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Maturity transformation and deposit franchise in Latin American banks

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Abstract

This paper examines the role of deposit franchise in mitigating interest rate risk among Latin American commercial banks over the period 2005–2023. Using individual bank estimates and a panel dataset across multiple countries, we estimate expense betas—the sensitivity of funding costs to policy rate changes—as a measure of franchise strength. We find that Latin American banks exhibit average betas of 10%, significantly lower than the $35-40\%$ observed in U.S. and European banks, indicating strong franchise effects. We find that overhead costs and market power, rather than bank size, explain beta variation. While interest rate increases reduce deposit and loan volumes, they have limited effects on income, underscoring the franchise's stabilizing role.

Keywords: maturity transformation, deposit franchise, net interest margins, market power

JEL: G21, E43, L22

1 Introduction

The fundamental business model of commercial banks hinges on maturity transformation—the financing of long-term assets with short-term liabilities. This structure enables banks to capture the term premium, earning higher returns on long-term loans while funding themselves primarily through short-term, typically low-cost deposits. However, this strategy inherently exposes banks to interest rate risk, as fluctuations in policy and market rates affect funding costs and, consequently, profitability.

One key mechanism for managing this risk is the deposit franchise—a bank's ability to attract and retain a stable base of non-maturing deposits whose remuneration is relatively insensitive to changes in interest rates. This stable funding base effectively shields banks from the full pass-through of rate changes to funding costs, reducing the need for hedging strategies such as interest rate derivatives [McPhail et al., 2023].

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Empirical studies from developed economies demonstrate that banks successfully leverage their deposit franchises to insulate net interest margins from policy rate volatility [Drechsler et al., 2021, Andersen and Engelund, 2024, Emin et al., 2024].

The extent to which banks exploit deposit franchises not only serves as a proxy for market power, but also has implications for monetary policy transmission and derivative usage. Despite extensive evidence from developed markets, little is known about the role of deposit franchises in Latin America, a region characterized by heterogeneous financial systems, varying regulatory frameworks, and distinct macroeconomic environments.

To address this gap, we compile a representative panel of commercial banks across Latin America and estimate bank betas—specifically, expense betas that measure the sensitivity of interest expenses to changes in central bank policy rates. These betas serve as a quantifiable measure of the strength of deposit franchises across banks, countries, and the region as a whole.

We show that, on average, Latin American banks exhibit lower asset and liability durations than their U.S. counterparts. An exception is Chile, where a deep and well-developed bond market supports longer-term funding, resulting in a duration gap comparable to that of U.S. banks (approximately 3.7 years). Brazil also exhibits longer average loan durations (4.1 years), while in other countries, the average duration gap remains below 2.7 years (in Chile it is 3.5). This ex-ante mismatch between assets and liabilities increases interest rate risk exposure, which many Latin American banks manage through robust deposit franchises.

Our analysis reveals that net interest margins (NIMs) in the region are significantly less volatile than policy rates. Across all countries, the standard deviation of NIMs (over the period 2005–2023) is substantially lower than that of central bank rates. Expense betas for Latin American banks average around 10%, well below the 35% estimated for U.S. banks. These findings are consistent across models controlling for macroeconomic factors and country-level heterogeneity.

We further investigate the relationship between bank betas and key institutional characteristics. Unlike in the U.S., bank size does not systematically explain the strength of the deposit franchise in Latin America. Instead, overhead costs and market power play more critical roles: a 10% increase in overhead costs is associated with a 3.13% decline in expense betas, suggesting that maintaining a low-sensitivity deposit base requires ongoing operational investment.

Our results also show that increases in policy rates contract both deposit and loan flows, but have minimal impact on interest income and net interest income, indicating that Latin American banks rely on deposit franchises to smooth profitability.

In sum, our findings suggest that Latin American banks benefit from deposit franchises at levels comparable to, or even exceeding, those in the U.S. and Europe. However, the ability to fully insulate profitability remains constrained, given the mixed results we obtain regarding the sensitivity of interest income, net interest income and profitability. By offering new evidence on the structure and function of deposit franchises in emerging markets, this study contributes to broader debates on regulatory design, monetary policy transmission, and strategic bank behavior. Our results also highlight the importance of measuring maturity transformation, overhead investments, and the dual production of deposits and loans as defining features of banking competition in the region. These element will play an important role in understanding the impact of new players (fintech, bigtech) and other innovations on banking in the region.

The structure of the paper is as follows. Section 2 reviews the relevant literature. Section 3 presents complete or partial estimates of the maturity mismatches between assets and liabilities in the banking sectors of the region's largest economies. Section 4 reports the main empirical findings on the sensitivity of various components of banks' profit and loss (P&L) statements to changes in the central bank policy rate. These sensitivities—referred to as bank betas—are calculated based on metrics such as expenses, income, return on equity (ROE), net interest margin (NIM), and stock prices. The analysis employs both individual bank-level data and regional or country-level panel datasets. Furthermore, we examine how these bank betas are associated with specific bank characteristics. Section 5 offers concluding remarks.

