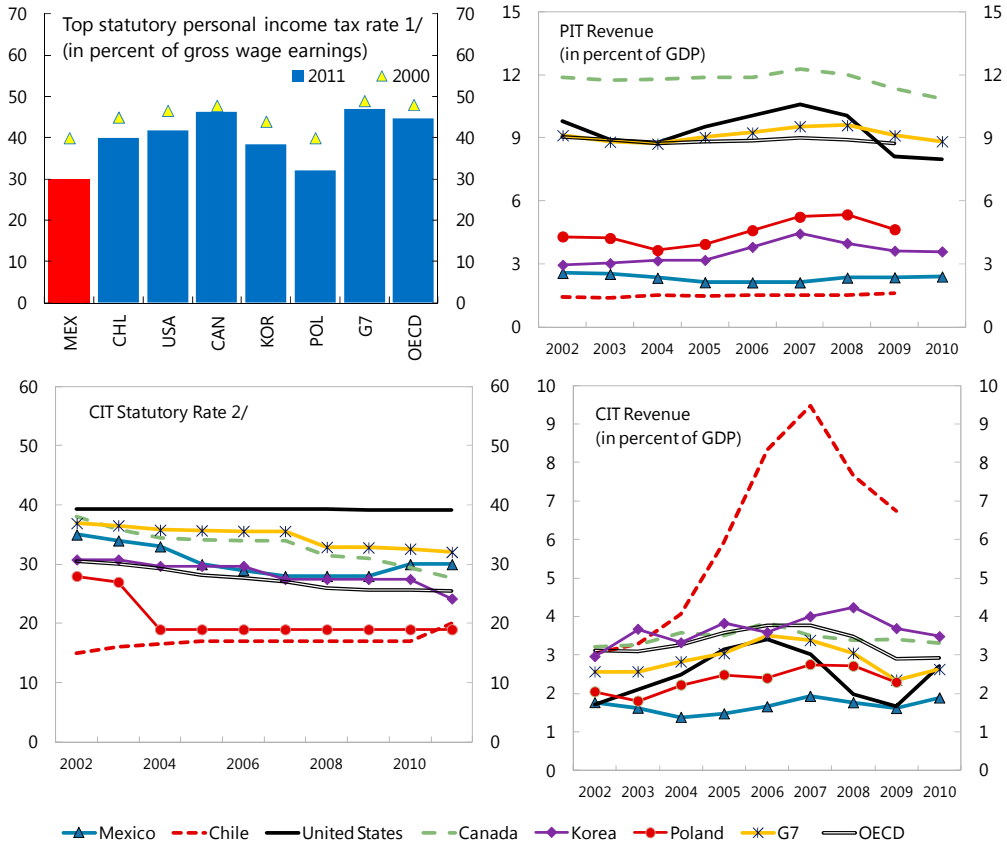
Income taxes

12. **Despite statutory rates broadly in line with comparator countries, Mexico's income tax revenues are low.** The combined income tax revenue in Mexico (PIT and CIT), at 5 percent of GDP in 2009, is significantly below OECD levels—although, as noted, some of this can be explained by the full integration of the PIT and CIT.[17] Statutory rates for the PIT and CIT, at 30 percent, are broadly in line with comparator countries.[18] Mexico's low income tax revenue collection reflects a combination of special regimes, widespread deductions and low compliance (OECD, 2011).

[17] In addition, the OECD's revenue statistics database defines two categories for taxes on income (profits and capital gains of individuals and corporates) which exclude other income taxes (such as Mexico's recently-implemented *Impuesto Empresarial a Tasa Unica* (IETU)) that cannot be directly allocated to either of them. This latter tax yielded about 0.4 percent of GDP in 2009. However, even after taking into consideration these caveats, Mexico shows a particularly low yield for income taxes. See SHCP (2011b) for details.

[18] In 2011 the average top PIT statutory rates in the LAC5 and OECD were 31 and 42 percent, respectively. Average top CIT rates for LAC5 and OECD were 30 and 26 percent, respectively. See Sabaini and Jiménez (2011) for further discussions on the characteristics of income taxes in Latin-American countries.

Figure 9. Selected OECD Countries: Income Taxes



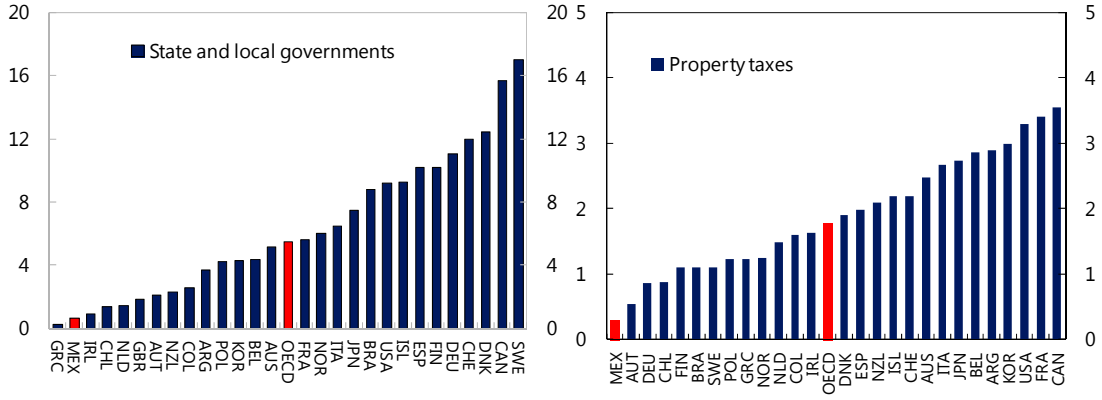
1/ For a single person without dependants based on the earnings level where the top statutory personal income tax rate first applies.
2/ Basic combined central and sub-central (statutory) corporate income tax rate given by the adjusted central government rate plus the sub-central rate.
Sources: OECD, Revenue Statistics, Tax Database, Corporate and Capital Income Taxes and Taxing Wages Databases.

Subnational revenues and property taxes

13. **Mexico's revenue mobilization at the subnational level is very low compared with OECD and regional peers.** At end-2009 subnational tax revenue collection reached 0.7 percent of GDP, about the lowest among OECD and LAC5 economies (Figure 10). Inadequate incentives, associated with the high reliance on transfers from the central government, and the high turnover of elected local authorities have underlain Mexico's subpar revenue performance at the subnational level.[19] This is seen especially in the low yield of property taxes in Mexico (which represent a substantial share of local taxation in most other countries), a phenomenon also explained by outdated property values. Other subnational tax bases could also be strengthened: small taxpayers (REPECOS), the local gasoline tax (administered by states), and the local vehicle-ownership tax, among others.

[19] Transfers from the central government currently represent more than 90 percent of subnational level revenues.

Figure 10. Subnational Government Revenue and Property Taxes, 2009
(in percent of GDP)



Sources: OECD, Revenue Statistics Database and Latin American revenue statistics.

