

Bejar, Pablo et al.

Article

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Can Fintech Foster Competition in the Banking System in Latin America and the Caribbean? ☆



Pablo Bejar^a, Kotaro Ishi^b, Takuji Komatsuzaki^{b,*}, Ippei Shibata^b, Jasmin Sin^b,
Suchanan Tambunlertchai^b

^a World Bank^b International Monetary Fund

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ABSTRACT

This paper revisits the competitive environment of the banking system in Latin America and the Caribbean and investigates the early impact of fintech development in the region thus far. Against the backdrop of high net interest margins (NIMs) and limited financial depth in the region, panel regressions broadly confirm the results of existing literature on the association of NIMs with the changes in financial sector structure, including market concentration, administrative costs, and foreign banks, although differences between domestic and foreign banks narrowed after the 2008-09 global financial crisis. Difference-in-difference regressions and case studies on Brazil and Mexico suggest that fintech is associated with reductions in NIMs and defensive responses by incumbent banks, both of which benefit consumers. The case studies also shed light on regulatory approaches and prudential considerations in fostering financial innovation and banking sector competition.

1. Introduction

The financial sector in Latin America and the Caribbean (LAC) has undergone large structural changes. Financial liberalization in the 1990s was followed by a wave of foreign acquisition of local banks that drove consolidation in the sector (Cardim *de Carvalho et al.*, 2012). Foreign presence in the region waxed and waned through financial and sovereign debt crises, with more sustained exits of North American and European banks following the global financial crisis in the late 2000s, followed by entries of regional institutions (Committee on the Global Financial System, 2014). In more recent years, another structural change has begun to take place within the region. The use of financial technology—or “fintech”—in banking services has emerged and grown at a rapid pace (Berkmen *et al.*, 2019). According to (Inter-American Development Bank 2018), the number of fintech companies in Latin America grew 66 percent (from 703 to 1,166) between 2017 and 2018.

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* Corresponding Author.

E-mail address: TKomatsuzaki@imf.org (T. Komatsuzaki).

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The trend in Latin America mirrors one appearing across the world where information technology, the internet, and mobile services are changing the way consumers and businesses access and manage their finances. In particular, fintech companies have been adept at unbundling traditional banking services, offering targeted solutions for existing constraints or inefficiencies, including reaching out to unbanked segments of the population. The rise of fintech has disrupted the banking sector, challenging the way banks operate. This has already forced incumbent banks to increase their efficiency and invest more in innovation. Whether fintech can or has threatened incumbent banks' market shares and profit margins, thereby affecting competition in the banking sector, is an open question.

Different types of fintech entries imply different effects on banking sector competition. Fresh entries may not threaten incumbent banks if they target a parallel market with a limited banking presence. In other instances, new fintech entrants compete directly with banks—peer-to-peer lending platforms, for example, entirely bypass banks in the intermediation process. Findings by (Mansilla-Fernández, 2017) that fintech investments have been higher in countries with less competitive banking sectors (i.e., those with greater concentrations and higher net interest margins) suggest that fintech is likely to foster more competition in financial services. The observed increases in banks' IT investments and direct investments in fintech start-ups in recent years also appear to confirm that banks see fintech firms as potential threats and the use of fintech as a way to maintain market relevance going forward.

An important force shaping the relationship between incumbent banks and fintech is financial regulation. While financial authorities have generally welcomed fintech as an opportunity to improve banking sector competition, efficiency, and financial inclusion, the regulatory response to fintech has taken different approaches. If the eventual regulatory environment provides a level playing field between fintech firms and traditional banks, the banking sector could see more competition and lower concentration. If, however, incumbent banks are able to deploy their vast resources to take over fintech companies or outstrip fintech firms in innovations, we may find that fintech has little effect on banks' concentration even if their financial inclusion and efficiency are improved. The entry of bigtech presents a significant challenge to existing banks, as bigtechs have customer platforms of a size that dwarfs those of banks (Stulz, 2019). While the entry of bigtechs could bring about efficiency gains and financial inclusion, it also poses complex regulatory challenges (Bank of International Settlements, 2019), which the authorities will need to face as the financial services offered by bigtechs continue to increase.

This paper revisits the competitive environment of the banking system in LAC and investigates the early impact of fintech development in the region thus far, combining empirical and case-study approaches. With fintech expansion still ongoing, the full picture of its influence on the banking sector is just starting to emerge. This is especially true in LAC, where fintech development is in the early stages and limited data is available. Additionally, because fintech both complements and challenges traditional banks, its influence on banking sector competition will be difficult to assess. While this paper cannot cover all dimensions of bank operations or provide a definitive answer, it aims to shed light on the early evidence on how fintech has affected banking sector competition in LAC through fintech lending, given the centrality of lending in bank operations and the availability of total fintech credit data at the country level. In addition, fintech entrance into payment and bigtech activities in finance is documented anecdotally in the case studies section. Quantitative analysis of fintech's influence on banks' non-lending activities and bigtech's entry into banking is beyond the scope of this paper but is an interesting future research topic.

The empirical section of this paper starts by documenting stylized facts on the competitive landscape of the banking sector in LAC and highlighting the high net interest margins (NIMs) and limited financial depth in the LAC in comparison with those in other regions. Then through panel regressions using bank-level data, we reexamine how the changes in financial sector structure (such as concentration, foreign bank entries, and M&A) have been associated with banking sector competition in the region. Although this approach does not directly address how fintech could affect banking sector competitiveness, we can infer from the past if an increase in competition with fintech companies could potentially affect banks' behaviors. Finally, we extend the panel regressions into a diff-in-diff setting by adding fintech lending to illustrate the association of fintech's emergence with changes in the competitive environment.

Our empirical results broadly confirm the results of existing literature on the association of NIMs with the changes in financial sector structure, including market concentration, administrative costs, and foreign banks, although the paper finds that the differences between domestic and foreign banks narrowed after the 2008-09 global financial crisis (GFC). Difference-in-difference regressions suggest that the existence of fintech lending is associated with a reduction in NIMs.

The case studies focus on the fintech developments in Brazil and Mexico, the two most developed fintech markets in the region. While there are many country-specific differences, in both cases, we observe rapidly growing but still small fintech lending; defensive responses by incumbent banks such as investing in innovation and improving their efficiency, customer service, and partnership with fintech; and encouraging signs that fees are declining on the payment side. We also discuss the financial regulators' difficult balancing act of promoting fintech, protecting consumers, and mitigating potential risks to the financial sector.

This paper follows up Berkmen and others (2019), a broad stocktaking work of the fintech in LAC, with a focus on the competition effect of the fintech. It also draws on work from the (Cambridge Centre for Alternative Finance 2018a; Cambridge Centre for Alternative Finance 2020, 2018b) and (Inter-American Development Bank 2017, 2018). Building on these studies that focus on documenting stylized facts, we take the first step in a quantitative analysis of the fintech in the LAC banking sector. We adopt the empirical framework of Martinez Peria and Mody (2004) for this purpose and update their analysis of the association of NIMs with the changes in financial sector structure in LAC.

The analytical focus of this paper is pre-pandemic periods. The ongoing COVID-19 crisis may have been encouraging the development of the fintech sector, because digital financial services allow for social distancing and allow many households and firms to access online payments and financing rapidly (). More specifically, technology has helped channel funds to small and medium-sized enterprises in serious need of financial relief (Cantú and Ulloa, 2020).

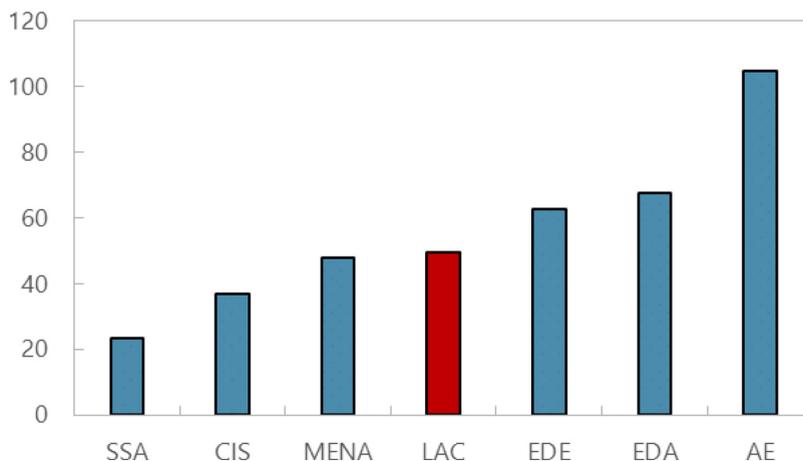
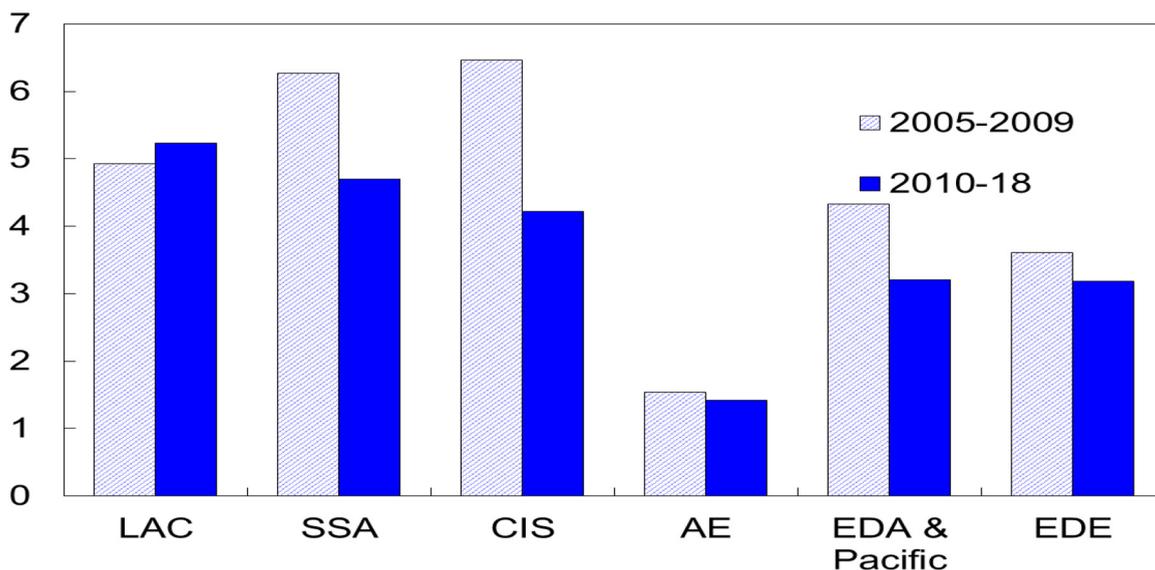


Fig. 1. Credit to Private Sector in 2018 (percent of GDP).



Sources: IMF International Financial Statistics

Fig. 2. Average Net Interest Margins (percent of total assets).

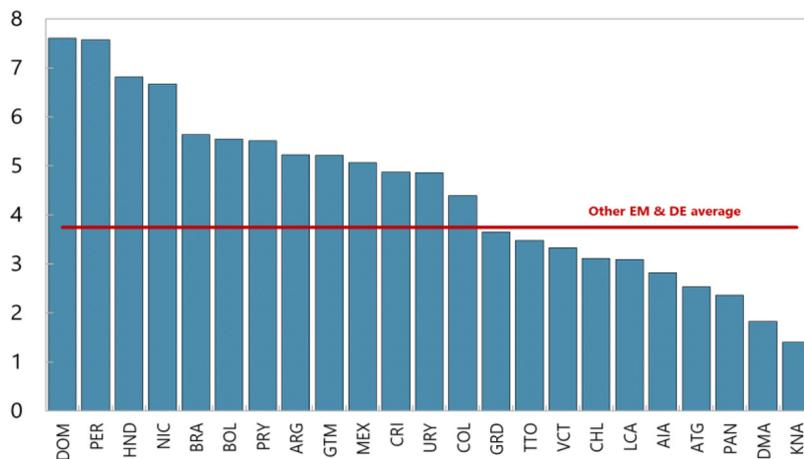
The rest of the paper is organized as follows. Section II documents stylized facts regarding the competitive environment in the LAC banking sector. Section III first introduces panel regressions and reports on the determinants of the banking sector in general and then extends the regressions to include diff-in-diff terms to highlight the effects of fintech lending. Section IV presents case studies. Section V offers concluding thoughts.