2 Literature Review

Following the financial crisis of 2007–2008, regulators recognized that banks were inadequately equipped to manage liquidity shocks. The available measurement tools were insufficient, and the classification of liquid and illiquid positions on balance sheets was rudimentary. In response, Basel III introduced specific metrics and tests designed to anticipate liquidity shortfalls, namely the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR). Additionally, Basel III developed standardized cash-flow-based measures to monitor a bank's ability to meet its payment obligations and to establish limits on maturity transformation. In essence, Basel III introduced an enhanced framework to address the impact of interest rate risk on banks. Cash-flow measures such as the Economic Value of Equity (EVE) and Net Interest Income (NII) sensitivity are fundamental components of the standardized approach for managing interest rate risk in the banking book of commercial banks [BIS, 2015]. Behavioral optionality risk encompasses any factor with a material impact on the banking book. Although broadly defined, this risk includes, for example, the uncertainty surrounding non-term deposits, which can be withdrawn at any time, and loan prepayment risk, which is sensitive to interest rate fluctuations. Deposits, in general, constitute a significant portion of commercial bank liabilities (ranging from 60% to 80%), with Non-Maturing Deposits (NMDs) being more prevalent than term deposits. Modeling NMDs requires identifying stable deposits—those that are unlikely to be withdrawn with high probability. Stable deposits are further categorized into core and non-core deposits, with core deposits being less susceptible to repricing due to changes in interest rates. Banks estimate the portion of core deposits by determining the pass-through rate parameter, defined as the *"proportion of a market interest rate change that the bank will pass onto its customers in order to maintain the same level of stable deposit balances"* [BIS, 2015]. Estimates of NMD pass-through rates, also known as bank expense betas, are used to quantify core deposits. Bank-specific information is essential for estimating these betas, which measure the relationship between variations in interest expenses and changes in the central bank's policy rate, denoted as β_i^{exp}. Ideally, if $\beta_i^{exp} \in (0, 1)$, then core deposits can be estimated by multiplying stable deposits by the fraction unaffected by the pass-through rate $(1 - \beta_i^{exp})$. The estimated expense betas for U.S. and European banks range between 30% and 46% [Drechsler et al., 2021, Andersen and Engelund, 2024, Emin et al., 2024]. However, substantial variation exists across countries, deposit types, institution types (e.g., size, online presence, and other banking characteristics), and time periods. [Emin et al., 2024] argues that it is crucial to account for time-varying betas to reflect different interest rate cycles. In a high-interest-rate environment, such as the U.S. monetary policy tightening from June 2022 to the end of 2023. In Europe, expense betas can increase to nearly 50% whereas in a low-interest-rate environment, the beta is approximately 27% [Andersen and Engelund, 2024]. Over economic cycles, the net interest margin (NIM) of U.S. commercial banks has remained relatively stable, ranging between 2.2% and 3.8%. Simultaneously, banks have maintained significant duration mismatches between assets and liabilities. According to [Drechsler et al., 2021], this stability is attributed to the bank franchise model, in which the relatively low sensitivity of bank expense betas to market rates (generally below 50%) and the near one-to-one matching of income and expense sensitivities enable banks to hold long-term, fixed-rate assets (such as loans and securities) without compromising their margins and profitability. These findings suggest that short-term deposit-taking and long-term lending are complementary activities and should not be separated. Moreover, they imply that banks are insulated from the balance sheet channel of monetary policy.

The literature acknowledges the concept of bank franchise value, which is shaped by both institutional effort—such as investment in customer-facing services and amenities—and prevailing market conditions, including the exercise of market power over deposit pricing. Commercial banks compete not only with each other but also with savings banks, online and cooperative banks, and alternative investment vehicles such as money market funds. A recent survey paper highlights the importance of considering the multimarket nature of financial intermediation when analyzing competition among financial institutions [Berger and Boot, 2024]. This framework incorporates various dimensions, including the joint production of deposits and loans, the heterogeneity of customer bases, geographic disparities in competitor sets, and differences between physical branch networks and digital banking platforms. Of particular relevance is the interdependence of deposit-taking and lending activities, which aligns with the asset-liability management literature on optimal pricing strategies that jointly consider both sides of the bank's balance sheet. Empirical evidence from the U.S. banking sector demonstrates that banks with above-average deposit market power are able to extend loans with maturities approximately 20% longer than those offered by banks with below-average deposit market power [Li et al., 2023]. Recent literature has increasingly focused on how financial innovation—especially in payment systems, fintech, big tech, and digital assets—is reshaping the competitive landscape [Berger and Boot, 2024]. In Brazil, for instance, a recent study analyzes the effects of Pix, an instant payment system launched by the Central Bank of Brazil [Liang et al., 2024]. Pix has significantly transformed the Brazilian banking sector by heightening interbank competition, particularly through its impact on deposit flows. By reducing transaction frictions and increasing consumer mobility, Pix has facilitated easier switching between banks, thereby intensifying deposit outflows. This heightened competition has led banks to improve deposit rates and service quality. Moreover, higher Pix transaction volumes are empirically associated with more pronounced increases in deposit rates following policy rate hikes, indicating a strengthened transmission of monetary policy via the deposit channel. Traditional measures of banking competition, such as the Lerner index, suggest a general increase in market power across the global banking sector, particularly in advanced economies, during the period following the 2007–2008 financial crisis and preceding the COVID-19 pandemic [Igan et al., 2021]. The authors attribute this trend to the relative stability of bank funding costs and observe persistently stable net interest margins (NIMs) from 2000 to 2017.