Table 1. Selected Countries: Structure of Property Taxes in 2009
(in percent of GDP)

	MEX 1/	CHL	BRA	ARG	COL	USA	CAN	POL	KOR	OECD
Recurrent taxes on immovable property	0.2	0.6	0.4	0.4	0.5	3.1	3.1	1.2	0.8	1.1
Estate and inheritance taxes	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.1
Recurrent taxes on net wealth	0.0	0.0	0.0	0.4	0.4	0.0	0.1	0.0	0.0	0.1
Taxes on financial and capital transactions	0.1	0.1	0.1	2.2	0.6	0.0	0.2	0.0	1.9	0.4
Other taxes on property	0.0	0.0	0.5	0.0	0.1	0.0	0.2	0.0	0.0	0.1
Total	0.3	0.9	1.1	2.9	1.6	3.3	3.6	1.2	3.0	1.8

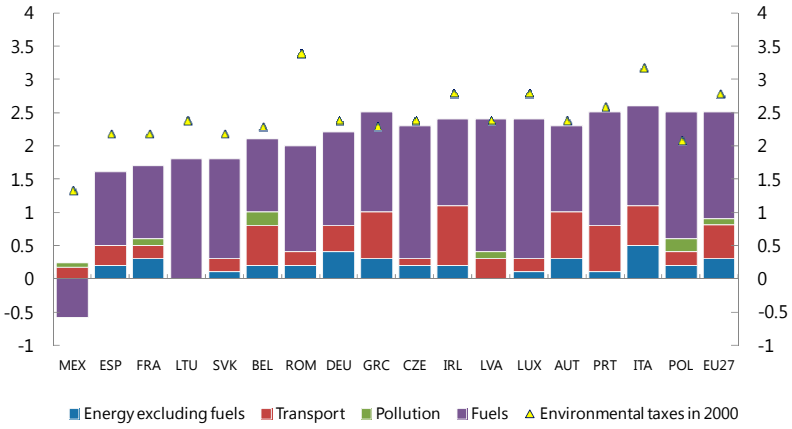
1/ excludes *impuesto a los depósitos en efectivo* (IDE) in the case of taxes on financial and capital transactions.
Source: OECD, Revenue Statistics Database.

Environmental taxes

14. **Environmental taxes in Mexico are an outlier in international comparison**. In 2010 these taxes generated negative net revenues due to Mexico's fuel subsidies (-0.3 percent of GDP).[20] Other environmentally-related taxes—such as those on pollution, transport or energy excluding fuels—have also shown a relatively weak performance from a cross-country perspective. This becomes apparent when considering the 2.6 percent of GDP collected by the EU27 in environmental taxes on average, with fuel taxes representing 1.6 percent of GDP (Figure 11).

[20] The average revenue from fuel excises between 1980 and 2005 was 1 percent of GDP. However, in recent years, higher subsidies to the consumption of gasoline and diesel led to a net negative collection of these excises (0.6 percent of GDP in 2010).

Figure 11. Selected Countries: Environmental Taxes in 2010
(in percent of GDP)



Source: European Commission, Taxation Trends in the European Union; and OECD/EEA database on environmentally related instruments.

Tax expenditures

15. **Mexico's tax expenditures appear large, representing about 2.8 percent of GDP in 2009.**[21] These expenditures are associated with income taxes (1.3 percent of GDP), VAT (1.3 percent) and other taxes and tax reliefs (0.2 percent). International comparison, with all the caveats needed due to differences in methodologies to estimate them, show that Mexico's tax expenditures appear relatively high in recent years (Table 2). These tend to also be poorly targeted while adding significant complexities and inefficiencies to the system.[22]

Table 2. Tax Expenditures: Estimates in Latin America
(in percent of GDP)

	2005	2006	2007	2008 1/	2009 1/	Average 2005-9
Argentina	2.2	2.1	2.2	2.1	2.1	2.1
Brazil	1.7	2.0	2.3	2.8	3.2	2.4
Chile	4.4	4.1	4.9	4.0	4.0	4.2
Colombia	3.7	4.0	3.5	-	-	3.7
Mexico	6.7	5.6	5.9	5.2	2.8	5.2
Peru	2.1	2.2	2.2	2.1	1.8	2.1

1/ Mexico's estimate in 2008 and 2009 excludes tax expenditures and collection of the IETU (see Annex).
Sources: *Secretaría de Hacienda y Crédito Público* (SHCP): *Presupuesto de Gastos Fiscales*, various issues; and Villela et al (2010).

[21] The estimate in 2008 and 2009 excludes tax expenditures and collection of the IETU (bringing it down by about 1 percent of GDP). It does not include estimates of tax expenditures associated with the *Maquiladora* sector. See Annex for a further breakdown of Mexico's tax expenditures, including official figures for 2010.

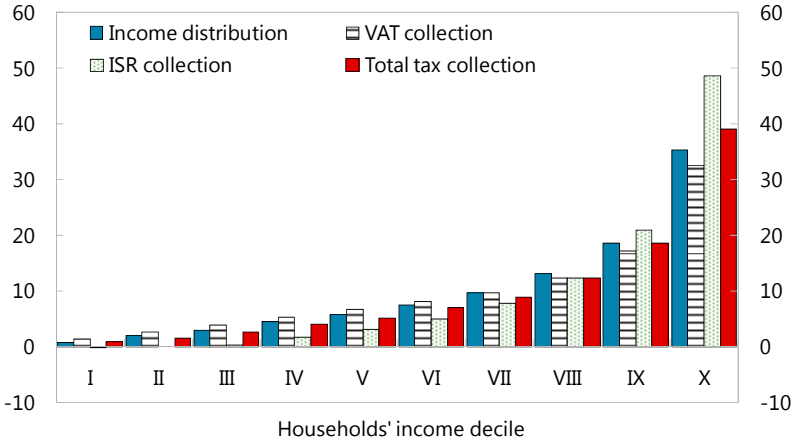
[22] See also OECD (2010a; 2010b) for further discussions on tax expenditures in OECD countries.

16. **Tax expenditures associated with the export assembly sector (*Maquiladoras*) are significant and lead to important inefficiencies in the tax system**. This regime currently provides substantial benefits to firms in terms of VAT, income taxes, and import tariffs, involves substantial fiscal costs, opens windows for tax planning and, over time, it has moved away from its initial objectives. To qualify as a *Maquiladora*, a firm currently needs to sell abroad only 10 percent of total sales; moreover, rules limiting eligible firms to border areas have been relaxed. This implies that in practice a large share of firms receiving these benefits produce goods and services that are sold in the domestic market.[23]

Distributional aspects

17. **The distributions of income and tax collection in Mexico across households' income deciles are broadly aligned**. According to the latest National Survey of Household Income and Expenditure (SHCP, 2011a), the highest three deciles of the income distribution obtain 67 percent of gross national income and contribute with about 70 percent of total taxes (82 percent for income taxes). The three lowest deciles of the distribution instead receive 6 percent of gross income and contribute 5 percent of total taxes (8 percent for the VAT).

Figure 12. Income and Tax Distribution by Income Decile
(in percent)



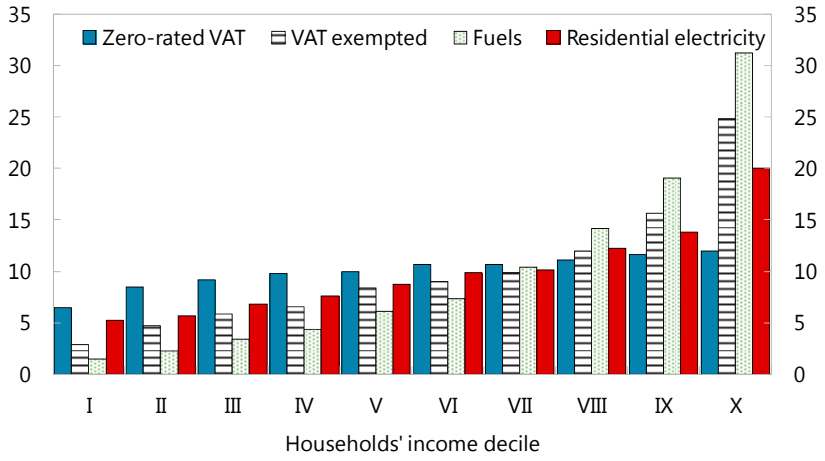
Sources: based on SHCP (2011a)