2. Competitive Landscape of the Banking Sector in LAC

The banking sector in LAC is characterized by limited financial depth and high interest spreads. The level of financial intermediation in the region lags behind the advanced economies and emerging markets in Asia and Europe (Fig. 1). The limited financial depth may be related to the cost of financial intermediation in the region. The countries in LAC are among those with the highest NIMs in the world (Fig. 2).¹ As Fig. 2 shows, the high NIMs in LAC have persisted over an extended period even as other regions have seen declines in these margins. This has raised questions about the competitiveness of the banking sector in the LAC region, because competition should in principle compress NIMs as banks compete for loans and deposits by offering lower lending rates and higher deposit rates, respectively.

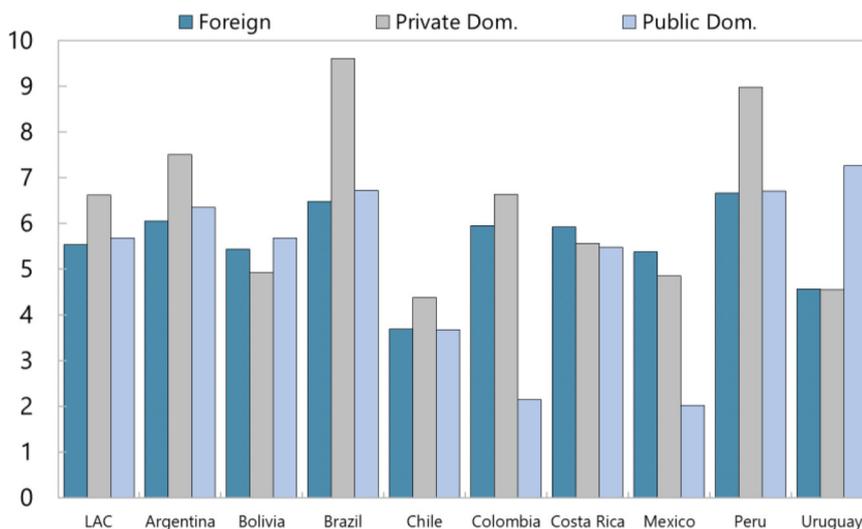
Among the LAC countries for which we have data on the NIMs, there is considerable cross-country variation (Fig. 3). Despite the differing levels of NIMs, however, these countries share some common patterns when the NIMs are grouped by the type of bank. In

¹ The net interest margin (NIM) measures the difference between the interest a bank charges for its loans and the interest it pays on deposits.



Sources: IMF Financial Soundness Indicators.

Fig. 3. Interest Margins in LAC, 2010-19 (percent of total assets).



Sources: Fitch Connect database; Orbis database; and author's calculations.

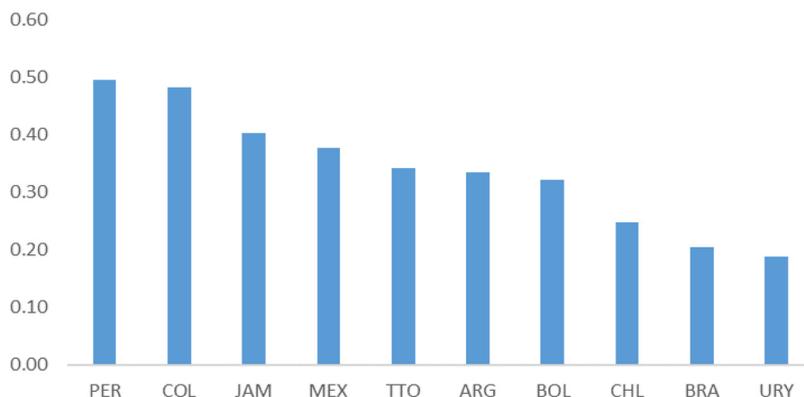
Note: The bars show the medians obtained from quarterly data from 1988Q1 to 2019Q4.

Fig. 4. Net Interest Margins in LAC Banks. (Gross interest revenue + Dividend income – Total interest expense)/Average assets.

Argentina, Brazil, Chile, and Peru, private domestic banks have higher NIMs than private foreign-owned banks. The reverse is true in Bolivia, Colombia, and Mexico, where the NIMs for foreign banks are slightly higher than those for domestic banks. Moreover, with the exception of Uruguay, where public banks appear to have higher NIMs than other bank types, public banks in other countries generally have substantially lower NIMs than private domestic banks (Fig. 4). In Mexico and Colombia, the average NIMs for public banks are less than half those of private banks.²

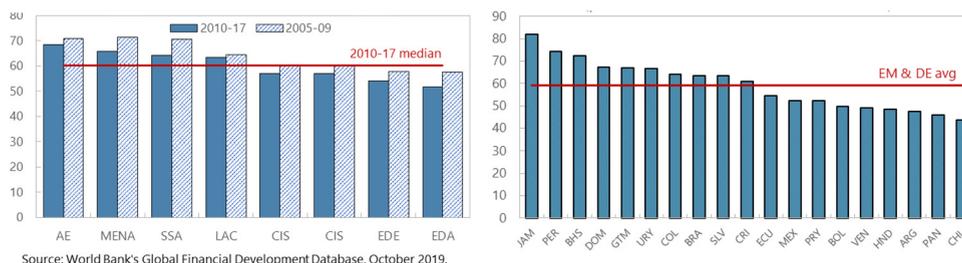
The literature argues that high NIMs reflect some combination of low competition and high operating costs (e.g., Ho and Saunders, 1981; Saunders and Schumacher, 2000; Williams, 2007). The high operating costs may stem from the premiums for greater underlying macroeconomic risks (Beck et al., 2003; Maudos and Solis, 2009), tighter regulatory requirements (Saunders and Schumacher, 2000; Gelos, 2006), or institutional settings, including property rights protection (Demirgüç-Kunt, Laeven, and Levine, 2004). Cardim de Carvalho et al. (2012) show that in the late 1990s to early 2000s, the regions with the highest NIMs (as shown in Fig. 2)—sub-Saharan Africa, Eastern Europe and Central Asia (which includes the CIS), and LAC—were also those with the highest

² In addition to NIMs, we consider banks' noninterest income, which includes fees (e.g., monthly fees, late fees, overdraft fees, loan origination fees) and revenues from the sale of products or services such as insurance, brokerage, and financial planning. Among LAC countries, noninterest incomes are significant for Argentina (at nearly 4 percent of average assets), followed by Colombia and Uruguay (both at around 2 percent of average assets).



Source: Global Financial Development Database, 2018

Fig. 5. Lerner Index in the Banking Sector, 2014 (or latest available). Source: Global Financial Development Database, 2018.



Source: World Bank's Global Financial Development Database, October 2019.

Fig. 6. Assets of the 3 Largest Banks (percent of commercial banks' assets).

overhead costs for banks. In the LAC context, high NIMs have been attributed to factors such as high interest rate levels, stringent reserve requirements, and high operating costs due to bank inefficiencies (Gelos, 2006; Cardim de Carvalho et al., 2012).

It is important to acknowledge that structurally high costs may or may not reflect low competition. High costs due to high taxes or more restrictive labor and banking sector regulations are different from those due to inefficiencies, but both would be reflected in higher NIMs. The former may lead to higher NIMs as banks try to maintain profits after incurring noninterest costs. The latter, however, would indicate low competition, as competitive pressure would generally ensure the exits of the inefficient firms.

To account for both interest and noninterest costs, we consider the Lerner index, which reflects the “markup,” or difference, between output price and input cost. The ability of a firm to maintain a markup is often interpreted as market power that stems from a lack of competitive pressure. Higher values of the Lerner index are associated with greater market power.³ Fig. 5 shows the average Lerner index values for banks in LAC countries for which data are available. Notably, Brazilian and Uruguayan banks, which are among those with the highest NIMs in the region, appear to have lower markups. This suggests that the high NIMs may be driven by high costs, which, as noted above, could be due to low competition, high regulatory costs (e.g., macroprudential requirements, labor laws), or both. In contrast, markups for Colombian banks are high even despite more moderate NIMs. Peruvian banks have both high markups and high NIMs, suggesting low competition in the banking sector.

High NIMs are also associated with greater levels of concentration in the banking sector (see, for example, (Maudos and de Guevara, 2004; Maudos and Solis, 2009); Saunders and Schumacher, 2000; and Williams, 2007). However, Beck et al. (2003) show that the positive association between concentration and bank margins disappears when they control for institutional developments. Claessens and Laeven (2004), who do not find links between the market structure and banks' spreads, argue that the concentration variables typically used may not be good proxies for the degree of competition in the banking sector.

Fig. 6 shows the 3-bank concentration measure for each region. The measure shows a generally high level of concentration in the banking sector across the world, with the assets of the top three banks across all regions on average making up more than half of the total banking sector assets. Emerging and Developing Asia has the lowest average 3-bank concentration, at 51.6 percent, while AEs, which have the lowest NIMs, have the highest 3-bank concentration, at 68.4 percent.⁴ LAC as a region stands at 63.5 percent, slightly above the median. Compared to the previous decade, the level of banking concentration went down across all regions. As with the

³ Strictly speaking, the mapping between the Lerner index and market power holds only under certain conditions. See Shaffer and Spierdijk (2020).

⁴ A high concentration in the banking sector may reflect to an extent the nature of the banking sector, where the concentration has been associated with greater banking sector stability, as larger banks are better placed to weather economic shocks.

NIMs, LAC saw the smallest improvement in this indicator. Once again, there is considerable heterogeneity among the countries in this region.

Ultimately, what matters for competition is market contestability—the possibility of new market entrants taking away incumbents' market shares. To the extent that market concentration arises from barriers to entry or confers market power on incumbents, concentration reflects anticompetitive forces that lead to higher prices and lower quantities. In the banking sector context, this would be reflected in high NIMs and less financial depth (or more limited financial products), both of which are true for LAC. The evidence presented in this section thus suggests that there may be scope to improve banking sector competition in the region, particularly in countries where persistently high NIMs have been accompanied by high concentrations.

Because high NIMs are associated with financial sector inefficiencies and high costs of financial sector participation, creating conditions for a competitive banking sector to lower NIMs is an important policy goal that is intricately linked with financial deepening and financial inclusion.

Studies show that deregulation and foreign bank entries into the region coincide with lower spreads and improved cost efficiencies in LAC banks (Yildirim and Philippatos, 2007; Cardim de Carvalho et al., 2012). These experiences bode well for the current context, where fintech firms' entries into the banking sector could threaten to take away incumbent banks' market shares, which could create competitive pressure that leads to more efficient outcomes. The next section empirically investigates this possibility by looking at the factors that influence NIMs in LAC, including the early fintech entries into the region.