With respect to the transmission mechanism of monetary policy, [Drechsler et al., 2017] propose the deposit channel of monetary policy. In an economy where banks exert market power over deposits due to their franchises, an increase in the policy rate leads banks to widen deposit spreads, prompting deposit outflows from the banking system—particularly in more concentrated markets.[1] Since deposits are a uniquely stable source of funding for banks, the deposit channel affects bank lending: a contraction in deposits triggered by a rate hike leads to a contraction in lending, as banks cannot costlessly substitute wholesale funding for lost deposits. As a consequence, the short-term interest rate matters in its own right, because it directly affects the supply of liquid assets and the cost and composition of banks' funding—unlike in the New Keynesian model, where changes in the short rate matter only to the extent that they influence long-term rates. Moreover, [Wang et al., 2022] document how banks' market power over deposits can interact with capital regulation, further weakening the transmission of monetary policy to loan supply. Due to elevated deposit spreads, banks earn higher profits and accumulate more capital, which makes capital requirements less binding. As a result, when faced with a contractionary monetary policy shock, banks reduce lending by a smaller amount[2].

3 Maturity transformation in the region

Asset-liability management is a critical component in ensuring value creation for shareholders within a banking business model characterized by a maturity mismatch between assets and liabilities [Dermine and Bissada, 2002]. The analysis of this gap is a long-standing concern for both bank regulators and management, yet it is only relatively recently that focused risk management approaches have been developed to address it explicitly [BIS, 2015]. Beyond regulatory compliance, bank managers are increasingly attentive to strategic decisions surrounding funding and pricing, particularly through the implementation of fund transfer pricing methodologies designed to align the cost of funding with lending rates. Historically, banks have not been required to estimate or report the duration of their assets and liabilities, nor the duration gap between them. [Drechsler et al., 2021] proposes two approaches to approximate these durations, relying on repricing maturities derived from balance sheet data, and supplementing these estimates—when necessary—with asset duration estimates based on replicating portfolios that track banks' interest income. We adopt a similar methodology to estimate repricing maturities using aggregate balance sheet data for a group of Latin American countries: Argentina, Brazil, Colombia, Chile, Peru, and Mexico. We reconstruct the

[1] When short-term interest rates are high, the spread paid on deposits increases as the opportunity cost of holding cash rises. This reduces competition from other financial assets and dampens aggregate deposit outflows. Conversely, when interest rates are low, the opportunity cost of holding cash declines, spreads narrow, and competition among banks for deposits intensifies.

[2] [Wang et al., 2022] show that in low interest rate environments—when cash is highly substitutable with deposits and, consequently, market power is lower—an expansionary monetary policy can lead to a contraction in lending. As the policy rate falls, banks' profitability declines due to narrower deposit spreads, reducing capital accumulation and making capital regulatory constraints more binding.

repricing maturity of liabilities exclusively from balance sheet data by identifying the share of term deposits and investments. In some countries, such as Peru and Argentina, we also account for U.S. dollar-denominated term deposits. Non-maturing deposits are assigned a maturity of zero and excluded from our calculations. Term deposits are categorized into six maturity buckets, with midpoint durations of $0.1, 0.6, 2, 4, 10$, and 20 years. For investments, we assume a fixed duration of five years. Although balance sheet data is insufficient to fully validate this assumption, investments generally represent a small share of total liabilities—between 1% and 6%—except in Chile, where the average is approximately 18%. Figure 1 presents the estimated repricing maturities of liabilities (in blue, left y-axis), based on available information on term deposit structures. The average estimated repricing maturities (in years) are: Colombia (0.20), Argentina (0.24), Peru (0.39), and Chile (0.97). The higher value for Chile reflects the presence of bank-issued bonds among liabilities. For comparison, [Drechsler et al., 2021] reports a liability repricing maturity of 0.34 years for U.S. banks. Additionally, data from the Central Bank of Brazil on loan repricing maturity (*Prazo médio da carteira de crédito*) show an increase of approximately one year in average loan maturity between 2011 and 2024, reaching 4.11 years in 2024. Reporting the maturity structure of assets and liabilities is not yet standard practice among Latin American banks—particularly with regard to loans—but this is likely to change in light of emerging regulatory requirements concerning interest rate risk in the banking book. An alternative approach to estimating asset repricing maturity involves constructing a replicating portfolio that tracks interest income, derived from balance sheet and income statement data. The goal is to model a portfolio composed of the central bank policy rate (representing a minimum funding rate) and the return on a basket of representative domestic bonds—preferably with maturities exceeding three years—serving as a proxy for the expected return on longer-term investments. The estimated weight of the bond portfolio component represents the share of long-term assets (e.g., loans) on banks' balance sheets. The asset repricing maturity is then calculated by multiplying this weight by the effective duration of the bond portfolio. Two types of bond indexes are used. The first is the FTSE Latin American Government Bond Index (LATAMGBI), covering 65 bonds across Brazil, Chile, Colombia, Mexico, and Peru, with an effective duration of 5.05 years. The second consists of country-specific bond indexes provided by Bloomberg, with durations ranging from 5.65 to 6.58 years.[3] We estimate the optimal tracking portfolio using a constrained linear regression model, where the interest income ratio is regressed on the minimum funding rate and the bond portfolio return, with weights restricted to sum to one. Monthly data from January 2001 to December 2024 is used, except for Brazil, where interest income data is available only quarterly. Note that the LATAMGBI begins in September 2011, while the country-specific indexes are available from 2001 onward. Our results indicate the following estimated asset repricing maturities (in years): Argentina (3.19), Brazil (2.95–3.43), Colombia (2.08–3.05), Chile (3.7–5.26), Peru (2.06–3.50), and Mexico (1.80). By comparison, [Drechsler et al., 2021] reports a U.S. asset repricing maturity of 3.78 years (replicating portfolio) and 4.23 years (balance sheet data).