18. **Explicit and implicit subsidies in Mexico tend to benefit households at the higher end of the income distribution.** The regressive structure of subsidies is particularly apparent in the case of fuel subsidies and residential subsidies for electricity. VAT exemptions and reduced rates also tend to be regressive, although less so in the case of zero-rated VAT

[23] Tax expenditure associated with the special income tax regime for *Maquiladoras* in 2010 was about 0.11 percent of GDP. This figure only reflects partially the associated fiscal cost, as it excludes the forgone revenue due to the elimination of VAT payments for 'so-called' temporary imports of intermediate inputs and other tax expenditures associated with the sector which are difficult to quantify.

goods. In all, tax expenditures in Mexico do not appear to be effective to help redistribute income to the most vulnerable groups.[24]

Figure 13. Selected Implicit Subsidies by Income Decile
(in percent)



Sources: based on SHCP (2011a)

19. **Mexico's conditional cash transfers program Progresa/Oportunidades has been particularly effective in improving the after-transfers distribution of income.** Recent estimations suggest that the program is a good example of redistributive efficiency, in the sense that it spends 0.36 percent of GDP and helps explain approximately the largest share of the post-transfer improvement in Mexico's Gini coefficient after including programs targeting the poor (Esquivel et al, 2010).

E. Options to Strengthen Revenue Mobilization

20. **To strengthen Mexico's revenue mobilization, efforts could focus on broadening the tax base through the elimination of tax expenditures, combined with improvements in tax administration to enhance compliance.** Mexico's statutory rates appear broadly in line with key comparator countries, which suggest that priority should be given to efforts to widen the tax bases and strengthen administration. Table 3 illustrates a number of areas

[24] In absolute terms the richest deciles spend more on consumption, and thus receive a larger share of the associated tax expenditure. But as a proportion of the income of each income group, the incidence of the implicit VAT subsidy is larger for the most vulnerable groups (OECD, 2011). Options for changing the system to broaden the tax base should consider associated measures to compensate these groups (as their purchasing power would be significantly reduced under the elimination of special VAT tax regimes).

where tax collection can be strengthened (to achieve levels closer to comparator countries) and presents indicative estimates of potential revenue gains.[25] Key measures include:

- **VAT**: reduced rates and exemptions should be revisited with the aim of eliminating them over time—in particular, the lower border rate is a concession not found elsewhere The lower bound of potential gains (from cutting tax expenditure) is estimated at 1.3 percent of GDP;[26] more ambitious efforts could bring about 2.3 percent of GDP in additional revenues (to achieve a VAT revenue ratio closer to the OECD average).[27]

- **Environmental taxes**: subsidies to gasoline and diesel should be eliminated over time, a measure that would increase revenue collection by about 0.6 percent of GDP. In addition, if Mexico were to tax fuels at the low end of the EU27 level,[28] Mexico's environmental taxes would yield an additional 1 percent of GDP, which Mexico has done in the past.[29]

- **Subnational taxes**: As regards property tax, updating land registers and property values while improving administration and tax enforcement at the local level appears necessary to mobilize subnational revenue. This would help reach immovable property tax revenues closer to the LAC5 average (0.4 percent of GDP) while setting the ground to achieve OECD average collection levels over time (1.1 percent of GDP). Other taxes and special regimes should also be strengthened to further increase subnational revenue—e.g., small taxpayers regime (REPECOS), the local gasoline tax (administered by states), and the local vehicle-ownership tax and payroll tax among others.[30]

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[25] The lower bound indicates first-round gains obtained through a number of identified measures (elimination of various tax expenditures, introduction of a positive excise on gasoline and improving administration of property taxes); the upper bound represents an indicative benchmark defined to reflect international standards (which in principle could be achieved through the introduction of broader tax measures).

[26] This is roughly given by 0.13 percent of GDP due to the reduced rate in border zones; 0.28 percent of GDP due to VAT exemptions; and about 0.87 percent of GDP due to goods and services at zero rate.

[27] Keen et al (2009) undertake similar estimations to determine a tentative upper-bound for VAT revenue in Mexico. They also discuss in detail the steps involved to increase the VAT efficiency ratio in Mexico to levels observed in peer countries. Reaching those levels of VAT efficiency over the longer term would involve the elimination of special treatments (for instance of suppliers to the *Maquiladora* sector) and the correction of various imperfections in the system (including in administration and compliance).

[28] For instance, Spain levied about 1 percent of GDP through fuel taxes in 2010.

[29] Over the period 1980–2005, Mexico's fuel excises were on average about 1 percent of GDP.

[30] The focus on immovable property taxes here is due to the fact that in most OECD countries they tend to explain a large share of subnational tax collection. In addition, they have efficiency-enhancing characteristics relative to other taxes owing to the immobility of the tax base, which make them appealing from a tax policy

(continued)

- **Elimination of other key tax expenditures**:[31] tax expenditures associated with the purchase of new vehicles and other personal deductions should be revisited; similarly, special regimes such as that for the *Maquiladora* sector could be phased out. These measures could tentatively yield 0.5 percent of GDP in additional revenue. If employment subsidies and special deductions for wages and salaries were reduced (as in Table 3 below), income tax revenues could increase by 1.1 percent of GDP.[32]

Table 3. Quantification of options to increase non-oil tax revenue
(in percent of GDP)

Measures to gain fiscal space	Revenue collection gains (lower and upper bounds)		
Value added tax:	1.3	-	2.6
elimination of reduced rates and exemptions 1/	1.3	-	2.6
Environmental taxes:	1.7	-	1.7
elimination of fuel subsidies 2/	0.6	-	0.6
fuel tax collection at low-end of EU27 3/	1.1	-	1.1
Property taxes:	0.2	-	0.9
increase in immovable property taxes revenue 4/	0.2	-	0.9
Elimination of other key tax expenditures:	0.3	-	1.1
personal income tax expenditures 5/	0.1	-	0.5
corporate income tax expenditures 6/	0.2	-	0.6
Total	**3.5**		**6.2**

1/ lower bound: SHCP 2010 estimates of VAT tax expenditure; upper bound: average 2008 revenue ratio of OECD.
2/ estimatation of 2010 fuel subsidy.
3/ fuel taxes observed in Spain in 2010.
4/ lower bound: to reach 2009 LAC5 average level; upper bound: to reach 2009 OECD average level.
5/ lower bound: SHCP 2010 estimates of PIT tax expenditure on various personal deductions; upper bound: includes reduction of various tax expenditures on wage income.
6/ lower bound: SHCP 2010 estimates of PIT tax expenditure on special regimes for Maquiladoras and vehicles up to Mex$ 175.000; upper bound: includes reduction of tax expenditure on employment subsidy and other CIT deductions.
Source: *Secretaría de Hacienda y Crédito Público* (SHCP) and IMF staff calculations.

21. **To alleviate potentially adverse effects of revenue mobilization efforts on the poor, well-targeted social protection measures could be considered.** The revenue gains associated with the increase in tax revenue would allow some resources to be allocated to social programs to alleviate the negative effects of the reforms on the poor. Moreover, in the context of needed reforms to boost Mexico's growth potential, increasing social spending with high social return would help provide the basis for higher growth.

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perspective. They are thus less distortionary in terms of the allocation of resources in the economy, since they do not tend to affect investment-savings decisions, thereby helping preserve long-run growth. They are also progressive, since property values and income levels are positively correlated with income.