3. Determinants of Net Interest Margins in LAC

Since Ho and Saunders (1981) developed their model for understanding bank spreads, the literature has included many studies on the factors that influence banks' NIMs. Examples of those that focus on the LAC region include (Brock and Rojas-Suarez, 2000), Martinez Peria and Mody (2004), Gelos (2006), and Chortareas, Garza-Garcia, and Girardone (2011). In this section of the paper, we update the findings for LAC with the latest data that include the period of nascent fintech activity in some countries. We first estimate an empirical model that closely follows that of Martinez Peria and Mody (2004), with a particular focus on the changes in financial sector structure (such as concentration, foreign bank entries, and M&A).⁵ Although this approach does not directly address how fintech could affect banking sector competitiveness, we can infer from the past if an increase in competition with fintech companies could potentially affect banks' behaviors. Then, adding fintech lending variables helps answer whether the effects of early fintech activities have already been empirically apparent.

3.1. Data Description

We use historical balance sheet data for 692 banks from 1988 to 2018 from the Fitch Connect Database for the following countries in LAC: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru, and Uruguay. Bank ownership and M&A data are from the Orbis and Zephyr databases and specific banking institutions' websites. Macroeconomic and macrofinancial data are gathered from the IMF's World Economic Outlook and the Financial Development Index databases.

Foreign-owned banks in our sample are identified from those with parent institutions that have more than 50 percent foreign ownership. Banks with an ownership structure that has shifted from domestically owned to foreign owned but with the majority of foreign owners domiciled in offshore tax havens (e.g., Andorra, Bermuda, Bahamas, Virgin Islands, and, in some cases, Panama) are treated as domestic banks. Public banks in our sample are those with more than 50 percent ownership by the government or subnational institutions.

The NIM is measured as the difference between gross interest income (interest on loans, other interests, and dividend income) and total interest expense (interest on deposits and other interest expenses) as a percent of average assets. Table 1 provides the summary statistics of the variables used.

3.2. Baseline Regressions

3.2.1. Baseline specification

Following Martinez Peria and Mody (2004), we specify a fixed effect panel regression model for the NIM with market structure and M&A as key explanatory variables of our interest and with bank-specific factors and macroeconomic and financial environments as control variables. We also include additional variables to control for bank ownership structure and depth of the financial market. The regression model is as follows:

$$Y_{ict} = \alpha_c + \beta_t + \delta \text{Concentration}_{ct} + \mu \text{M\&A}_{ct} + \Gamma X_{ict} + \Theta Z_{ct} + \eta \text{Access}_{ct} + \varepsilon_{ict} \quad (1)$$

where Y_{ict} is the NIM of bank i in country c in year t , X_{ict} is a vector of bank-specific characteristics, and Z_{ct} represents the macroeconomic conditions. The model controls for country and time fixed effects.

⁵ While this type of panel regressions is common in the literature, they do not necessarily establish a tight causality. For example, we flag the possibility of endogeneity for market concentration, M&A, and noninterest income variables below. More recently, the literature has started to use more granular credit registry data to establish tighter causality relationships. This option is not available to us, however, as credit registry data access is typically limited to the authorities of a country.

Table 1
Summary Statistics.

Variable	Source	Observations	Mean	S.D.
Net interest margin	Fitch Connect and author's calculations	10,032	6.6	5.6
Net Fees/Average Assets	Fitch Connect and author's calculations	9,125	1.8	2.2
Liquid Assets/Total Assets	Fitch Connect and author's calculations	10,986	23.6	19.0
Operating Costs/Average Assets	Fitch Connect and author's calculations	10,035	8.1	6.5
Equity/Total Assets	Fitch Connect and author's calculations	11,142	18.2	16.1
NPL/Total Loans	Fitch Connect and author's calculations	7,656	7.3	10.1
Market Share	Fitch Connect and author's calculations	10,903	4.6	12.3
Foreign Market Share	Fitch Connect, Orbis and Zyphyr databases, and author's calculations	11,105	26.8	18.0
HHI	Fitch Connect and author's calculations	11,309	13.8	11.8
3-Bank Concentration	Fitch Connect and author's calculations	11,309	51.0	15.0
Gross Loans to GDP	Fitch Connect and author's calculations	11,309	36.6	300.4
Real GDP growth	IMF's WEO database	11,309	3.0	3.7
Inflation	IMF's WEO database	10,554	36.1	232.0
Real Interest Rate	IMF's WEO database	9,627	44.3	407.0
EMBI Spreads	Thomson Reuters Datastream	8,707	6.0	0.8
Financial Market Access Index	IMF's Financial Development Index	10,523	0.4	0.2
Lerner Index	Fitch Connect and Igan et al. (2020)	6,039	0.4	0.2

The concentration measure is the Herfindahl-Hirschmann Index (HHI), although we also test the model with the 3-bank concentration.⁶ The M&A variable includes a dummy to indicate whether a bank in country c in period t was acquired. We test alternate specifications using all M&A (including both domestic and foreign) and only foreign M&A.

Bank-specific explanatory variables, X_{ict} , include liquid to total assets, equity to total assets, credit share in the banking sector, and nonperforming loans (NPLs) to total assets. These variables capture the banks' risk profiles, which can affect their NIMs. The bank-specific vector also includes net fee income, administrative costs to average assets, and the public and foreign ownership status.

Macroeconomic variables in the model, Z_{ct} , include the countries' credit to GDP, inflation, real GDP growth, short-term real interest rates, and sovereign EMBI spreads. Credit to GDP reflects the depth of the banking sector. Inflation is presumed to affect differently the interest rates on loans (which are typically longer term) and deposits (typically shorter term), with implications for banks' NIMs. Real GDP growth reflects the business cycle, which affects banking sector activity and NIMs. The short-term real interest rates control for the banks' marginal costs of funds, while the EMBI spreads control for sovereign creditworthiness, which also affects the banks' funding costs.

The variable *Access* is the financial market access index from the Financial Development Index database.

3.2.2. Baseline results

Regression results for the baseline specification are presented in Table 2.⁷ In general, we find that, consistent with previous literature, a more competitive environment is associated with lower NIMs, but the entry of foreign banks and M&A activities may be associated with higher NIMs.

- Lower NIMs are associated with less concentrated markets. This finding is consistent with that of Martinez Peria and Mody (2004). The effect is statistically significant when using the HHI or the top three banks' share as a concentration measure. The results hold whether we use total asset concentration or total loan concentration. One standard deviation increase in the top three banks' share is associated with over 110 basis points higher NIM, which is a large effect. However, interpreting this result is not straightforward. First, high concentration does not imply low competition, as pointed out in Section I. Moreover, concentration could be a response to a profitability environment, raising concern on reverse causality.
- Foreign banks have lower NIMs on average, but the NIMs increase with their market share. Perhaps benefitting from economies of scale due to their global networks, foreign-owned banks are able to charge lower NIMs. With all else equal, foreign banks' NIMs are around 100 basis points lower than are those of domestic banks. However, results show that NIMs do increase with the foreign bank's market share. This suggests increased ability to exert market power as the foreign bank becomes more dominant. Alternatively, the higher NIM may reflect the increased production costs from having a more extensive local presence.
- M&A activities involving foreign banks are associated with higher NIMs. Because M&A increases the banking sector concentration but possibly also the efficiency of the new entity, its ex-ante impact on the NIM is unclear. In fact, similar to Martinez Peria and Mody (2004), we find that M&As by foreign banks are associated with higher NIMs, but total M&As including both local and foreign banks are not. This may suggest that less efficient domestic banks with higher NIMs are the usual targets of foreign takeovers, consistent with (Nocke and Yeaple, 2007) and (Neary, 2007) model predictions that less efficient companies ("lemons")

⁶ $HHI = s_{12} + s_{22} + s_{32} + \dots + s_{n2}$, where s_n is the market share of firm n . Higher HHI values indicate higher concentrations. The 3- and 5-bank concentrations are calculated from gross assets or gross loans.

⁷ As a robustness check, we also tried a specification with bank fixed effect instead of county-fixed effect. Most results are robust to this variation, but foreign banks do not have lower NIMs on average, and there is no statistically significant relationship between market concentration and NIMs.

Table 2
Baseline Regression Results.

NIM	(1)	(2)	(3)	(4)
Liquid Assets/Total Assets	-0.0229*** (0.00728)	-0.0226*** (0.00721)	-0.0229*** (0.00729)	-0.0229*** (0.00728)
Net Fees/Average Assets	-0.212** (0.0983)	-0.209** (0.0981)	-0.212** (0.0982)	-0.213** (0.0980)
Operating Costs/Average Assets	0.680*** (0.0422)	0.680*** (0.0422)	0.681*** (0.0422)	0.682*** (0.0421)
NPL/Total Loans	-0.0517*** (0.0150)	-0.0523*** (0.0149)	-0.0522*** (0.0150)	-0.0532*** (0.0150)
Equity/Total Assets	0.0427*** (0.00949)	0.0420*** (0.00941)	0.0427*** (0.00948)	0.0427*** (0.00948)
Market Share	-0.0103 (0.0168)	-0.0119 (0.0164)	-0.0101 (0.0168)	-0.0105 (0.0168)
Foreign Dummy	-1.074*** (0.267)	-1.116*** (0.263)	-1.073*** (0.267)	-1.078*** (0.266)
Foreign Dummy x Market Share	0.128*** (0.0338)	0.128*** (0.0340)	0.128*** (0.0338)	0.127*** (0.0336)
Public Dummy	-0.448 (0.328)	-0.497 (0.328)	-0.443 (0.328)	-0.435 (0.329)
Real Growth	0.173*** (0.0378)	0.188*** (0.0376)	0.172*** (0.0376)	0.171*** (0.0377)
Inflation	-0.0240 (0.0197)	-0.0176 (0.0195)	-0.0243 (0.0197)	-0.0249 (0.0196)
Total Loans/GDP	-0.0269** (0.0120)	-0.0419*** (0.0120)	-0.0269** (0.0120)	-0.0263** (0.0120)
Real Interest Rate	0.0750*** (0.0186)	0.0836*** (0.0183)	0.0746*** (0.0186)	0.0747*** (0.0186)
EMBI Spreads	-0.488** (0.209)	-0.547*** (0.209)	-0.486** (0.209)	-0.473** (0.209)
Foreign Market Share	0.00798 (0.0132)	0.00821 (0.0130)	0.00806 (0.0132)	0.00807 (0.0132)
Financial Market Access Index	-0.913 (0.967)	-1.034 (0.957)	-0.900 (0.972)	-0.950 (0.966)
HHI	0.149** (0.0577)		0.148** (0.0578)	0.147** (0.0578)
3-Bank Concentration		0.101*** (0.0186)		
M&A Dummy			0.285 (0.665)	
Foreign M&A Dummy				1.522** (0.721)
Constant	3.859** (1.948)	1.561 (1.999)	3.851** (1.950)	3.827** (1.946)
Observations	4,085	4,085	4,085	4,085
R-squared	0.619	0.623	0.619	0.620
F	20.09	21.33	19.67	19.79
Country, Year FE	Yes	Yes	Yes	Yes
N_clust	507	507	507	507

Robust standard errors in parentheses

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

are the likely targets of cross-border M&A. That said, some caution is needed to interpret our findings because if we take a one or two-year lag of foreign M&A dummy, this association disappears.

We also confirm that bank-specific characteristics, including banks' costs and income structure, matter for NIMs.

- Bank-specific characteristics can explain differences in NIMs. Higher levels of liquidity are associated with lower NIMs—each percentage point increase in liquid to total assets is associated with a two basis points decrease in the NIM—likely because of the lower interest income liquid assets generate.⁸ Similarly, banks with higher shares of NPLs also see lower NIMs because the inability to collect interest on loans diminishes the banks' interest income. However, banks with higher equity ratios see higher NIMs, perhaps as a result of lower funding costs and dependence on external funding, which lowers the need to offer high deposit

⁸ In contrast, [Martinez Peria and Mody \(2004\)](#) and [Gelos \(2006\)](#) find a positive relationship between liquidity and NIMs, which they interpret as banks having to charge higher spreads for the opportunity cost of holding liquid assets (by prudence or regulation).

interest rates. Quantitative effects of these bank-specific characteristics are similar to each other: one standard deviation change of each of them are associated with 40-70 basis points changes in NIMs.