These findings highlight significant cross-country heterogeneity in the duration of

[3] For Argentina, bond portfolio information is unavailable; therefore, estimates rely exclusively on the LATAMGBI.

assets and liabilities. The implied average duration gaps are: Argentina (2.95 years), Colombia (2.37), Chile (3.5), and Peru (2.39). Due to data limitations, we are unable to estimate duration gaps for Brazil and Mexico. As in the U.S., the existence of a duration gap—indicative of a maturity mismatch—poses a key management challenge, underscoring the importance of interest rate risk oversight for banks across the region.

4 Empirical results

We constructed a representative sample comprising 393 commercial banks operating in Latin America. The dataset includes annual balance sheet and income statement data spanning the period from 2000 to 2023. To ensure consistency and reliability, only banks with at least ten years of available data were included, with the average bank in the sample having 15 years of data. The primary source for bank-level financial data is Moody's BankFocus dataset. Additionally, central bank policy rates and other macroeconomic indicators, such as inflation and exchange rates, were obtained from multiple sources, including national central banks, the Bank for International Settlements (BIS), the International Monetary Fund (IMF), and the World Bank.

4.1 Sensibility of the net interest margin (NIM)

Interest rate risk in commercial banks has been a key concern for regulators, as discussed in Section 2. In particular, unexpected interest rate shocks affect bank margins to varying degrees depending on the composition of assets and liabilities and their respective repricing sensitivities. In the short term, such fluctuations influence profitability and the overall economic value of financial institutions. A robust banking business model requires effective risk management strategies to mitigate these impacts. One critical area of concern is the effect of central bank policy rate changes on net interest margins (NIM).

Most Latin American economies have made significant progress since the volatile decades of the 1980s and 1990s, which were marked by currency and banking crises across the region. In recent years, macroeconomic conditions have generally stabilized, although substantial challenges persist—notably low productivity, sluggish growth, and persistent fiscal imbalances—many of which were further exacerbated by the COVID-19 pandemic [Goldfajn and Yeyati, 2021]. With respect to monetary policy, the majority of large economies in the region have adopted inflation targeting regimes, with the notable exceptions of Argentina and Venezuela. Bolivia and Suriname continue to implement monetary aggregate targeting frameworks, while most Caribbean countries—as well as Ecuador, El Salvador, Honduras, and Nicaragua—maintain exchange rate anchors to the U.S. dollar. Since 2000, the region has largely avoided systemic banking crises, with the exception of Argentina, and has navigated several major macroeconomic shocks—including the global financial crisis, commodity price volatility, and the pandemic—through a diverse set of monetary policy responses.

Despite the changing monetary policy in the last 25 years observed in most Latin American economies, aggregate NIM has remained relatively stable across most countries, averaging approximately 4.93%. In most regions, NIM remains below 10%, with notable exceptions including Peru in the early 2000s and Argentina in recent years

(Figure 2). However, NIM at the individual bank level exhibits significantly greater variability. Figure 2 illustrates this heterogeneity by defining a range of NIM variation (light blue area), represented by the maximum and minimum NIM values observed among institutions within a given country or region for each year. This suggests that, while aggregate NIM is relatively stable over time, substantial differences exist among individual banks.

Over the same period, central bank policy rates—serving as a benchmark for institutional funding—have exhibited considerable variation. In most countries, policy rate fluctuations have ranged between 2% and 12%, except in Brazil, where rates have periodically ranged between 15% and 17.5%, and Argentina, where they have exceeded 20% at certain times. The temporal evolution of policy rates does not demonstrate a significant correlation with aggregate NIM, and even extreme NIM movements at individual banks do not align with fluctuations in policy rates.

Further examination of NIM components, including interest income and interest expenses as ratios of earning assets and consumer deposits, respectively, indicates similar trends. Across Latin American countries, these rates average 10.88% and 7.15%, respectively, and remain stable over time within each region. However, variability is more pronounced in specific cases, such as Brazil and Argentina, where both rates exceed 10% and exhibit greater within-bank fluctuations. A comparison of the standard deviation of NIM and the central bank policy rate reveals that the latter is substantially more volatile. Specifically, the policy rate standard deviation is at least five times that of NIM in Colombia, Chile, and Mexico; approximately three times in Brazil and Caribbean economies; and nearly ten times in Argentina. These findings suggest that NIM volatility is largely independent of central bank rate fluctuations, underscoring the presence of other factors driving bank-level margin dynamics.

4.2 Individual Bank Betas and characteristics

Using individual bank-level data, we adopt a conventional approach to estimate bank-specific betas that capture the sensitivity of various implicit rates—net interest margin (NIM), interest expenses, interest income, return on assets (ROA), and bank stock price returns—to changes in the central bank policy rate.

Let $\Delta y_{i,t}^k$ denote the annual variation in indicator k for bank i, and let Δr_t^{po} represent the annual change in the central bank policy rate. We estimate the following regression,

$$\Delta y_{i,t}^k = \alpha_i + \beta_i^k \Delta r_t^{po} + \varepsilon_{i,t}.$$

Then coefficient β_i^k measures the interest sensitivity of NIM (β_i^{nim}), interest expenses (β_i^{exp}), interest income (β_i^{inc}), ROA (β_i^{roa}), and bank stock returns ($\beta_i^{r_{i,t}}$) to policy rate changes.