[31] Tax expenditures that are not strictly justifiable in terms of efficiency or effectiveness should be eliminated over time, as they tend to generate important costs to society and unnecessary complexities to the tax system.

[32] This estimate, however, would have to be adjusted to net out that part of the revenue already collected through the IETU.

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Appendix 1. Mexico: Breakdown of Tax Expenditures in 2008, 2009, and 2010

	2008		2009		2010	
	Mex$ bn	percent of GDP	Mex$ bn	percent of GDP	Mex$ bn	percent of GDP
Total	629	5.2	335	2.8	375	2.9
Income taxes 1/	206	1.7	159	1.3	168	1.3
o/w special deductions of *Maquiladoras (ISR empresas)*	13	0.1	13	0.1	14	0.1
o/w deductions for vehicles up to Mex$ 175,000 (*ISR empresas*)	9	0.1	17	0.1	17	0.1
o/w employment subsidy *(ISR empresas)*	35	0.3	32	0.3	34	0.3
o/w various wage exemptions (*ISR personas fisicas)*	67	0.6	46	0.4	49	0.4
o/w other deductions (*ISR personas fisicas)*	26	0.2	9	0.1	9	0.1
VAT	210	1.7	159	1.3	167	1.3
Zero-rated 2/	152	1.2	108	0.9	114	0.9
Exempted 3/	43	0.4	34	0.3	36	0.3
Reduced rate at the border (11 percent)	15	0.1	16	0.1	16	0.1
Special taxes	199	1.6	7	0.1	34	0.3
o/w negative IEPS 4/	196	1.6	6	0.0	32	0.2
Fiscal stimulus	14	0.1	10	0.1	6	0.0
Memorandum items:						
Nominal GDP (Mex$ bn)	12176	12176	11930	11930	13084	13084
IETU tax expenditure (percent of GDP) 5/	0.8	0.8	0.7	0.7	0.6	0.6
IETU tax collection (percent of GDP)	0.4	0.4	0.4	0.4	0.3	0.3

Sources: *Secretaría de Hacienda y Crédito Público* (SHCP): *Presupuesto de Gastos Fiscales, various issues,* and IMF staff calculations.

1/ excludes tax expenditures and tax collection of IETU.

2/ includes: food, medicines, books and newspapers, imported goods by Maquiladoras, hotels services used for conventions, and other goods and services.

3/ includes: medical, educational and transport services, cultural events and housing.

4/ may differ from actual figures due to differences between projections and outturns.

5/ as reported by Mexican authorities in *Presupuesto de Gastos Fiscales,* various issues.

IV. MEXICO: FINANCIAL SECTOR DEVELOPMENT[1]

While Mexico's bond and equity markets have developed rapidly during recent years, banking sector credit has remained relatively subdued compared to emerging market peers. Evidence suggests that bond and equity financing in Mexico can be explained by usual factors (economic development, saving rate, sovereign debt market depth, institutional/regulatory environment), but bank financing has remained below what those factors would suggest. The sustained increase of bank credit after the global crisis has helped to start reversing this puzzle, with potential implications for access to credit for small and medium size enterprises and growth.

A. Background

1. **There is growing consensus in the literature that financial development matters for economic growth.** Since the early work by Diamond (1969) on the relationship between financial development and growth, substantial work has been done, particularly during the last 20 years.[2] Financial development can have an impact on economic growth through different channels, including by (i) facilitating diversification of risks; (ii) mobilizing savings; (iii) reducing the cost of external financing for firms; and (iv) disseminating information and monitoring investment decisions. The empirical literature also suggests that financial depth is important for growth.[3]

2. **The structure of the financial system also matters, as it may affect access to credit for some companies, in particular small and medium size enterprises (SMEs).** Although the literature has not found a direct link between the relative development of bank-based and market-based financing and economic growth, it is generally acknowledged that bond and equity financing is less effective in serving borrowers in situations characterized by "opaqueness" (i.e., the difficulty to ascertain whether firms have the capacity or the willingness to pay). Banks, through a number of transactional technologies, are better suited to serve companies for which the lender has to rely predominantly on soft information.[4]

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[1] Prepared by Francisco Vázquez Ahued and Esteban Vesperoni.

[2] See, for example, Beck et.al. (2001), Goldsmith (1969), Levine (1997 and 2005), Rajan and Zingales (1998), Stultz (2001), and references therein.

[3] For a summary on theoretical and empirical underpinnings in the relationship between financial development and growth, see Levine (2005).

[4] These include relationship lending, credit scoring, standardized risk rating tools, asset-based lending, factoring, leasing, etc. See, for example, Berger and Udell (2006), and de la Torre, Martinez Pería and Schmukler (2010). Other papers on these issues are Armendariz et. al. (2005), Beck, Demigurc-Kunt and Martinez Pería (2008 and 2010); and Beck and Demigurc-Kunt (2007).

3. **The development of domestic bond and equity markets has helped Mexico recover financing levels reached during the early 1990s.** Total credit to the private sector (including bank credit as well as bond and equity financing), which peaked at more than 50 percent of GDP in 1994 (Figure 1), fell to less than 40 percent in the early 2000s and has only recently recovered past high levels (data sources for Figures 1–4 included in Appendix Table 1). This recovery has been mainly driven by the gradual expansion of bond and equity markets between 1994 and 2010 (Figures 2a and 2b), which has likely been driven in part by the reform of the pension system.[5] Domestic bond markets, in particular, have grown significantly and reached market capitalization levels of around 20 percent of GDP, larger than the average in other EMs. Equity markets have also developed in line with other EMs, although equity financing is still lower than in comparator countries (this financing includes the cumulative value of annual Initial Public Offerings, as percent of GDP in the year of issuance).[6] Despite the development of market financing, total financing in Mexico still appears low compared to other EMs, including other Latin American economies.

Figure 1. Total Private Sector Financing
(share of GDP)

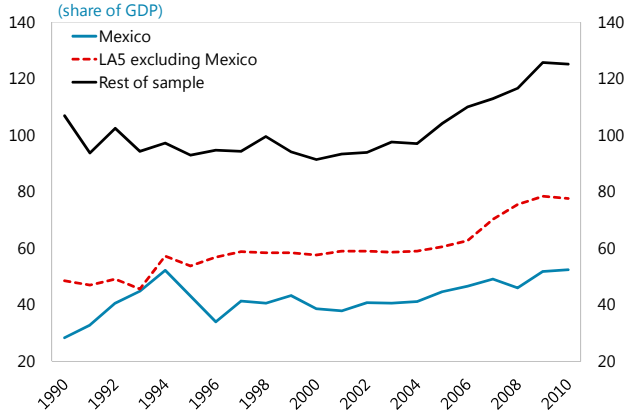


Figure 2a. Domestic Private Bonds
(market capitalization, share of GDP)