- Higher administrative costs are associated with higher NIMs. This result confirms the findings by [De Carvalho et al. \(2012\)](#) and [\(Williams, 2007\)](#) findings, among others, that high operational costs may explain the high NIMs in some countries. This variable's quantitative effect is very large. A one-standard deviation increase in administrative costs is associated with 440 basis points increase in NIM.
- Banks with higher fee incomes have lower NIMs. This suggests that more diversified income sources may allow banks to charge lower margins for intermediation because they can recoup the foregone income from other services. It is also possible that the causality runs in the opposite direction: banks with lower NIMs may make more efforts to diversify income sources, leading to higher fee incomes.

We also confirm that macroeconomic conditions influence NIMs. We find that higher NIMs are associated with stronger real GDP growth and higher real interest rates.⁹ The positive effect of GDP growth, holding constant credit levels in the economy, real interest rates, and inflation, indicates a business cycle impact where increased economic activity may lead to banks adjusting their margins. The positive effect of the real interest rate suggests that higher rates raise the interest charged on loans by more than that offered on deposits. We also find that NIMs decrease with total credit in the economy and EMBI spreads. The former may reflect a supply effect—with all else equal, banks competing to extend credit would lead to lower margins. The latter finding for EMBI spreads may be associated with lower funding costs for banks domiciled in more creditworthy countries, which allow them to have higher NIMs.

Because our data sample covers the periods before and after the GFC, we also observe the structural changes in the banking sector that have taken place since 2008. Considering that the internationalization of regional banks progressed while many banks in the advanced economies retrenched from the region, this exercise indirectly studies whether there are differences between the entry of advanced economy banks and regional banks. Dividing the sample into pre-GFC (1988–2007) and post-GFC (2009–18), we find the margin differentials between domestic and foreign banks have more than halved since 2008. Possible reasons for this narrowing include improved efficiency among domestic banks and post-GFC retrenchment of western foreign banks from the region and their replacement by regional foreign banks, which have more similarities to domestic banks. We also find that margin differentials between private and public banks also diminished, which likely reflects a smaller role of public banks in directed credit subsidies in recent years. The low global interest rates in the post-GFC years also likely played a role in forcing margins to tighten across all banks. These results are reported in [Table 3](#).

As a robustness check, we replicate the baseline regressions with banks' markups rather than NIMs as the dependent variable. Markups are measured by the Lerner Index, as [Igan and others \(2020\)](#) estimated. Results, presented in [Table 4](#), confirm the broad findings of the NIM regressions with differences likely reflecting that NIMs and markups do not consistently point in the same direction, as discussed in Section I. Higher markups are associated with higher market concentration, albeit with a lower degree of statistical significance than in the NIM regressions. Results show that foreign banks on average have lower markups. Although public banks do not have NIMs that are statistically different from those of non-public banks, the Lerner regressions show that public banks on average have higher markups. As with findings for NIMs, macroeconomic conditions also affect banks' markups. Notably, higher real GDP growth and higher real interest rates are associated with lower markups, which suggest that banks' NIM adjustments during periods with high growth or high real rates, as discussed above, may occur in response to changing profit margins. Similar to NIMs, markups also decrease with total credit in the economy and EMBI spreads.

A key takeaway from the baseline regression results is that whether fintech would enhance banking sector competition would depend on how and in what forms fintech enters the market. Fintech will bring new technology to reduce the overall costs structure in the banking system, but unless fintech entries enhance competition between banks and fintech companies, costs of financial services would not fall (as the regression results on foreign banks and M&A activities suggest). That said, anecdotal evidence suggests that banks have increased IT investment as well as direct investment in fintech start-ups in recent years, implying that banks perceive fintech firms as a potential threat. If so, fintech could contribute to enhancing competition.

3.3. Regressions Incorporating Fintech

We next explore whether fintech activities in the region have already affected banks' margins. With the baseline results identifying variables that matter for the NIM, we conduct a difference-in-differences regression exercise to test for effects of fintech while controlling for the aforementioned variables. Note that this is an exploratory exercise—to understand whether the early effect of fintech already shows up empirically—and therefore must be heavily caveated. Quantitative information on fintech in LAC remains sparse ([Marqués et al., 2021](#)). Although fintech has been growing rapidly in some countries in the region, its overall volume remains very small. Fintech lending in the countries for which we have data makes up only about 0.02 to 0.05 percent of total loans. Countries in our sample with fintech lending activity, as the Cambridge Center for Alternative Finance identified, are shown in [Fig. 7](#).

We specify the following regression model:

$$NIM_{ict} = \beta_0 + \beta_1 D_{t>2012} + \beta_2 D_{Fintech} + \beta_3 D_{t>2012} D_{Fintech} + \beta_4 X_{ict} + \varepsilon_{ict}$$

where $D_{t>2012}$ equals 1 for time periods after 2012 when fintech activity started to take place in the region; $D_{Fintech}$ equals 1 for countries shown in [Fig. 7](#). The definition of these two dummy variables is based on the interpretation that fintech lending existed

⁹ [Martinez Peria and Mody \(2004\)](#) also find positive, albeit insignificant, effects of GDP growth and the real interest rate on NIMs. [Gelos \(2006\)](#) finds a negative relationship between GDP growth and NIMs.

Table 3
Baseline Regression Results: Structural Shifts After the GFC.

NIM	Before GFC				After GFC			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Liquid Assets/Total Assets	-0.0164* (0.00898)	-0.0163* (0.00896)	-0.0166* (0.00901)	-0.0166* (0.00899)	-0.0363*** (0.0101)	-0.0364*** (0.0101)	-0.0363*** (0.0101)	-0.0364*** (0.0101)
Net Fees/Average Assets	-0.253** (0.112)	-0.249** (0.112)	-0.252** (0.112)	-0.254** (0.113)	-0.231* (0.139)	-0.232* (0.139)	-0.231* (0.140)	-0.232* (0.139)
Operating Costs/Average Assets	0.635*** (0.0451)	0.637*** (0.0451)	0.636*** (0.0453)	0.636*** (0.0451)	0.712*** (0.0562)	0.712*** (0.0562)	0.712*** (0.0565)	0.714*** (0.0563)
NPL/Total Loans	-0.0530*** (0.0172)	-0.0536*** (0.0172)	-0.0543*** (0.0172)	-0.0538*** (0.0172)	-0.0499** (0.0249)	-0.0503** (0.0250)	-0.0497** (0.0251)	-0.0532** (0.0248)
Equity/Total Assets	0.0627*** (0.0132)	0.0621*** (0.0132)	0.0630*** (0.0132)	0.0625*** (0.0132)	0.0296*** (0.0112)	0.0299*** (0.0112)	0.0296*** (0.0112)	0.0302*** (0.0112)
Market Share	-0.0320 (0.0219)	-0.0322 (0.0216)	-0.0314 (0.0218)	-0.0331 (0.0218)	0.0148 (0.0214)	0.0146 (0.0214)	0.0148 (0.0214)	0.0161 (0.0216)
Foreign Dummy	-1.703*** (0.314)	-1.696*** (0.313)	-1.702*** (0.314)	-1.702*** (0.314)	-0.821** (0.345)	-0.821** (0.345)	-0.820** (0.345)	-0.830** (0.344)
Foreign Dummy x Market Share	0.211*** (0.0441)	0.208*** (0.0441)	0.212*** (0.0441)	0.208*** (0.0441)	0.0921** (0.0409)	0.0919** (0.0409)	0.0920** (0.0409)	0.0938** (0.0410)
Public Dummy	-1.000** (0.415)	-1.012** (0.416)	-0.978** (0.416)	-0.985** (0.416)	-0.185 (0.409)	-0.184 (0.408)	-0.186 (0.409)	-0.173 (0.409)
Real Growth	-0.0857 (0.0663)	-0.0709 (0.0654)	-0.0874 (0.0662)	-0.0877 (0.0663)	0.0729* (0.0397)	0.0811** (0.0394)	0.0729* (0.0397)	0.0757* (0.0395)
Inflation	-0.127*** (0.0320)	-0.123*** (0.0322)	-0.126*** (0.0318)	-0.128*** (0.0318)	0.0210 (0.0307)	0.0213 (0.0308)	0.0211 (0.0306)	0.0225 (0.0309)
Total Loans/GDP	-0.0307 (0.0269)	-0.0510* (0.0284)	-0.0323 (0.0267)	-0.0316 (0.0269)	0.0207 (0.0163)	0.0213 (0.0166)	0.0208 (0.0163)	0.0200 (0.0164)
Real Interest Rate	0.0250 (0.0202)	0.0375* (0.0198)	0.0244 (0.0203)	0.0249 (0.0202)	0.0554 (0.0437)	0.0622 (0.0433)	0.0554 (0.0436)	0.0575 (0.0432)
EMBI Spreads	-0.474* (0.281)	-0.532* (0.284)	-0.492* (0.278)	-0.466* (0.279)	0.178 (0.404)	0.0809 (0.403)	0.175 (0.410)	0.217 (0.416)
Foreign Market Share	-0.0408** (0.0163)	-0.0420** (0.0163)	-0.0415** (0.0162)	-0.0414** (0.0162)	-0.00880 (0.0370)	-0.00479 (0.0345)	-0.00919 (0.0369)	-0.00299 (0.0374)
Financial Market Access Index	1.828 (1.964)	2.562 (1.982)	1.719 (1.922)	1.749 (1.958)	1.248 (1.777)	1.035 (1.721)	1.250 (1.775)	1.221 (1.767)
HHI	0.0903 (0.0878)		0.0805 (0.0857)	0.0855 (0.0876)	0.0590 (0.123)		0.0581 (0.119)	0.0688 (0.115)
3-Bank Concentration		0.0765** (0.0317)				0.0375 (0.0341)		
M&A Dummy			0.660 (0.763)				-0.130 (1.467)	
Foreign M&A Dummy				1.152* (0.610)				2.189 (1.677)
Constant	4.209 (2.864)	2.124 (2.925)	4.529 (2.767)	4.296 (2.843)	-1.337 (3.254)	-1.502 (3.265)	-1.301 (3.295)	-1.772 (3.372)
Observations	1,679	1,679	1,679	1,679	2,032	2,032	2,032	2,032
R-squared	0.625	0.627	0.626	0.626	0.652	0.652	0.652	0.653
F	21.29	21.40	20.75	20.88	16.78	16.95	16.57	16.18
Country, Year FE	Yes							
N_clust	358	358	358	358	343	343	343	343

Robust standard errors in parentheses

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

only in years and countries in which the CCAF data existed. X_{ict} are the control variables from the baseline regressions.¹⁰ We also test an alternate specification where the volume of fintech credit to total credit in the economy—a measure of fintech “intensity”—replaces $D_{Fintech}$. The difference-in-differences coefficient of interest is β_3 , the marginal effect of having fintech within country on NIM.

3.3.1. Fintech regression results

The difference-in-differences results are reported in Table 5.¹¹ Findings for the variables from the baseline regressions are consistent with the results described in the previous section. Again, market concentration is associated with higher NIMs. For the fintech

¹⁰ Country, year-fixed effects are not included because they would overlap with $D_{t>2012}$ and $D_{Fintech}$.

¹¹ Given the uncertainty on the timing that fintech activities became substantial enough to affect the competitive environment, we ran another version replacing $D_{t>2012}$ with $D_{t>2016}$. Results did not change materially because all signs and most of the statistical significance did not change, but β_3 loses statistical significance.

Table 4
Robustness Check for Baseline Regressions.