Figure 3 compares the estimated expense betas for Latin American banks (up to 2023) with those for U.S. banks, as reported by [Drechsler et al., 2021] and updated through the same period.[4] The distribution of expense betas for Latin American banks is shifted to the left, indicating lower average values relative to their U.S. counterparts, while also exhibiting a wider and longer tail, suggesting greater dispersion and the presence of extreme estimates for some institutions. The average (standard deviation)

[4]The updated expense betas are obtained from the authors.

expense beta for Latin American banks is 9.99% (21%), compared to 34.87% (6.99%) for U.S. banks. Similarly, [Andersen and Engelund, 2024] reports an estimated average expense beta of 40% (standard deviation: 39%) for Euro area banks based on data from 1999 to 2023. This suggests that a 100 basis point (bp) increase in the central bank policy rate is associated with an increase in interest expenses of approximately 35–40 bp in the U.S. and Europe, whereas the corresponding increase for Latin American banks is around 10 bp.

Overall, the estimated expense betas for Latin American banks are lower than those observed for banks in the U.S. and Europe, with greater cross-sectional variation across institutions. Figure 4 presents the distribution of expense betas by country and region within Latin America. Chile exhibits the highest average beta (27.93%), followed by Brazil, Colombia, and Mexico, with values around 20%. In all other regions, the average expense beta is below 10%.

The estimated income, NIM, and ROA betas are 12.78%, 4.95%, and 8.43% (median: 3.85%), respectively. In comparison, [Drechsler et al., 2021] reports corresponding values of 35.1%, 0.6%, and 3.2% for U.S. banks. The relatively larger NIM betas for Latin American banks suggest an incomplete hedge against interest rate risk. Additionally, ROA betas exhibit greater dispersion across institutions, with the presence of outliers significantly influencing the average, although the median is close to the U.S. value, meaning that most banks mitigate any impact on profitability. Furthermore, ROA betas are not significantly correlated with expense betas (negative but not statistically significant), while they exhibit a positive correlation of 17–26% with income betas (Figure 6).

Our findings suggest that Latin American banks rely on their banking franchise to mitigate interest rate risk. First, deposits constitute a substantial portion of their liabilities, averaging 80% across countries and regions, except in Brazil, where this share is closer to 65%, resembling the structure observed in U.S. banks. Second, following the interest rate risk hedging framework of [Drechsler et al., 2021], Latin American banks appear to hedge policy rate fluctuations effectively due to the co-movement between interest income and expense betas. The correlation between these two betas ranges from 39.3% to 54.2%, depending on whether Spearman or rank correlation is used, and is statistically significant in both cases. The fitted regression line between interest income and expense betas (Figure 5) has a slope of 0.78, closely matching the U.S. estimate of 0.81. However, despite this hedging mechanism, significant variation in net interest income and overall net income remains (ROA), particularly when examining cross-sectional differences across regions. In Chile and Mexico, income betas are 33% and 44%, respectively, while in Brazil, Peru, and Central American economies, they range between 10% and 15%. In other regions, income betas are below 10%, leading to NIM and ROA betas generally below 10%, except in Mexico, where these values are 17% and 12%, respectively.

Unlike in the U.S., most Latin American bank stocks are not publicly traded in local or international markets. Among our sample, only 64 banks are publicly listed. For these banks, we estimate an average stock return beta of −1.92%, compared to −4.24% for U.S. banks, as reported by [Drechsler et al., 2021].

Interest income and expense betas for Latin American banks generally exhibit low sensitivity to central bank policy rate changes, with values significantly lower than those observed for North American and European counterparts. This suggests that

Latin American banks leverage their banking franchise to insulate their net interest income and overall profitability from policy rate fluctuations. However, substantial variation among institutions indicates that some banks are better positioned than others to benefit from this advantage and, consequently, are less exposed to interest rate risk.

The extent to which banks maintain their franchise value depends on country-specific market conditions and the associated costs (Figures 7 to 10). The theoretical and empirical literature has yet to provide a comprehensive framework to analyze these factors simultaneously. Using bank-level data, we explore correlations between key variables, particularly expense betas. First, we examine the relationship between bank size and interest rate sensitivity. For interest expenses, the correlation with bank size ranges from 16% to 26%, while for interest income, the correlation is not statistically significant (Figure 7). [Drechsler et al., 2021] suggests that larger banks hold a greater share of wholesale deposits, thereby increasing their sensitivity to market rates, whereas interest income remains relatively stable due to the prevalence of fixed-rate loans. An alternative measure of size—the number of employees—also shows a positive and significant correlation of 14–21% with expense betas (Figure 8).

Next, we examine the relationship between bank overhead costs, measured as the ratio of operating expenses to total income, and interest expense betas. The correlation is negative (-7.43% to -12.89%) and statistically significant (Figure 9), suggesting that higher overhead costs—potentially reflecting greater investment in physical infrastructure such as branches and ATMs—may help sustain the banking franchise. However, this evidence is inconclusive, as the correlation is relatively weak, and a considerable degree of heterogeneity exists within banks exhibiting overhead ratios between 25% and 50%. Finally, we analyze the relationship between market share in deposits and interest expense betas. The correlation is between -6.88% and -13.2% and is statistically significant, suggesting that banks with larger market shares can maintain lower deposit costs. However, significant heterogeneity persists among banks with market shares below 5%.