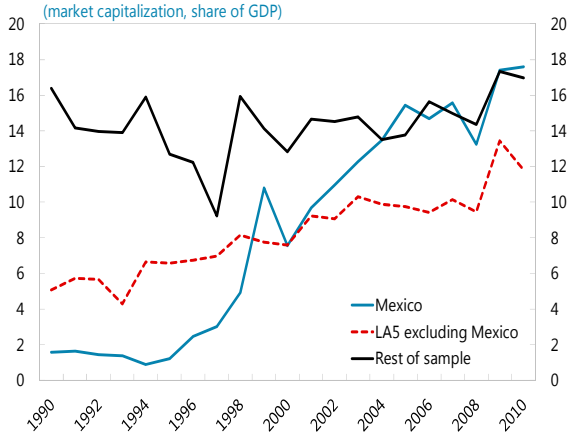
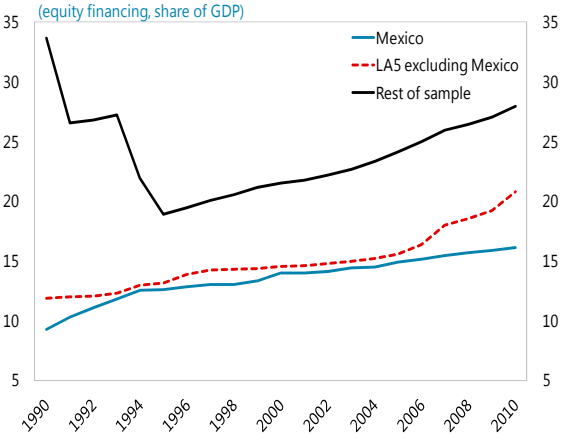


Figure 2b. Equity
(equity financing, share of GDP)

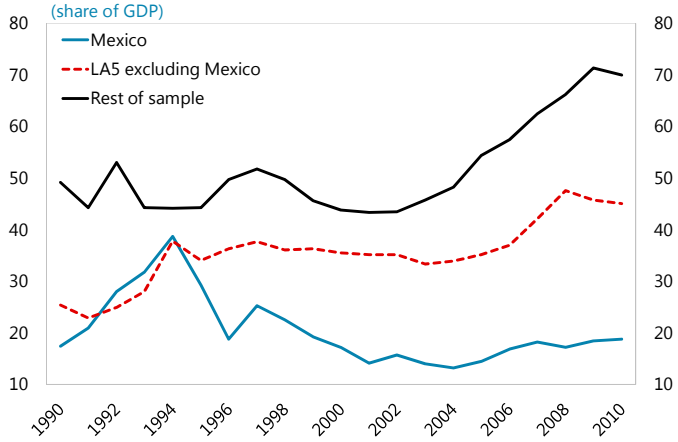


[5] Assets under management by pension funds represented more than 10 percent of GDP by 2010.

[6] These comparisons are based on a group of EMs in Latin America, Asia and Europe that have depicted dynamic financial systems during the last 20 years. The sample includes Brazil, Bulgaria, Chile, Colombia, Czech Republic, Estonia, Hungary, Indonesia, Korea, Latvia, Lithuania, Malaysia, Mexico, Peru, Philippines, Poland, Romania, Slovak Republic, Thailand, Turkey, and South Africa. In Figure 1, rest of the sample refers to non Latin American countries listed above.

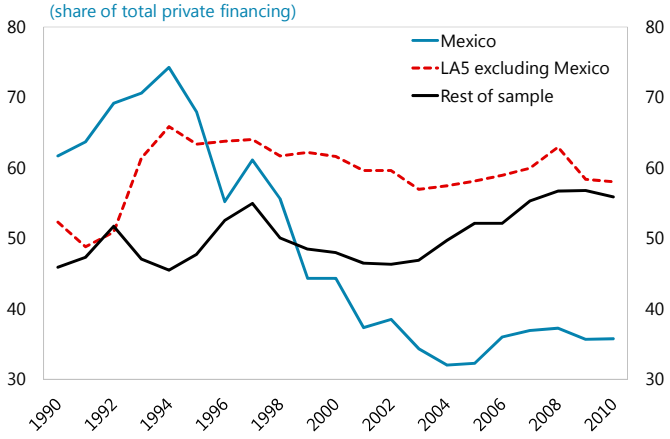
4. **Bank credit has remained relatively subdued (Figure 3).** After reaching almost 40 percent of GDP in 1994, bank credit to the private sector (defined as claims to the private sector by other depositary corporations, as reported in IFS) hit a trough at about 13 percent of GDP in 2004. By 2010, bank financing had rebounded to about 20 percent of GDP, still well below previous peaks.[7] Bank credit to GDP also represents less than half the level of other EMs in the sample. More recently, bank credit has shown a sustained recovery, growing at about 10 percent in real terms during the last couple of years.

Figure 3. Bank Credit to Private Sector
(share of GDP)



5. **As a result of these trends, the financial sector in Mexico has become less bank-based, compared both to the past and to other EMs (Figure 4).** The share of bank credit in total financing to the private sector, which reached almost 75 percent in 1994, was about 35 percent in 2010.[8] This contrasts with the experience of other EMs, in which the share of bank credit has remained at around 50–60 percent during the last 20 years.

Figure 4. Banking Credit
(share of total private financing)



[7] This performance in banking system credit is consistent with the low level of intermediated funds. Bank deposits peaked during the 1990s at more than 30 percent of GDP, a level that was broadly similar to other EMs; and in particular to Latin American peers. However, the trend in deposits reversed in the mid-1990s, and bottomed out at about 20 percent of GDP in 2004. Deposits recovered to about 27 percent of GDP by 2010, but it is still well below the average level in other EMs (57 percent of GDP). Loan-to-deposit ratios in Mexico—at 1.2—are also lower than the average in other EMs at 1.65. Relatively low leverage may have also contained credit growth, although it has likely shielded the banking system from vulnerabilities experienced in other EMs.

[8] The share of bank credit bottomed in 2004 at about 30 percent.

B. Financial Development: Mexico in the Context of Emerging Markets

6. **To study financial sector development in Mexico a cross-country econometric analysis was performed on the drivers of bank- and market-based financing between 1990s and 2010 (Appendix 1). The main results show that**:

- **The evolution of market-based financing in Mexico is explained by usual fundamentals, in line with other EMs.** Regression analysis suggests that the dynamics of market financing is driven by the size of the economy, saving rates, the development of sovereign debt markets, institutional factors, foreign financing spreads, and the cost of equity financing. Moreover, market-based financing is usually higher after financial crises, with Mexico's well captured by the regression analysis without a significant fixed effect.

- **The evolution of bank credit in Mexico, however, remains only partly explained by usual fundamentals.** The analysis suggests that the factors explaining market-based financing help also understand bank credit in EMs. However, while these variables help explain market-based financing in Mexico, the specification for bank financing cannot reject a significant negative fixed effect, suggesting that that macroeconomic and financial factors would predict higher bank credit in Mexico.[9]

- **A sequential analysis of crises suggests that the protracted stagnation of bank credit in Mexico is not likely associated with the direct impact from the 1994 crisis.** Figure 5 (appendix) shows that a crisis dummy for Mexico becomes significant only in 2005, a decade after the 1994 financial crisis, suggesting that other factors not associated with the immediate financial distress may be at play in the evolution of bank credit, including a lower level of savings through bank deposits and the implementation of tighter prudential regulations that usually follow financial crises.[10]

[9] Although beyond the scope of this note, other factors at play could be related to competition in the banking sector.

[10] For some countries, notably Mexico, pension system reforms after financial crises may have also played a role.

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APPENDIX 1. CROSS-COUNTRY ANALYSIS OF FACTORS BEHIND FINANCIAL SYSTEM DEVELOPMENT

This appendix analyzes the factors behind the evolution of bank- and market-based financing in EMs. Panel regressions comprising the EMs in the sample are used for the period 1990–2010.[11] The dependent variables are: (i) the ratio of financing instruments issued in capital markets (i.e., bonds and equity) to GDP; (ii) the ratio of bank financing to the private sector to GDP; and (iii) the ratio of financing instruments issued in capital markets to total financing to the private sector.[12] The method of estimation is GMM, including country dummies.[13]

Three specifications are presented. An initial specification regressing the dependent variables on development, macroeconomic and financial factors is followed by an analysis of the impact of financial crises. Finally, institutional factors are added to the specification.