Lerner Index	(1)	(2)	(3)	(4)
Liquid Assets/Total Assets	-3.19e-05 (5.33e-05)	-3.52e-05 (5.33e-05)	-3.18e-05 (5.34e-05)	-3.14e-05 (5.35e-05)
Net Fees/Average Assets	0.000688** (0.000279)	0.000667** (0.000281)	0.000687** (0.000279)	0.000684** (0.000279)
Operating Costs/Average Assets	-0.000358** (0.000142)	-0.000356** (0.000143)	-0.000358** (0.000142)	-0.000362** (0.000142)
NPL/Total Loans	0.000155 (0.000133)	0.000155 (0.000131)	0.000157 (0.000132)	0.000161 (0.000132)
Equity/Total Assets	3.67e-05 (7.59e-05)	4.04e-05 (7.60e-05)	3.66e-05 (7.59e-05)	3.69e-05 (7.59e-05)
Market Share	-0.000249 (0.000223)	-0.000231 (0.000222)	-0.000249 (0.000223)	-0.000248 (0.000224)
Foreign Dummy	-0.00290* (0.00169)	-0.00285* (0.00168)	-0.00290* (0.00169)	-0.00287* (0.00170)
Foreign Dummy x Market Share	0.000531 (0.000384)	0.000539 (0.000380)	0.000531 (0.000384)	0.000537 (0.000386)
Public Dummy	-0.00250 (0.00178)	-0.00245 (0.00178)	-0.00251 (0.00178)	-0.00256 (0.00178)
Real Growth	-0.00537*** (0.000619)	-0.00535*** (0.000622)	-0.00537*** (0.000618)	-0.00537*** (0.000619)
Inflation	-0.00198*** (0.000240)	-0.00195*** (0.000235)	-0.00198*** (0.000240)	-0.00198*** (0.000240)
Total Loans/GDP	-0.000391** (0.000180)	-0.000363** (0.000151)	-0.000391** (0.000179)	-0.000394** (0.000179)
Real Interest Rate	-0.00168*** (0.000214)	-0.00170*** (0.000216)	-0.00168*** (0.000214)	-0.00168*** (0.000214)
EMBI Spreads	-0.00643** (0.00296)	-0.00645** (0.00287)	-0.00644** (0.00295)	-0.00650** (0.00295)
Foreign Market Share	-0.000420 (0.000260)	-0.000378 (0.000268)	-0.000421 (0.000261)	-0.000427 (0.000262)
Public Banks' Market Share	0.00255*** (0.000538)	0.00275*** (0.000641)	0.00255*** (0.000544)	0.00254*** (0.000542)
Financial Market Access Index	0.190*** (0.0123)	0.192*** (0.0119)	0.190*** (0.0123)	0.190*** (0.0123)
HHI	0.00197 (0.00120)		0.00197* (0.00120)	0.00199* (0.00120)
3-Bank Concentration		0.000425 (0.000316)		
M&A Dummy			-0.000898 (0.00549)	
Foreign M&A Dummy				-0.00853 (0.0101)
Constant	0.00700 (0.0275)	-0.00353 (0.0308)	0.00714 (0.0277)	0.00788 (0.0277)
Observations	3,851	3,851	3,851	3,851
R-squared	0.974	0.974	0.974	0.974
F	11777	11958	11554	11596
Country, Year FE	Yes	Yes	Yes	Yes
N_clust	483	483	483	483

Robust standard errors in parentheses

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

variables, we find that the difference-in-differences coefficient has the expected negative sign, suggesting that banks in fintech countries have seen greater reductions in NIMs compared to those non-fintech countries in the periods after fintech lending emerged. Unobserved time-invariant differences between fintech and non-fintech countries are controlled for by β_2 , which indicates a positive and significant relationship between countries with fintech lending activities and NIMs, consistent with the finding that fintech has tended to develop in countries with high intermediation prices where alternative financial solutions are of greatest value (Mansilla-Fernández, 2017).

As noted earlier, quantitative findings at this early stage of fintech development should be interpreted with caution. As progress in this area continues, the evolution of fintech within the banking sector will shape the data that will become available for further empirical studies. The methodology laid out in this section could serve as a useful point of departure for future analyses of the effect of fintech on the banking sector. Until further quantitative analyses can be performed, case studies can provide insights on how fintech has developed in some countries and its effect thus far. We turn to two case studies in the next section.



Source: Cambridge Center for Alternative Finance (CCAF).

Fig. 7. Fintech Lending (\$ million). Source: Cambridge Center for Alternative Finance (CCAF).

4. Fintech in LAC: Case Studies

As noted in Section I, the fintech evolution and its effect on banking sector competition will depend on how incumbent banks and regulators respond to these new forces. In this section, we take a closer look at fintech in Brazil and Mexico—the two most developed fintech markets in the region. Despite substantive differences in their banking systems, Brazil and Mexico have the largest market sizes in Latin America and financial authorities who have embraced financial innovations as potential opportunities to improve the banking sector, which provides ideal conditions for fintech growth.

While there are many differences between the two case studies, some common threads do emerge:

- Although fintech lending is growing rapidly, its relative size is still very small.
- Both fintech and bigtech are progressing more rapidly for the payments segment than they are for lending.
- Many fintech start-ups are focusing on niche markets and unbanked populations, which helps enhance financial inclusion.
- Incumbent banks are responding by investing in innovation, hence improving their efficiency and customer service.
- Some incumbent banks are partnering with fintech start-ups. Although this could improve financial sector efficiency and productivity, the effect on competition is unclear because banks may increase their markups rather than reduce fees or interest rates because of these efficiency gains.
- There are encouraging signs in both Brazil and Mexico that fees are declining for the payments segment.

4.1. Fintech in Brazil

4.1.1. Background

Brazil has a vast banking sector, with assets totaling around 105 percent of GDP. Large banks—the five largest account for over 80 percent of total assets—dominate this sector with NIMs that are among the highest in the world. While the share of the adult population with financial accounts is relatively high at 86.5 percent (Central Bank of Brazil, 2018), Brazil's large population implies that tens of millions of potential financial accounts remain untapped. Therefore, it is unsurprising that Brazil is LAC's largest and fastest growing fintech hub with more than 650 fintech companies operating in the country at end-2019 (Fig. 8).

Fintech companies typically operate in narrow lines of business in which they have comparative advantages, often targeting populations that existing banks underserve such as those with limited formal credit history. Several fintech start-ups in Brazil have grown rapidly, with some such as Nubank (Brazil's largest fintech company), Credits (the largest fintech for secured loans), and Stone (the fintech for merchant payments processing) having attracted substantial external financing.¹² Some fintech firms enter the market in partnership with banks or other licensed entities to avoid the heavy regulatory burden of obtaining licenses; although, as discussed further below, regulations have recently been passed that facilitate fintech licensing. Other fintech firms have opted to be licensed as non-bank financial institutions. For example, Nubank, which offers digital bank accounts and personal loans, has two licenses: Credit, Finance, and Investment Company and Payment Institution.

Growth in fintech has also benefited from the entry of bigtechs into this space. For example, the largest regional e-commerce company, the Argentine Mercado Libre, also owns the payment processing fintech company Mercado Pago and the lending fintech company Mercado Credito. Bigtechs with global presence (such as American and Chinese bigtechs) initially focused on their main business lines, such as e-commerce and its associated payment systems, but have since begun to invest in other types of fintech and

¹² Nubank has received investments from Goldman Sachs and Tencent, and Credits from Santander InnoVentures and Softbank, among others. Stone had an IPO in 2018.

Table 5
Difference in Differences.

NIM	(1)	(2)
Liquid Assets/Total Assets	-0.0112 (0.00684)	-0.0139** (0.00656)
Net Fees/Average Assets	-0.244** (0.100)	-0.253** (0.101)
Operating Costs/Average Assets	0.694*** (0.0429)	0.693*** (0.0434)
NPL/Total Loans	-0.0471*** (0.0150)	-0.0468*** (0.0151)
Equity/Total Assets	0.0405*** (0.0106)	0.0414*** (0.0105)
Market Share	-0.0179 (0.0173)	-0.0225 (0.0181)
Foreign Dummy	-0.737*** (0.251)	-0.840*** (0.253)
Public Dummy	-0.281 (0.330)	-0.345 (0.329)
Real Growth	0.128*** (0.0236)	0.113*** (0.0246)
Inflation	-0.0482** (0.0141)	-0.0591*** (0.0148)
Total Loans/GDP	-0.0217*** (0.00804)	-0.0292*** (0.00804)
Real Interest Rate	0.0916*** (0.0180)	0.0920*** (0.0187)
EMBI Spreads	-0.342** (0.143)	-0.419*** (0.146)
Foreign Market Share	-0.0406*** (0.0109)	-0.0532*** (0.0107)
Financial Market Access Index	-3.309*** (0.942)	-1.399** (0.705)
HHI	0.208*** (0.0411)	0.220*** (0.0403)
Fintech Period Dummy	1.437** (0.592)	0.314* (0.184)
Fintech Country Dummy	2.343*** (0.741)	
Fintech Period Dummy x Fintech Country Dummy	-1.194* (0.619)	
Fintech intensity		1.086 (6.073)
Constant	2.171 (1.595)	4.649*** (1.452)
Observations	4,085	4,085
R-squared	0.579	0.575
N_clust	507	507

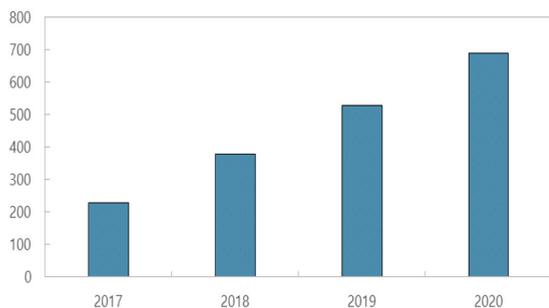
Robust standard errors in parentheses

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

Robust standard errors in parentheses

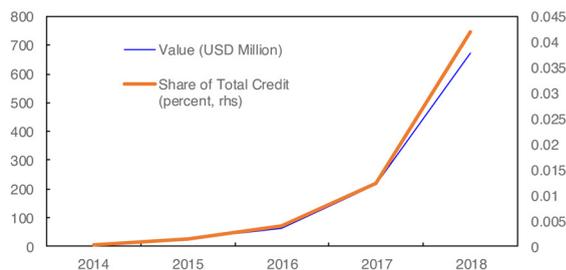
*** p<0.01, ** p<0.05, * p<0.1

Brazil: Number of Fintech Firms



Source: IDB (2018), IDB (2019), Radar Fintechlab (June 2019, August 2020)

Brazil: Total Alternative Finance Volume of Lending



Source: CCAF and IMF Staff Estimates

Fig. 8. Fintech Development in Brazil.

become more directly involved in the domestic financial markets. A recent example is the June 2020 announcement by Facebook Inc.'s messaging platform, WhatsApp, on the launch of its digital payments service, WhatsApp Pay, in Brazil. With over 100 million users, the platform could improve financial inclusion by reaching a wide segment of the unbanked population and increase payments efficiency. Although the new service could erode the fee incomes banks currently earn on payment and transfer services, assessing the effect on banking sector competition is not straightforward. For example, WhatsApp Pay originally planned to partner with Cielo, the payments processor the biggest banks in Brazil (Banco do Brasil and Banco Bradesco) own. In this context, the increased profitability and asset values could further increase banking sector concentration.¹³

4.1.2. The regulatory response

The Brazilian authorities have welcomed fintech as a positive development in the financial sector. They have largely accommodated the presence of fintech in the financial system with specific fintech-related legislations within the existing regulatory and legal frameworks rather than producing a separate fintech framework (e.g., as was done in Mexico). The Brazilian regulatory approach follows the segmentation and proportionality principles, that is, with rules tailored to reflect the size, activities, and risk profile of each entity. The financial regulatory authorities, which include the National Monetary Council (CMN), the Central Bank of Brazil (BCB), the Securities and Exchange Commission of Brazil (CVM), and the Superintendence of Private Insurance (SUSEP), issue specific regulations within their mandates, following the principle of proportionality. In this framework, most fintech firms would be subject to less complex authorization processes compared to big financial institutions.