Overall, no single factor fully explains the cross-sectional heterogeneity in interest expense betas among Latin American banks. The empirical evidence suggests that cost structures and market conditions contribute to the maintenance of a strong banking franchise. We estimate a regression of interest expense betas on bank size, overhead costs, and deposit market share (Table 1). The results indicate that a 10% increase in overhead or market share reduces the expense beta by 2.5%. When including country-fixed effects, only the overhead coefficient remains statistically significant. Therefore, a 10% increase in overhead reduces the beta expense by 3.13%; in other words, higher administrative costs related to physical or service amenities for customers increase the bank franchise.

4.3 Country and region Betas

To complement the individual bank-level estimates, we conduct panel regressions across regions and countries, as well as for the full sample of Latin American banks. Panel estimation offers several advantages over individual bank estimates. First, by pooling data across countries and regions, we significantly increase the number of observations, enhancing the statistical consistency and power of our analysis. Second, panel models allow for the inclusion of relevant control variables that account for heterogeneity in macroeconomic conditions and banking industry dynamics across the region. Incorporating these controls leads to more credible estimates of overall sensitivities, improving the robustness and generalizability of the findings.

We start with the econometric specification for the full sample of Latin American banks. An unbalanced panel with macro controls, bank and year fixed effects. We estimate the following equation,

$$\Delta y_{i,c,t} = \alpha_i + \mu_t + \sum_{\tau=0}^{1} \beta_\tau \Delta r^{po}_{t-\tau} + X_{c,t}\Theta + e_{i,c,t}.$$

Where $\Delta y_{i,c,t}$ is the change in interest expenses of bank i, in country c from t to $t+1$, normalized by bank i's period's t total assets; α_i is bank fixed effects and captures unobserved and constant heterogeneity across banks; μ_t is year fixed effects and takes into account global common shocks; while $X_{c,t}$ is a vector of macro controls at the country level and includes inflation, GDP growth, and exchange rate depreciation/appreciation, which helps to control for the idiosyncratic macro conditions of country c at period t. The variable of interest is $\Delta r^{po}_{t-\tau}$ which is the change in the policy rate of central bank in country c from t to $t+1$. We include one period lag to allow for a two-year cumulative effect. We run analogous regressions for interest income, net interest income, derivatives (all normalized by total assets), the log of stock prices, and the log change of deposits and net loans as independent variables. All standard errors clustered at the bank-level. Alternatively, we cluster our standard errors at the country level.

On average, for LAC banks, an increase in the policy rate associates with higher interest expenses. The cumulative effect of a 100 bps increase in the policy rate after two years is a 12 bps increase in interest expenses (Table 2, column 7). Results are robust to the different combinations of country, year, bank fixed effects and inclusion/exclusion of macro-controls. A 100 bps increase in the policy rate raises interest rate expenses by 9 to 15.5 bps depending on the econometric specification (Table 2, columns 1 to 7). Compared to individual bank expense betas, the range provided by our panel estimates contains the average expense beta for Latin America (9.99%).This suggests that, despite significant heterogeneity across and within banks, the average of the bank-level time series betas tends to converge toward the panel estimate under certain conditions. However, this convergence reflects an aggregation and does not imply homogeneity of effects across banks.

With respect to interest income, we do not find robust evidence of a statistically significant association with the policy rate. The only econometric specification in which we find a positive and statistically significant relationship between these variables is the one in which we do not include any type of fixed effect or macro control (Table 3, column 1). On average, for Latin American banks, the cumulative effect of a 100 bps increase in the policy rate after two years is a 7 bp increase in interest income. When compared to bank-level income betas, this value is similar to those estimated for banks located in the Caribbean.

Consistent with the previous results, we find that on average, a hike in the policy rate associates negatively with net interest income of banks in Latin America. A 100 bps increase in the policy rate decreases net interest income by 9 to 14.4 bps, depending on the econometric specification (Table 4, columns 1 to 7).

Overall, on average, Latin American banks seem to have an incomplete hedge against interest rate risk, as the sensitivity of their net interest income with respect to the policy rate is very low.

As for stock returns, we find that on average a 100 bps increase in the policy rate decreases bank stock price by 1.5 to 1.7% (Table 5, columns 1-6). Very close to the average stock return beta (-1.92%) calculated from the individual bank betas. Nevertheless, once we control for macro variables and year and bank fixed effects, the policy rate has a positive but small effect on stock returns. A 100 bps increase in the policy rate increases stock returns by 0.5% (Table 5, column 7). A counterintuitive result.

Now, following the results of bank-level betas for deposit franchise proxies, we want to test, using our panel estimates, how effective overhead costs are as a proxy. From a theoretical point of view, [Drechsler et al., 2021] shows that the deposit franchise functions like an interest rate swap, where the bank pays the fixed leg and receives the floating leg. The fixed leg represents the operating cost the bank incurs to obtain market power, proxied here by overhead, while the floating leg is the interest spread it charges depositors by paying them a low deposit rate. The value of the deposit franchise can then be viewed as the net present value of this swap (the present value of the floating leg minus the fixed leg). As with any interest rate swap, this value is exposed to interest rate changes. In particular, an increase in interest rates causes the present value of the fixed leg to fall, and since the swap is short the fixed leg, the value of the deposit franchise rises. Thus, the deposit franchise has positive exposure to interest rates; equivalently, it has negative interest rate duration. However, for this to hold, the operating cost must not fluctuate with the policy rate. We find a negative relationship between the policy rate and overhead costs (Table 6, columns 1 to 6); however, once we control for macro variables, as well as bank and year fixed effects, this relationship disappears (Table, 6 column 7). Therefore, overhead costs resemble a long-term fixed-rate liability that helps banks naturally hedge against interest rate risk by providing long-term, fixed-rate credit to firms and households and by investing in long-term, fixed-rate securities. In regard to the floating leg of the interest rate swap, we run a regression in which the the change in interest expenses (as defined before) is a function of the change in the policy rate, overhead and their interaction (Table 7, columns 1 to 7). No matter the combination of bank, country, year fixed effects and macro controls, we find a negative effect of the interaction between overhead and the policy rate. For a positive change in the policy rate, the bigger the overhead cost payed by the bank, the lower the interest expense. The bigger the deposit franchise, the larger the interest spread charged on depositors.