Basic Specification

Bank credit and market-based instruments are affected *inter alia* by the level of development, savings, the depth of sovereign debt markets and funding costs (Table 2). The results in the basic specification suggest that: (i) both bank-based and market-based financing increase with the size of the economy; (ii) increasing levels of savings (i.e., total savings for market-based instruments and bank deposits for bank credit) are associated with higher financing; (iii) the development of sovereign debt markets helps boosting market-based instruments, but it has a negative impact on bank financing; (iv) countries with more open capital accounts, by facilitating access of domestic corporations to external credit markets, show lower levels of domestic market-based financing; (v) higher international interest rates and more expensive domestic equity markets are associated with lower market-based financing in EMs; and (vi) higher international interest rates are associated with more bank financing, which is likely funded to a large extent by domestic deposits.

[11] Some of the countries in the sample have not been included in the different regressions depending on the availability of information, in particular for bond and equity market instruments. The list of variables is described in Table 1.

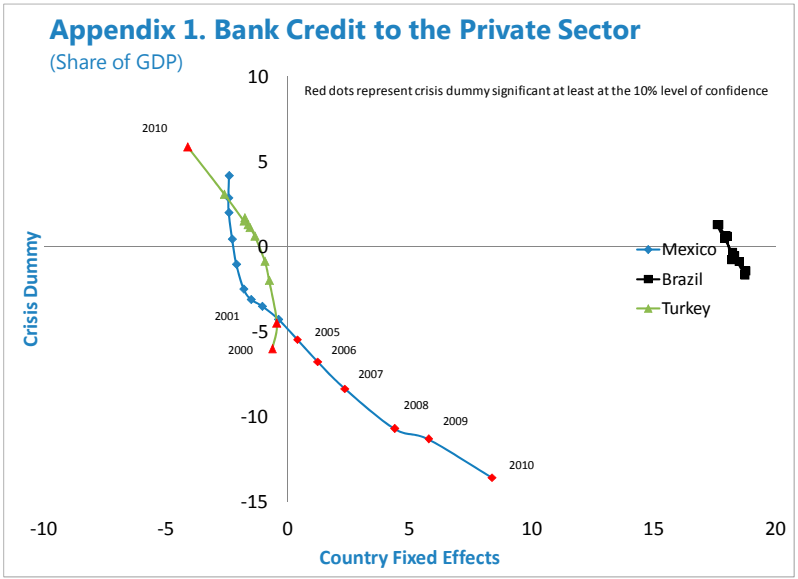
[12] The variable on equity financing has been adjusted for valuation changes, i.e. the variable captures the net financing associated to new issuances at a given year, valued in terms of the GDP of that year.

[13] The following variables have been instrumented by using their lagged values: GDP per capita, domestic savings, public bond market capitalization, and capital account openness.

The role of Crises

After financial crises, countries seem to experience a reduction in bank credit concomitantly with an increase in market-based financing. In order to test the effect of financial crises on the depth and structure of EMs credit markets, a step-dummy variable is introduced to the basic specification.[14] The results suggest that after financial crises, EMs experience a reduction in bank credit and an increase in market-based financing. Financial crises, however, usually bring about significant changes in the functioning of banking systems and in regulatory frameworks, which cannot be easily disentangled.

A sequential analysis suggests that the dynamics of bank credit after financial crises is likely associated with a number of factors.[15] The basic specification incorporates a crisis-dummy sequentially.[16] The results suggest that the impact of crises is not necessarily related to the financial distress itself, but to changes that take place following the crises, (Figure 5 illustrates the results of the analysis for some EMs, including Mexico). Many factors may explain changes in banking sector credit after financial crises, including *inter alia* a lower level of savings in the form of bank deposits and the implementation of tighter prudential regulations.



[14] The variable takes the value zero as long as a country did not experience a financial crisis, and one afterwards.

[15] The analysis was also performed for market-based financing instruments, with similar results.

[16] Starting with a single 1-value dummy variable during the crisis year, we run multiple regressions incorporating an extra 1-value observation in subsequent years in each regression.

Institutional Factors

An institutional variable is added to the specification. The World Bank's World Governance Indicator (WGI) for rule of law is used, which captures perceptions of the extent to which agents have confidence in and abide the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The WB produces a score based on an unobserved components model for each economy, and then ranks them in a scale of 0 to 100.[17]

Better institutions have a positive effect on bank lending in EMs (Table 4). The new specification shows that the WGI variable is positive and significant in the regression of bank credit in EMs, which is likely related to an increase in the quality of contract enforcement and property rights. The crisis variable, however, becomes non-significant suggesting that the crisis step-dummy variable may be capturing an effect not directly related to financial distress during crises.

[17] The World Bank produces this indicator bi-annually between 1994 and 1998. We interpolate the values of the indicator for 1995 and 1997.

Appendix Table 1. Summary of Variables

Variables	Source(s)	Units
GDP per capita	WEO, Sept. 2011	USD
National savings as percent of GDP	WEO, Sept. 2011	Percent
Government domestic bonds market capitalization as percent of GDP	BIS, Quarterly Statistics Table 16B WEO, Sept. 2011	Percent
Private domestic bonds market capitalization as percent of GDP	BIS, Quarterly Statistics Table 16A WEO, Sept. 2011	Percent
Capital Account openness	Chinn Ito Financial Openness Index (normalized)	Between 0 and 1
Deposits as percent of GDP	IFS	Percent
Bank credit	IFS	Percent
Equity market financing as percent of GDP	S&P Global Stock Markets Factbook, 2011 Dealogic	Percent
Equity markets index	S&P Global Stock Markets Factbook, 2011	Index, 2000=100
U.S. 2-Years Treasury Bond	Haver Analytics	Percent
World Bank Governance Indicator	World Bank	Percentile

Variable	Variables used to construct, and source(s), if not defined above	Definition
Capital markets as percent of GDP	pvtbond sm_adjusted Nominal GDP (in USD): WEO, 2011	$\left(\frac{pvtbond + sm\_adjustedngdp}{}\right) * 100$
Capital markets as percent of total private financing	Pvtbond sm_adjusted creditpvt	$\left(\frac{pvtbond + sm\_adjusted}{pvtbond + sm\_adjusted + creditpvt}\right) * 100$

Appendix Table 2. Bank and Market-Based Financing: Basic Specification

	(1) Market-based financing as share of GDP	(2) Banking financing as share of GDP	(3) Market-based as share of total financing
GDP per capita in USD	0.0022***	0.0024***	0.0000
Domestic Savings	0.8958***		0.8313**
Public Bond Market Capitalization	0.2735***	-0.5146***	0.4197***
Capital Account Openness	-10.9993**	-4.4179	0.4574
T-Bond, 2 YRS	-1.3637***	0.8655**	
Stock Market Index	-0.0079***		
Banking Institutions: Deposits		0.5173***	-0.0620
Observations	255	278	251

Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Appendix Table 3. Bank and Market-Based Financing: Crises

	(1) Market-based financing as share of GDP	(2) Banking financing as share of GDP	(3) Market-based as share of total financing
GDP per capita in USD	0.0017***	0.0025***	-0.0002
Domestic Savings	0.7398**		0.6774**
Public Bond Market Capitalization	0.1993**	-0.4550***	0.3170***
Capital Account Openness	-7.3950*	-7.2752*	4.0016*
T-Bond, 2 YRS	-0.9868***	0.6888**	
Stock Market Index	-0.0060***		
Crises	7.0325***	-6.6633**	8.0622***
Banking Institutions: Deposits		0.6596***	-0.2296***
Observations	255	278	251

Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

Appendix Table 4. Bank and Market-Based Financing: Institutional Factors

	(1) Market-based financing as share of GDP	(2) Banking financing as share of GDP	(3) Market-based as share of total financing
GDP per capita in USD	0.0011***	0.0023***	-0.0001
Domestic Savings	0.5115*		0.1529
Public Bond Market Capitalization	0.3389***	-0.6030***	0.3572***
Capital Account Openness	-0.3988	-9.6663	5.1536*
T-Bond, 2 YRS	-0.9338***	0.3940	
Stock Market Index	-0.0054***		
World Bank Governance Indicator	0.1453	0.4950***	-0.1143
Crises	2.9188*	-4.0389	4.4026***
Banking Institutions: Deposits		0.5259***	-0.2330***
Observations	222	239	220

Standard errors in parentheses
* p<.10, ** p<.05, *** p<.01

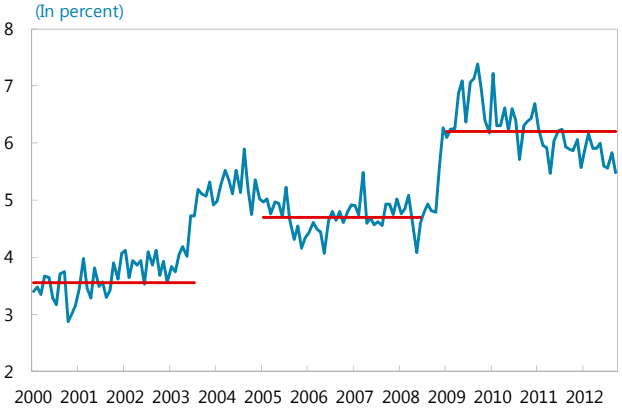
V. MEXICO: MIGRATION AND LABOR MARKETS[1]

Urban unemployment in Mexico remains higher than in past recoveries. At the same time, Mexican migration to the United States has decelerated significantly since the mid-2000s, linked to the slump in construction in the U.S. This suggests that the dynamics of migration has played a role in the evolution of urban unemployment in Mexico through an increase in participation in the labor force. In turn, the increase in labor participation has contributed to contain labor costs and to help regain competitiveness. Over the medium term, the effects of migration on urban unemployment and output would depend on the recovery in the U.S. construction sector and on how permanent the change in migration dynamics is. The labor reform being considered by congress would facilitate adjustments in labor markets in coming years.

A. Background

1. **The level of urban unemployment in Mexico is falling after the crisis, but remains elevated compared with the early 2000s, when it reached a multi-decade low.** After peaking at more than 7½ percent in 1995, urban unemployment fell steadily following the recovery from the 1994 crisis and the incorporation of Mexico into NAFTA. As a consequence, urban unemployment hit its minimum since the mid-1980s in the last quarter of 2000. In the last decade, the evolution of urban unemployment could be characterized by three different plateaus (Figure 1). The early 2000s were characterized by very low urban unemployment rates, which trended up after 2003 into a 'mid-decade plateau'. A third plateau with urban unemployment around 6 percent followed the fall in economic activity after the global crisis.

Figure 1. Urban Unemployment
(In percent)



Sources: INEGI, serie unificada

2. **Mexican migration to the United States decelerated in the 2000s compared to previous decades.** Migration to the U.S. was particularly dynamic during the 1970s and 1980s.[2] However, recent data from both INEGI and the American Community Survey (ACS) shows that migration flows have decelerated sharply during the second half of the 2000s,

[1] Prepared by Enrique Flores and Esteban Vesperoni.

[2] See CONAPO at http://www.conapo.gob.mx/

associated with the weak U.S. construction sector and the increase in unemployment in U.S. states with a strong presence of Mexican population.

B. Recent Developments in Labor Markets

3. **Following the economic recovery after the 1994 crisis, Mexico recorded historically low unemployment rates in the early 2000s.** After a prolonged and sustained fall since the mid 1990s, urban unemployment rate reached 2¾ percent in December 2000, the lowest level on record since the mid 1980s. This historically low urban unemployment rates took place in the context of fairly stable participation rates and moderate employment creation during this period (Table 1).[3]

Table 1. Mexico: Labor Market Indicators

Period	Average Quarterly Growth 1/	
	Labor Participation 2/	Employment 3/
2000-2004	1.86	1.51
2005-2008	2.16	2.21
2008-2009	1.46	0.24
2010-2012	1.91	1.56
2011-2012	2.50	2.73

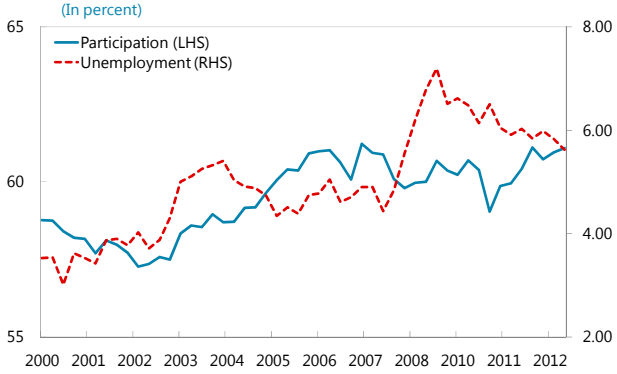
Source: INEGI (ENOE).
1/ Year-on-year growth rates, at a quarterly frequency.
2/ Number of people in the economic active population.
3/ Number of people employed.

4. **An increase in labor participation before the global crisis pushed up urban unemployment despite buoyant labor demand.** The four years before the global crisis showed a significant acceleration in employment creation (from 1½ percent to 2¼ percent). Despite buoyant labor demand, the urban unemployment rate in this period increased to 4¾ percent, from slightly above 4 percent in 2000–2004, due to the increase in participation rates since 2003. This latter peaked at over 61 percent at end-2007 (Figure 2).

[3] Labor participation, which had stood at around 50 percent in the late 1980s/early 1990s, increased significantly during the first five years before the Tequila crisis, not only pushed by favorable cyclical conditions, but also in part by an increase in labor participation by women. After reaching values around 55 percent in 1993/4, it remained stable during the following 10 years to the early 2000s. For an analysis of labor participation in Mexico, see Duval-Hernández and Orraca Romano (2009).

5. **The global crisis halted job creation and triggered a sharp increase in urban unemployment.** While labor participation stabilized at around 60 percent of the working age population during the global crisis, the creation of employment plummeted, falling to about ¼ percent from about 2¼ percent in the period 2005–2008. In turn, the urban unemployment rate spiked to more than 7 percent in 2009.

Figure 2. Unemployment and Participation
(In percent)

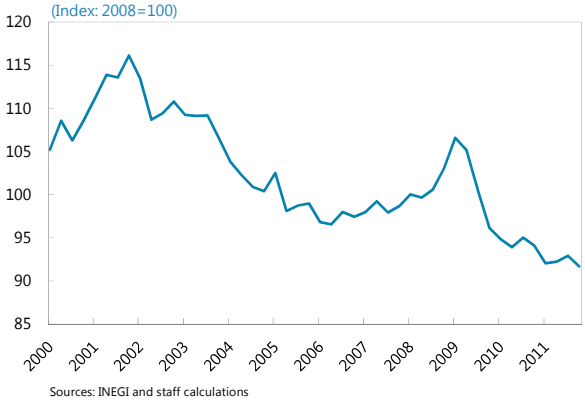


Sources: INEGI, series unificadas

6. **Urban unemployment has fallen with the recovery in economic activity in 2010-2012, but it has remained high compared to historical averages.** Urban unemployment remains at 5½-6 percent, compared with 4¾ percent before the global crisis. Despite that employment creation has been strongest since the early 2000 (see Table 1), labor participation has continued to growth more rapidly than in the past, especially in 2011 and 2012.