The move to include and facilitate fintech activities in the financial sector is in line with the authorities' ongoing efforts to deregulate and increase competition in the banking sector. In 2016, the BCB introduced Agenda BC+ aimed at tackling structural issues in the financial system, including aligning regulations to international standards, promoting financial education and inclusion, and promoting a more competitive and efficient system. More recently, the BCB launched Agenda BC# ("BC hashtag"), which added new dimensions and strengthened Agenda BC+. The latest agenda aims to promote inclusion, competitiveness, transparency, financial education, and sustainability.

Important regulations related to bank lending in recent years include the following. Annex describes the regulatory initiatives that are relevant for broader fintech.

- *Credit market.* CMN Resolution 4656 (April 2018) provides for creating two new types of financial institutions that originate credit through digital platforms: (i) direct credit companies (Sociedade de Crédito Direto or SCD) that make loans through electronic platforms with their own capital; and (ii) peer-to-peer (P2P) loan companies (Sociedade Entre Pessoas or SEP) that facilitate loans between creditors and debtors made via electronic platforms.¹⁴ Under CMN Resolution 4656, fintechs can offer services, for which they previously needed to partner with traditional banks, under a simplified licensing process. Since 2019, 24 SCDs and six SEPs have been licensed.
- *Open banking.* In May 2020, the BCB announced regulations on open banking, following previous guidelines issued under Communiqué 33455 in April 2019. Open banking would cover financial institutions and other institutions the BCB licenses, it would include the sharing of information on products and services participating institutions offer, and, per customers' consent, customers' personal and transactional data. Implementation has taken a phased approach, the first phase of which started in February 2021 at some of the country's largest banks. The final implementation phase started in December 2021.

4.1.3. Effect on competition and incumbent banks' responses

Despite the rapid growth, fintech still accounts for a very small share of banking sector activities in Brazil. However, there is some evidence that the changing landscape has forced incumbent banks to reevaluate prices and services offered as well as operational efficiency.

At the current juncture, fintech lending in Brazil does not appear to have substantively altered traditional banks' lending prices. Credit by fintech lenders (e.g., Banco Inter, Banco Original) is growing several folds faster compared to the largest banks (Fig. 9), but their sizes remain quite small (Fig. 10).¹⁵ Moreover, rather than directly competing with banks in lending, many fintech companies have concentrated on market segments that incumbent banks have excluded thus far while some are directly collaborating with incumbent banks. However, as the explosive pace of fintech credit expansion continues, the question is not one of whether but how quickly banks' NIMs will be affected.

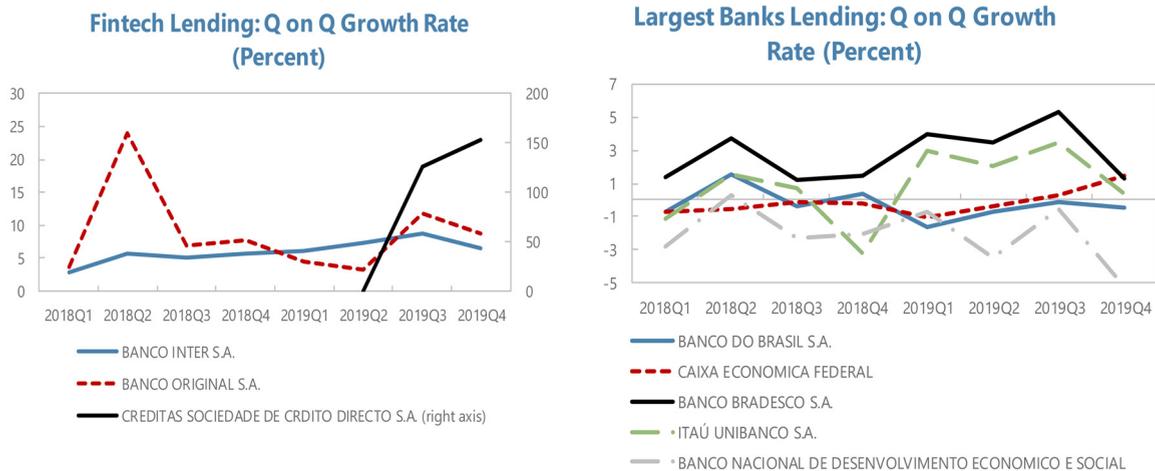
One area where the entrance of fintech has the most visible effects thus far is the fees for credit card use. Due to de facto exclusivity contracts to acquire merchants, the market for merchants' credit card adoption was that of a duopoly until mid-2010 (Garber and Nakane, 2015).¹⁶ The competition authority's (CADE) efforts to eliminate exclusivity deals led to the entrance of other acquirers

¹³ Due to concerns about its size and the effect on competition, the regulatory approval process of WhatsApp Pay was initially delayed to allow the authorities to have sufficient time to conduct analyses. Subsequently, in April 2021, WhatsApp Pay was authorized as a payment initiator in Visa and MC's transfer schemes. WhatsApp is still forbidden to operate in purchase schemes. Therefore, WhatsApp is only allowed to facilitate peer-to-peer payments, but not for purchases from merchants.

¹⁴ Creditas and Nexoo are examples of, respectively, a SCD offering balance-sheet lending and a SEP offering P2P lending that received a license under CMN4656.

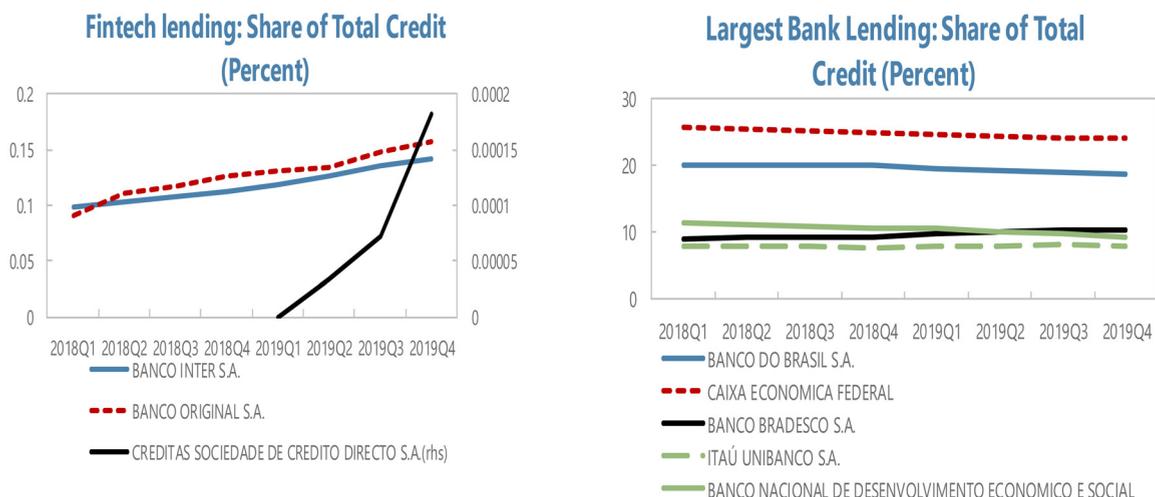
¹⁵ Data for some relevant fintechs, such as the digital bank arm of existing large banks (e.g., Banco Next) and lending by e-commerce firms (e.g., Mercado Credito) were not available and therefore not included in the figures.

¹⁶ Cielo had an exclusivity contract to acquire merchants for Visa while Rede had a practical, if not formal, exclusivity to acquire merchants for MasterCard.



Source: Central Bank of Brazil

Fig. 9. Growth Rates of Lending: Fintechs vs. Largest Banks.



Source: Central Bank of Brazil

Fig. 10. Shares of Lending: Fintechs vs. Largest Banks.

including fintechs and bigtechs such as Stone and PagSeguro. With more than 20 competitors and the market share outside the two original incumbents approaching 30 percent, the merchant discount rate (MDR), a payment processing fee merchant acquirers charged to businesses, has fallen from nearly 3 to around 2.5 percent (Fig. 11).¹⁷

More recently, a public initiative boosted progress in competitive environment and efficiency in payment. Pix, an instant payment system the BCB created, has been operational since November 2020. It has enabled low-cost, instant payment with convenient access among participants. As of November 2021, more than half of the Brazilian population has registered accounts at the Pix, and Pix payment volume is already equivalent to 80 percent of debit and credit card transactions (Standard & Poors, 2021).

The fintech companies' entry accelerated the incumbent banks' digitization of banking services to preserve market share and increased operational efficiency to preserve margins (e.g., by reducing the number of branches as shown in Fig. 12). Some incumbents have adopted fintech products, for example, Banco Bradesco launched the fully digital bank Next, and Banco do Brasil and Bradesco partnered to launch a digital credit card. Some, such as Banco Original and Banco Inter, which started as traditional banks, have converted to digital banks. Many are directly funding fintech start-ups through establishing innovation hubs such as Cubo Itaú, Bradesco's InovaBra and Banco do Brasil's fintech lab in Silicon Valley. Such partnerships have appeared mutually beneficial as

¹⁷ Credit card issuers add cardholders to the network and serve them while, card acquirers add and serve merchants. Issuers and acquirers can be, but are not necessarily the same entities (Garber and Nakane, 2015).

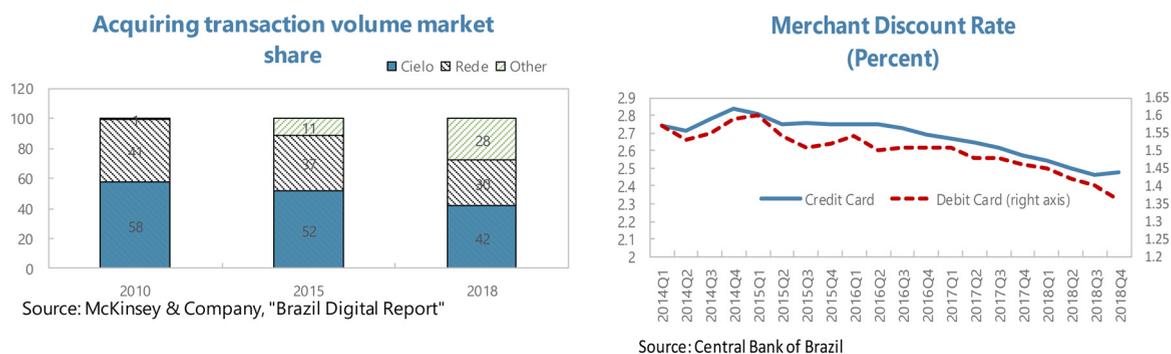
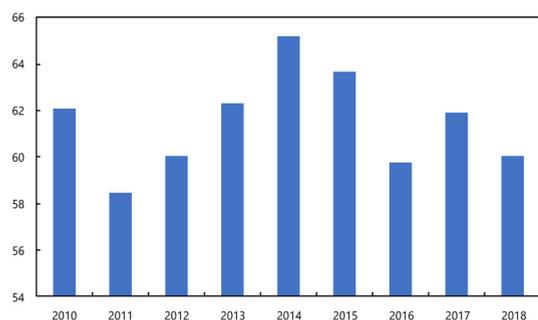


Fig. 11. Developments in Payment Card Acquisition Market Lending.