The aforementioned natural hedge is a good explanation for why banks in the US do not seem to use interest rate derivatives [McPhail et al., 2023]. Leveraging on our panel estimates, we want to test if this is also the case for Latin American banks. We run a similar regression in which the derivatives on the asset (or liability) side of balance sheets are a function of the policy rate. With respect to the derivatives on the asset side, we find that a 100 bps increase in the policy rate increases derivatives by 2 to 3 bps (Table 8, columns 3 and 6). Nevertheless, once we control for the exchange rate, the policy rate is no longer statistically significant (Table 8, columns 2, 4, 5 and 7). A 10 percent depreciation increases derivatives by 0.25 to 0.45 bps. Derivatives on the liability side increase by 4 to 4.5 bps with an increase of 100 bps in the policy rate (Table 9, columns 3 and 6). However, once we control for the exchange rate, the coefficient on the policy rate swaps sign: a 100 bps increase in the policy rate decreases derivatives by 5 to 7 bps, while a 10 percent depreciation increases derivatives by 0.15 to 0.7 bps (Table 9, columns 2, 4, 5 and 7). This evidence suggests that Latin American banks primarily use derivatives to hedge against foreign currency mismatches and exposure to exchange rate shocks, rather than to manage interest rate risk. This aligns with the findings of the Triennial Central Bank Survey [BIS, 2022] on over-the-counter derivative markets. In emerging markets across Latin America and Asia, the average daily turnover in foreign exchange (FX) derivatives reached 58 billion and 357 billion USD, respectively. In contrast, the average daily turnover in interest rate derivatives was considerably lower, at 11 billion and 44 billion USD, respectively.[5] By comparison, in the United States and Europe, the average daily turnover in FX and interest rate derivatives markets does not differ significantly.

Finally, we use the panel estimations with the full sample of banks to test for the transmission of monetary policy in Latin America. [Drechsler et al., 2017] document the deposit channel of monetary policy for the US. When the Fed funds rate rises, banks widen the spreads they charge on deposits, and deposits flow out of the banking system. Since banks rely heavily on deposits for their funding, these outflows induce a contraction in lending [Li et al., 2023]. Intuitively, when the central bank raises the Fed funds rate, cash becomes more expensive to hold, and this allows banks to raise deposit spreads without losing deposits to cash. Households respond by reducing their deposit holdings, and deposits flow out of the banking system and into bonds. Using our panel of Latin American Banks we test for the deposit outflow and for the consequent contraction in net loans. On average, a 100 bps increase in the policy rate increase the deposit outflows by 0.7 to 1.3 bps (Table 10, columns 1 to 7) and cuts net loans by 1.1 to 1.8 bps (Table 11, columns 1 to 7). This is evidence for the presence of the deposit channel of monetary policy in Latin American banks[6]. In comparison to the US, the effect on deposit outflows and contraction on loans in Latin America is somewhat smaller. [Drechsler et al., 2017] document that in the US a 100 bps hike in policy rates causes a contraction in deposits of 20 bps (in high concentration counties). With respect to loans, when the Fed funds rate rises, banks that raise deposits in more concentrated markets reduce lending relative to banks that raise deposits in less concentrated markets: a one standard deviation increase in [Drechsler et al., 2017] measure of banking concentration reduces lending by 291 bps per 100 bps increase in the Fed funds rate.

Now lets move on to our region and country level panels. We run separate panel regressions at the country and region level in order to better capture the heterogeneity of the macro conditions that might influence the behaviour of banks. We run an

[5] The reported data corresponds to the most recent observations available in the 2022 survey.

[6] It is important to highlight some short-comings of our estimations. The first one is that the our dependent variables do not capture the marginal deposits and net loans but the log change in stocks. Therefore, the reduction in the stock might be not only a consequence of a decision of the bank, but also may be capturing the fact that deposits and net loans' contracts are reaching maturity. A second short-coming relates only to the log change in net loans. On average, the coefficient of these regressions are around 0.5 bps bigger than their deposit out-flows counterpart. This may signal that these coefficients might also be capturing the demand driven reduction in net loans as a consequence of the hike in interest rates.

unbalanced panel with bank fixed effects and macro controls for each country/region:

$$\Delta y_{i,t} = \alpha_i + \sum_{\tau=0}^{1} \beta_\tau \Delta r^{po}_{t-\tau} + X_t\Theta + e_{i,t}.$$

Where $\Delta y_{i,t}$ is the change in interest expenses (or interest income, or net interest income) of bank i from t to $t+1$ (all normalized by bank i's period's t total assets); α_i bank fixed effects; $\Delta r^{po}_{t-\tau}$ the change in the policy rate from t to $t+1$ (we introduce one period lag to allow for a two-year cumulative effect); and X_t a vector of macro controls, which include inflation, GDP growth, exchange rate depreciation/appreciation and US percentage changes in its policy rate, all in period t.