7. **The increase in labor participation has likely contributed to a reduction in unit labor costs (Figure 3).** Despite a healthy expansion in employment between 2005 and 2008, unit labor costs in the manufacturing sector remained broadly stable. Following the global crisis, manufacturing unit labor costs have fallen by about 5 percent between end-2009 and end-2011.[4]

Figure 3. Unit Labor Costs
(Index: 2008=100)



Sources: INEGI and staff calculations

C. Migration: Recent Developments

8. **The number of Mexican migrants to the U.S. grew rapidly during the 1970–2000 period.** In 1970, there were close to one million Mexican born residents in the U.S. That number increased dramatically to almost 9 million in 2000, after the strong Mexican migration flows in previous decades. These migrants were mainly located in California (about 45 percent), Texas (over 20 percent), Arizona, and Illinois.

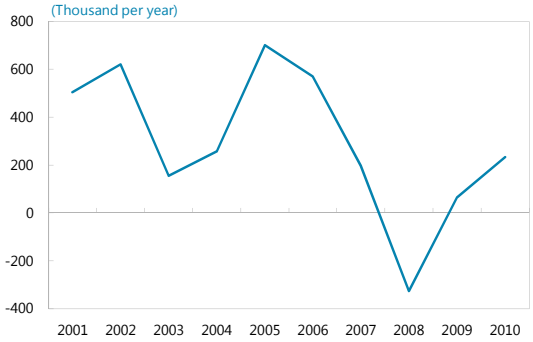
[4] The dynamics of wages—and unemployment—may also be affected by participation in formal and informal labor markets. See Alcaraz (2009) and Alcaraz, Chiquiar and Ramos Francia (2008).

9. **Migration flows to the U.S. fell significantly in the 2000s, particularly after 2005.** Migration flows decelerated sharply in the second half of the 2000s, with some indicators showing reversed migration flows from the U.S. to Mexico during the global crisis:[5]

- The **American Community Survey (ACS)** is an ongoing statistical survey that presents data on Mexican-born residents in the U.S. since 2000. The ACS shows that these residents increased by 35 percent between 2000 and 2010; it also shows that the net number of Mexican migrants to the U.S. was negative in 2008 (Figure 4a).[6]

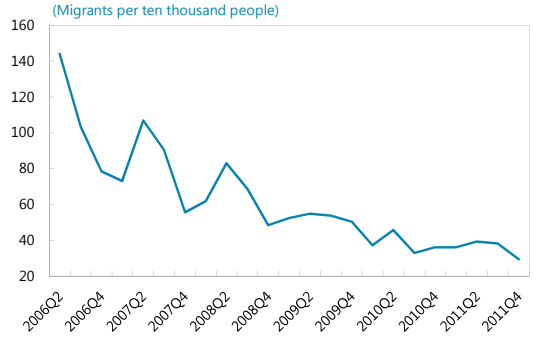
- A **survey by INEGI** compiling quarterly information on net migration flows suggests that these flows have declined sharply since 2006 (from about 144 migrants per ten thousand people in Q2-2006 to about 30 in Q4-2011) and has stabilized at low levels in the last few years (Figure 4b).[7]

Figure 4a. Mexico: Migration to the U.S.
(Thousand per year)



Sources: American Community Survey

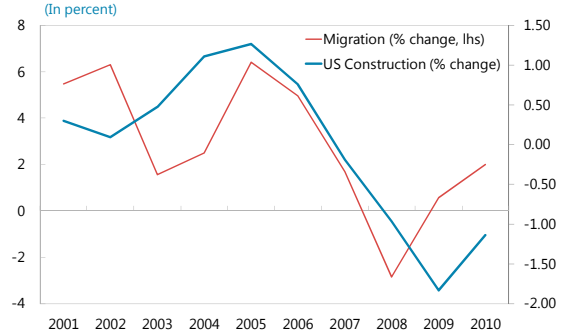
Figure 4b. Migration to the U.S.
(Migrants per ten thousand people)



Sources: INEGI (ENOE)

10. **The data suggests that migration began decelerating with the downturn in the construction sector in the U.S.** Annual data from the ACS suggests that the turning point in U.S. construction activity and migration from Mexico to the U.S. took place in early 2006 (Figure 5), after which unemployment rates in some key states in the U.S. began to increase.[8]

Figure 5. Migration and U.S. Construction
(In percent)



Sources: ACS, U.S. Department of Commerce

[5] Data on migration flows between Mexico and the U.S. can be obtained from different sources, but all of them offer a similar picture for the last decade.

[6] For a comprehensive analysis of this data, see Cervantes González (2011).

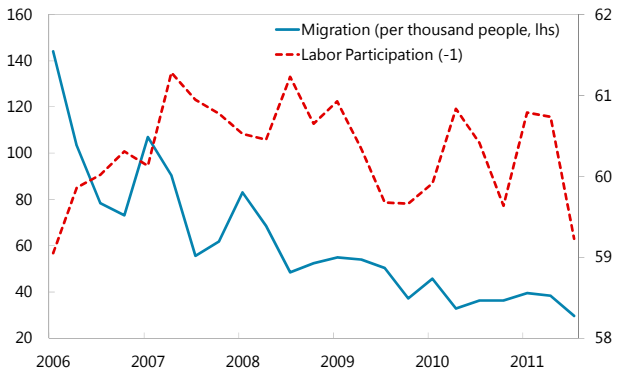
[7] In contrast with the ACS, data from INEGI does no show a recovery in migration flows after the global crisis (Figure 5).

[8] Quarterly migration data from INEGI and regional unemployment rates in the U.S. also support this point.

D. Migration and Labor Markets

11. **Evidence suggests that migration has had an impact on urban unemployment during the last decade.** The impact of migration flows on urban unemployment has in part taken place through the increase in labor participation in Mexico in the second half of the 2000s (Figure 6). The sustained increase in participation has also played an important role in the sluggish fall in urban unemployment rates that took place after the global crisis, despite a healthy recover in economic activity and employment creation in Mexico.

Figure 6. Labor Participation and Migration



Sources: INEGI (ENOE)

12. **The longer-term impact of migration on urban unemployment (and potential output) will depend on how persistent the recent trends in migration are**. In particular, the effect of migration on urban unemployment would depend on: (i) the pace and extent of the recovery in the U.S. construction sector, which is still 35 percent below its peak; (ii) the dynamics of migration flows as the U.S. construction activity recovers; and (iii) the impact of higher labor participation on real wages in Mexico. A permanent shift in labor participation in Mexico can potentially have a sustained impact on unit labor costs and increase potential output in Mexico.

13. **Prospects for a persistent increase in Mexico's labor participation highlight the importance of labor market flexibility.** In this context, the labor reform being considered by congress—which allows new types of temporary employment contracts, streamlines the settlement of labor disputes and limit compensation for unjustified dismissals, introduces more flexible seniority rules favoring productivity and labor skills, and changes the regulatory framework for outsourcing—would be important to facilitate the incorporation of new entrants in the labor markets.[9]

[9] For the effects of labor market rigidities on productivity, see Chiquiar and Ramos Francia (2009).

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