Brazil: Median Expense to Revenues (Percent)



Brazil: Number of Branches of Five Largest Banks

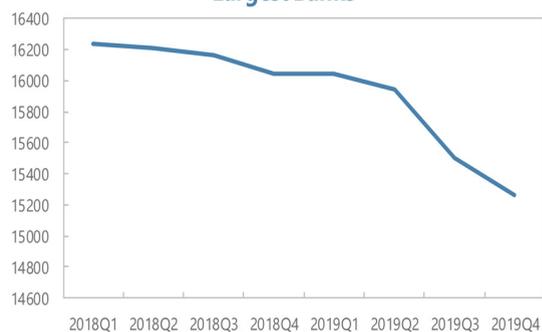


Fig. 12. Trends in Incumbent Banks.

incumbents take part in fintech innovation while fintech start-ups benefit from the banks' resources, experience, and licenses to undertake financial activities.

4.2. Fintech in Mexico¹⁸

4.2.1. Background

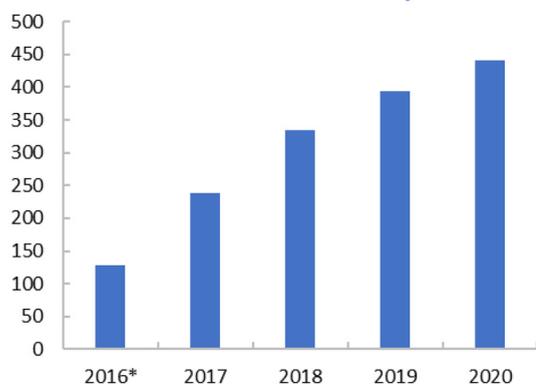
In Mexico, foreign banks dominate the banking sector. Of the seven largest banks by assets, only two are domestically owned.¹⁹ The five largest banks account for about 70 percent of total assets. Despite a relatively sophisticated banking system, the Mexican banking sector is small compared to others in the LAC region. Banking sector assets are around 40 percent of GDP and bank credit as a share of GDP is only about a quarter of the level observed in other emerging markets, including Brazil (Herman and Klemm, 2017). These figures reflect low financial inclusion in Mexico, where only 47 percent of the adult population have financial accounts and around 70 percent of individual borrowers rely on informal credit through pawnbrokers, savings groups, or other individuals.²⁰ The credit market survey the Bank of Mexico (Banxico) conducted for 2020Q2 shows that only one-third of companies identified commercial or foreign banks as their main financing source.²¹ Those without access to formal credit are forced to borrow from the more expensive informal sector. The low access is particularly notable among younger firms and start-ups due to their limited credit history (World Bank, 2016).

¹⁸ Based on interviews with the Bank of Mexico, the National Banking and Securities Commission (CNBV), and the Ministry of Finance (SHCP) during February–March 2020.

¹⁹ The largest banks in Mexico are BBVA, CitiBanamex, Santander, HSBC, Scotia (all foreign), Inbursa, and Banorte (domestic).

²⁰ Encuesta Nacional de Inclusión Financiera (ENIF) (2018) conducted by the National Banking and Securities Commission (CNBV) and the National Institute of Statistics and Geography (INEGI).

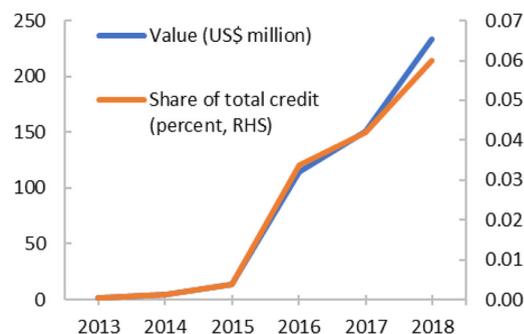
²¹ Source: <https://www.banxico.org.mx/SieInternet/consultarDirectorioInternetAction.do?accion=consultarCuadro&idCuadro=CF471§or=19&locale=en>

Mexico: Number of fintech startups

* According to the first version of Fintech Radar Mexico published in May 2016.

Source: Finnovista Fintech Radar Mexico.

Note: Finnovista includes a broader spectrum of fintech firms compared to those the Fintech Law regulates.

Mexico: Volume of fintech credit

Sources: Cambridge Centre for Alternative Finance and IMF staff estimates.

Note: CCAF may include a broader spectrum of fintech firms compared to those the Fintech Law regulates.

Fig. 13. Fintech Development in Mexico.

According to Finnovista,²² since 2016, the number of fintech start-ups has been growing at an average annual rate of 23 percent. By March 2020, the number reached 441. The mortality rate of fintech start-ups also decreased from 11.3 percent in 2018 to 4.5 percent in 2020. Fintech firms provide a wide array of financial services, but most engage in payments and transfers (88 firms) and consumer and business lending (83 firms; Finnovista, 2020). The amount of fintech credit has grown dramatically over the recent years; however, it still accounts for a small share of total formal credit (0.06 percent) as of 2018 (Fig. 13).

Many of the expanding fintech start-ups have tended to focus on SME lending or microcredits, filling the niche of the credit market that traditional banks underserve. The fintechs Credijusto and Konfio, for example, specialize in SME loans that have received significant external funding, which enabled them to expand further. Kueski, one of the largest online lenders in Mexico specialized in short-term microloans to individuals, applies Bigdata analytics and machine learning to process loan applications with a decision usually made within 24 hours.²³

Bigtechs are also increasing their presence in Mexico's booming fintech industry. Konfio, for example, has partnered with Facebook and PayPal to take advantage of their advanced data analytics for faster and more reliable loan processing. Amazon has entered the payments segment with its 2017 launch of Amazon Cash in Mexico. This service allows users to deposit cash into their accounts at convenience stores and other merchants, which can then be spent with their mobile phones. Amazon also partnered with Banorte and launched Amazon Rechargeable in 2018, a virtual debit card that cash deposits at convenience stores fund and that does not require visits to a bank branch.

4.2.2. The regulatory response

A fintech regulatory framework. Recognizing the growing role of fintech in the financial sector, the Mexican authorities developed the Fintech Law ("the Law"), which was enacted in March 2018 and is the first comprehensive fintech legislative framework in Latin America. The Law is aimed at providing legal certainty to fintech investors, consumers, and companies. It is based on the following guiding six principles: (i) promote financial inclusion and innovation, (ii) foster competition, (iii) protect consumers, (iv) strengthen anti-money laundering/combating the financing of terrorism (AML/CFT), (v) maintain financial stability, and (vi) observe technological neutrality.

Among various initiatives, the introduction of application programming interface (APIs) paves the way for open banking, which could facilitate competition in the financial system.²⁴ The aim is to allow the mutual sharing of: (i) open financial data, including information about financial products and services offered to the public; (ii) aggregated data, which are statistics that do not reveal the identities of clients; and (iii) transactional data, only with the client's prior consent. Financial entities and third parties specializing in information technology can request access to other entities' interface subjects for discretionary fees and with prior approval from

²² Finnovista covers a broader spectrum of fintech services (including finance and wealth management, insurance, financial education, and trading platforms) compared to those the Fintech Law regulates, as discussed in the following section.

²³ Credijusto, Konfio, and Kueski engage in activities that are outside the coverage of the Fintech Law. Source of company information is the Crunchbase database.

²⁴ A more comprehensive description of Mexico's initiatives that encompasses fintech more generally is included in the Annex.

the corresponding regulators. Following the introduction of the concept of open banking in the 2018 Fintech law, specific regulations are being rolled out at a measured pace. In the meantime, some incumbent banks have begun to take a step toward open banking by creating an API hub and collaborating with fintechs.

Secondary regulations. After the Law was enacted, secondary regulations governing the implementation of the Law were published in September 2018. Under the secondary regulations, companies engaging in the fintech activities that the Law governs were required to apply to the CNBV by September 2019 for formal financial technology institution (FTI) licenses to operate. Banks that wished to carry out or continue with fintech operations that the banking law did not cover were also required to establish FTIs and file applications. The secondary regulations also set forth additional requirements for licensed FTIs. In developing the secondary regulations, the Mexican authorities considered the protection of consumers and investors, the promotion of financial innovation, and the mitigation of risks to the financial sector. Striking the right balance among these factors, however, is challenging. Although some praised the Law for providing greater certainty and security to users, in a survey by Finnovista, 52 percent of fintech start-ups in Mexico said the Law presents high barriers to entry to the market (Finnovista, 2019). A study that Endeavor Mexico conducted suggests that 63 percent of existing fintech start-ups would not be able to absorb the estimated cost of complying with the secondary regulations (Endeavor Mexico, 2019).

Potentially reflecting the additional regulatory burden, only 85²⁵ out of the 124 fintech entities requiring licenses to operate as FTIs under the new legal framework filed applications with the CNBV by the September 2019 deadline. About two-thirds of the applicants were e-money platforms, whereas the remaining one-third were crowdfunding or P2P lending platforms. Of these applicants, about 20 were foreign-owned entities. In January 2020, the first license was issued to NVIO Pagos Mexico, the company that owns Bitso, an online trading platform for cybercurrencies with more than one million users across Latin America as of July 2020.²⁶ The authorization process, however, has been interrupted since the onset of the COVID-19 pandemic.

4.2.3. Impact on competition and responses of incumbent banks

The impact of fintech on the banking sector competition in Mexico has been most apparent in the digital payment market. With state-of-the-art technologies, fintechs are able to offer reliable and almost immediate payments and transfers with low fees. To ensure traditional banks' competitiveness, the Mexican Banking Association announced in March 2019, in response to a proposal by a member of Congress, the elimination of banks' commission fees charged on digital accounts and money transfers.

As with Brazil, the young and fast-growing fintech industry may have yet to quantitatively impact traditional banks' NIMs, but the pressure on Mexico's banking sector to innovate has been undeniable. Traditional banks are devoting more resources than ever to innovation, which includes developing their online banking platforms. In addition, in 2017, Santander Mexico established a digital factory ("fábrica digital") called Spotlight, which is dedicated to the development of innovative fintech products to better serve the bank's clients.

Collaboration between traditional banks and fintech start-ups has also been increasing. In June 2020, Banorte announced that it is working with food delivery startup Rappi on a joint venture aimed at providing innovative financial products that are integrated into users' daily lives.²⁷ Santander has organized a recurring competition called Radar Santander for fintech start-ups to present their business ideas. The winners are invited to collaborate with the Santander team at Spotlight to turn their ideas into products. BBVA has organized a similar program called Fast Track. Through these types of competitions, the chosen start-ups could benefit substantially from the collaboration due to the extensive resources and large client bases that traditional banks have. Collaboration also occurs in the form of funding. Klar, a fintech startup that offers alternative financial service solutions, received US\$57.5 million of debt and equity funding from Santander in 2019, which was the largest seed funding round in Mexico.²⁸

Traditional banks have also reacted to preserve their shares in the booming digital payment market through M&A. BBVA Mexico, for instance, acquired OpenPay, a fintech startup specializing in payments, in 2016. In February 2020, Santander announced its plan to acquire Elavon México, a merchant payment solutions company.

Finnovista foresees that fintech start-ups could take over up to 30 percent of Mexico's banking market during the next decade. To allow for the healthy development of the industry, regulators need to strike a careful balance between promoting competition and protecting investors and customers in the design of regulations. Efforts to promote the regulatory sandbox and the approval of operating licenses under the secondary regulations should be resumed to the extent that that the pandemic allows to maintain the dynamics of fintech development.

5. Concluding remarks

For countries in LAC, the rapid growth of fintech gives rise to opportunities for improved banking sector competition and financial inclusion. Although the fintech industry is still new to the region, this paper presents early evidence of its impact by showing that the presence of fintech lending is associated with lower NIMs. Case studies document the defensive responses of banks thus far, including fintech adoption, the lowering of fees, and expansions into new markets. They demonstrate that fintech can indeed bring about greater banking sector competition, and we may just be seeing the tip of the iceberg. Open banking has the potential to be a

²⁵ The number of applicants would be 96 if the entities that engage in fintech activities not regulated by the Fintech Law are also counted.

²⁶ <https://cointelegraph.com/news/bitso-hits-1m-users-as-crypto-adoption-spikes-in-latin-america>

²⁷ Source: <https://iupana.com/2020/06/29/rappi-banorte-jv-targets-innovative-financial-services/?lang=en#widget/?lang=en>

²⁸ <https://news.crunchbase.com/news/klar-raises-57-5m-in-debt-and-equity-to-become-the-chime-of-mexico/>

gamechanger for fintech firms. Equal access to data within the financial system, including previously proprietary banks' customer data, could greatly level the playing field for fintech firms. However, it remains unclear whether fintech will reduce the banking sector concentration.

Although the focus of this paper was on the regulatory challenges and initiatives related to competition in fintech lending, the rise of fintech has also brought new challenges, including data privacy concerns, cybersecurity, AML/CFT controls, and fraud (CEMLA, 2019). Financial system regulators have the tough task of balancing the goal of greater innovation and competition while considering risks and financial stability, all while keeping pace with changes in the fintech space. This balancing act, however, holds the key to fintech's integration into the financial system. Looking forward, as fintech grows and transactions increasingly move across borders, international collaboration among financial regulators is likely to play a key role in shaping the future of fintech. Such a collaboration would allow for collective surveillance, the sharing of knowledge and the best regulatory practices, and the prevention of regulatory arbitrage.

Declaration of Competing Interest

None.

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Annex. Detailed Changes in Regulations

Brazil

The Brazilian authorities have welcomed fintech as a positive development in the financial sector. They have largely accommodated the presence of fintech in the financial system with specific fintech-related legislations within the existing regulatory and legal frameworks, rather than producing a separate framework for fintech (e.g., as was done in Mexico). The Brazilian regulatory approach follows the principles of segmentation and proportionality (i.e., with rules tailored to reflect the size, activities, and risk profile of each entity). The financial regulatory authorities, which include the National Monetary Council (CMN), the Central Bank of Brazil (BCB), the Securities and Exchange Commission of Brazil (CVM), and the Superintendence of Private Insurance (SUSEP), issue specific regulations within their mandates, following the principle of proportionality. In this framework, most fintech firms would be subject to less complex authorization processes than big financial institutions would be.

The move to include and facilitate fintech activities in the financial sector is in line with the authorities' ongoing efforts to deregulate and increase competition in the banking sector. In 2016, the Central Bank of Brazil (BCB) introduced Agenda BC+, which is aimed at tackling structural issues in the financial system, including aligning regulations with international standards, promoting financial education and inclusion, and promoting a more competitive and efficient system. More recently, the BCB launched Agenda BC# ("BC hashtag"), which added new dimensions and strengthened Agenda BC+. The latest agenda is aimed at promoting inclusion, competitiveness, transparency, financial education, and sustainability.

Important regulations related to fintech in recent years include those in the following areas:

- *Payment services.* Payment services regulations include BCB Circular 3682 (November 2013), BCB Circular 3885 (March 2018), and BCB Resolution 80 (March 2021), which revoked Circular 3885. Payment institutions can carry out four types of services: (i) electronic money issuer; (ii) post-paid payment instrument issuer; (iii) acquirer; and (iv) payment transaction initiator (PISP). For the post-paid payment instrument issuer and acquirer, services can be exempt from licensing based on the volume or number of users.
- *Securities market.* Regulation 588 (July 2017, by the CVM) gives crowdfunding platforms a greater scope to grow by creating an exception to the general rule that public offerings of securities in the Brazilian market must be registered with the CVM. Small enterprises' equity issuances via electronic crowdfunding platforms are exempted from this registration provided that certain conditions are met.
- *Credit market.* CMN Resolution 4656 (April 2018) provides for the creation of two new types of financial institutions that originate credit through digital platforms: (i) direct credit companies (Sociedade de Crédito Direto or SCD) that make loans through electronic platforms with their own capital; and (ii) P2P loan companies (Sociedade Entre Pessoas or SEP) that facilitate loans between creditors and debtors via electronic platforms.²⁹ Under CMN Resolution 4656, fintechs can take advantage of a simplified licensing process to offer services for which they previously needed to partner with traditional banks. Since 2019, 24 SCDs and six SEPs have been licensed.

²⁹ Creditas and Nexoo are examples of, respectively, an SCD offering balance-sheet lending and an SEP offering P2P lending that received a license under CMN4656.

- *Open banking.* In May 2020, the BCB announced regulations on open banking following the previous guidelines issued under Communiqué 33455 in April 2019. Open banking covers financial institutions and other institutions that the Central Bank has licensed. It includes the sharing of information on products and services that participating institutions offer. This information is shared per customers' consent as well as customers' personal and transactional data. Implementation started in February 2021 and will become fully operational by the end of 2021.
- *Regulatory sandbox.* The BCB, the CVM, the SUSEP, and the Ministry of Economy published a joint statement in June 2019 on their intention to create regulatory sandboxes to promote financial innovation. The three regulators (the BCB, the CVM, and the SUSEP) have since approved the rules for their sandboxes. Both licensed and unlicensed institutions will be able to participate. The SUSEP already selected the projects to be tested in the first cycle, and some of them are already operating. The BCB and the CVM are going through the projects' selection, and the projects are expected to begin their operation in the second half of 2021. The duration of one cycle (or "cohort") may differ depending on the sandbox of different authorities (every two or three years). In the first cycle, the SUSEP authorized 11 projects, the CVM will authorize seven projects, and the BCB will authorize between 10 and 15 projects. Although the aim is to customize the sandbox to each participant, Brazil's civil law tradition implies detailed statutes, which may limit the flexibility of the sandbox.

Along with regulations, open banking, and regulatory sandbox, the authorities are also directly encouraging innovation. In 2018, the BCB launched the Financial and Technology Innovation Laboratory (LIFT), a program aimed at promoting technological innovation in financial activities to increase efficiency and reduce the cost of credit.

Mexico

A fintech regulatory framework

Recognizing the growing role of fintech in the financial sector, the Mexican authorities developed the Fintech Law ("the Law,") which was enacted in March 2018 and is the first comprehensive fintech legislative framework in Latin America. The Law seeks to provide legal certainty to fintech investors, consumers, and companies. It is based on the following guiding six principles: (i) promote financial inclusion and innovation, (ii) foster competition, (iii) protect consumers, (iv) strengthen AML/CFT, (v) maintain financial stability, and (vi) observe technological neutrality. The Law recognizes and regulates two types of fintech institutions—crowdfunding (which includes P2P lending) and e-money platforms, (both referred to as FTIs)—and three other areas related to fintech:

- Virtual assets (also known as crypto assets) as defined within the Law; FTIs and banks can use them only for specific operations, with their use being subject to authorization by Banxico.
- Application programming interfaces (APIs); all financial entities, including FTIs, traditional banks, credit bureaus, and clearing houses, must develop them for the purposes of connecting and sharing information with each other.
- Regulatory sandboxes permit commercial firms and traditional financial institutions to temporarily test and operate innovative models of financial services.

The Law designates Banxico, the CNBV, and the Ministry of Finance (SHCP) as the main regulators for the fintech industry.³⁰ The regulation of e-money platforms, virtual assets, and the use of foreign currencies falls primarily on Banxico. The CNBV, under the Law, is responsible for prudential regulations for FTIs, such as capital requirements, corporate governance, and risk management. The SHCP is responsible for AML/CFT regulations.

The introduction of APIs paves the way for open banking, which could facilitate competition in the financial system. The aim is to allow the mutual sharing of: (i) open financial data, including information about the financial products and services offered to the public; (ii) aggregated data, which are statistics that do not reveal the identities of clients; and (iii) transactional data, only with the client's prior consent. Financial entities and third parties specializing in information technology can request access to other entities' interface for discretionary fees and prior approval from the corresponding regulators. The ultimate objective of open banking is to promote transparency and to foster competition.

The Law created a regulatory sandbox to promote innovation and provide legal flexibility for new financial models. The sandbox allows (i) non-regulated entities to operate temporarily without the need to apply for full licenses as financial entities and (ii) regulated entities to test new business models without full compliance with the regulatory requirements. The CNBV has been actively communicating with the public to promote the regulatory sandbox, including organizing the financial innovation contest known as the Sandbox Challenge with the support of the UK government, where winners receive legal and business advice to support their sandbox applications. Although no applications for the sandbox have been submitted successfully as of March 2020, prior to the COVID-19 pandemic, engagement between the CNBV and interested entrepreneurs regarding their eligibility is ongoing.

In addition to the regulatory sandboxes and the move toward open banking, the Mexican authorities are also directly facilitating fintech development with the launch of the digital payment system Cobro Digital Systems (CoDi), which allows customers to make payments online and in person through smartphones free of charge using quick response (QR) codes. CoDi, which Banxico built, had five million users as of September 2020, with all traditional banks participating in the system. Both Amazon and Mercado Libre have also approached the central bank about adopting the QR-code-based payment system.

Secondary regulations

After the Law was enacted, secondary regulations governing the implementation of the Law were published in September 2018. Under the secondary regulations, companies engaging in the fintech activities that the Law governed were required to apply to the

³⁰ Along with the National Commission for the Protection and Defense of the Financial Services Users (CONDUSEF), the National Commission for the Pension System (CONSAR), and the National Bonding and Insurance Commission (CNSF)

CNBV by September 2019 for formal FTI licenses to operate. Those who failed to comply would have to cease operation according to the transitory provision of the Law. Banks that wished to carry out or continue with fintech operations that the banking law did not cover were also required to establish FTIs and file applications. The secondary regulations also set forth additional requirements for licensed FTIs, including:

- Minimum capital stock of 500,000 unidad de inversion (UDIs) (approx. US\$146,000) or 700,000 UDIs (approx. US\$204,000) depending on the types of fintech activities;
- Maximum limits on cash transfers per client and per day for electronic payment and crowdfunding platforms;
- Maximum limits on lending activities for crowdfunding and P2P platforms;
- Obligations for crowdfunding platforms to make investors diversify their resources across different projects;
- Reporting requirements for anyone intending to acquire 10 percent or more of shareholding in an FTI.

In developing the secondary regulations, the Mexican authorities have considered the protection of consumers and investors, the promotion of financial innovation, and the mitigation of risks to the financial sector. Striking the right balance among these factors, however, is challenging. Although some have praised the Law for providing greater certainty and security to users, in a survey by Finnovista, 52 percent of fintech start-ups in Mexico said that the Law presents high barriers to entry to the market (Finnovista, 2019). A study that Endeavor Mexico conducted suggests that 63 percent of the existing fintech start-ups would not be able to absorb the estimated cost of complying with the secondary regulations (Endeavor Mexico, 2019).

Potentially reflecting the additional regulatory burden, only 85³¹ out of the 124 fintech entities requiring licenses to operate as FTIs under the new legal framework filed applications with the CNBV by the September 2019 deadline. About two-thirds of the applicants were e-money platforms, whereas the remaining one-third were crowdfunding or P2P lending platforms. Of these applicants, about 20 were foreign-owned entities. A committee that Banxico, the SHCP, and the CNBV represented reviewed the applications. In January 2020, the first license was issued to NVIO Pagos Mexico, the company that owns Bitso, an online trading platform for cryptocurrencies with more than one million users across Latin America as of July 2020.³² The authorization process, however, has been interrupted since the onset of the COVID-19 pandemic.

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³¹ The number of applicants would be 96 if the entities that engage in fintech activities that the Law does not regulate were also counted.

³² <https://cointelegraph.com/news/bitso-hits-1m-users-as-crypto-adoption-spikes-in-latin-america>

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