With respect to interest expense beta we observe a lot of heterogeneity (Figure 11). The positive betas range from 0.18 in the Caribbean to 0.81 in Brazil. Chile (0.53), Mexico (0.56), and Colombia (0.67) also having larger expense betas in relation to the US (0.35). Peru (0.26) and other Central (0.27) and South American (0.34) countries present smaller betas with respect to the US. On general terms, in comparison to the average expense beta from the bank-level regressions, we find that our country and region betas are much bigger in absolute magnitude. This might be a consequence of not weighting in our country and region regressions by the importance of each bank in terms of market share, assets or overhead costs. Therefore, all banks weight the same: the smallest banks with the highest and most sensitive interest expenses provide the same information as the largest banks with the lowest and less sensitive interest expenses, pulling the country and regional betas upward[7].

As a result, we carry out three alternative estimations. We run the exact same specification using Generalized Least Squares (GLS), which excludes bank fixed effects, and two within estimations (demeaned OLS, as in the benchmark), weighted by assets and by overhead. As stated before, we acknowledge that our results might be driven by heteroskedasticity in the error structure. GLS corrects our estimations by giving equal importance to all observations, regardless of their residual variance. Our intuition is that banks with stronger deposit franchises experience smaller shocks to their deposit expenses, and therefore exhibit lower residual variance. GLS will then place more weight on these observations, pulling our estimated betas closer to what these banks experience—a more muted pass-through—potentially lowering the size of the coefficients. Nevertheless, GLS does not reveal the source of the heterogeneity in residual variance. To test our intuition, we run the within estimations weighted by total assets and overhead, which we consider our best proxies for deposit franchise strength.

Figure 11, shows how our GLS estimations reduce the betas by between 2 and 24 percentage points (excluding Argentina, where the beta increases by 1 percentage point in absolute magnitude). When we compare the GLS betas with the within estimators weighted by assets and overhead, we find that our intuition may be confirmed for banks in Colombia, Mexico, Brazil, Peru, and other Central American countries. For other countries, these estimates are sometimes even larger than those from the benchmark estimation. This may suggest that the upward bias observed in some countries is driven by country-specific characteristics that are not fully captured by our macroeconomic control variables.

[7] We also do not winsorize the observations in the country and region regressions, while in the bank-level regressions we winsorize the bank-level betas at 5%.

Interest income betas also present a wide range, but very similar to the interest expense betas (Figure 12). Positive betas range from 0.22 in Chile to 0.85 in Colombia. Brazil (0.64), Mexico (0.5), other South (0.39) and Central (0.37) present larger income betas in comparison to the US (0.35). Caribbean countries and Peru present smaller betas. In this case, the GLS betas are smaller in absolute value for Argentina, Caribbean, Other South America, Other Central America, Peru, Colombia and Brazil. Our intuition seems to be validated for Other Central America, Peru, and Brazil, where the GLS estimates are the closest to the within estimation coefficients.

Consistent with these previous results we find that in general terms, the net interest income betas are small in absolute magnitude and close to zero (Figure 13), but bigger in relation to the US beta (0.06). Brazil, Argentina, Chile and Mexico present negative betas that range between -0.31 and -0.06. Peru, Caribbean other South and Central countries, and Colombia present positive betas that range between 0.05 and 0.2. These results point out to a partial hedge against short-term interest rate movements for banks in Latin America. With respect to the GLS estimates, we find that they are smaller in absolute value for Brazil, Argentina, Chile, Other Central America and Colombia. Our intuition seems to be validated by the within estimators of Chile and other Central American countries.

5 Conclusions

Maturity transformation lies at the core of commercial banking. It is typically measured by the duration gap—the difference between the average duration of assets and liabilities. Empirical estimates show that this gap is generally positive: in the U.S., it averages around 3.4 years [Drechsler et al., 2021]. In several Latin American countries such as Argentina, Colombia, and Peru, the gap is shorter—typically below three years—reflecting generally shorter asset and liability durations. Chile, however, is a notable exception. Its well-developed domestic bond market provides banks with access to longer-term, stable funding, resulting in a duration gap comparable to that of U.S. banks.

The duration gap exposes banks to interest rate risk, a vulnerability that has drawn increasing attention from regulators. Recent regulatory frameworks in both the U.S. and the European Union emphasize assessing the impact of interest rate shocks on banks' economic value of equity (EVE) and net interest margins (NIM) over a one-year horizon. These regulatory concerns are now becoming central in Latin American jurisdictions as well.

A key structural driver of the duration gap is the predominance of non-maturing deposits, which in some banks account for 60–80% of total liabilities. These deposits, while inherently uncertain in their maturity structure, tend to have low and relatively sticky interest rates. This characteristic—often referred to as the deposit franchise—provides a significant hedge against interest rate risk. Studies such as [Drechsler et al., 2021] and [Andersen and Engelund, 2024] provide robust empirical evidence for the role of the deposit franchise in mitigating interest rate risk in U.S. and European banking systems, respectively.

Our findings indicate that banks in Latin America similarly benefit from a strong deposit franchise—potentially even under more favorable terms than their U.S. and

European counterparts. Nevertheless, significant heterogeneity exists across and within countries, warranting careful country-specific and bank-level analysis. This helps explain the relatively limited use of interest rate derivatives for hedging among some commercial banks, as the deposit franchise itself acts as a natural buffer.

Beyond its regulatory relevance, measuring the value of the deposit franchise and associated bank betas—which capture the sensitivity of bank income and expenses to central bank policy rates—is essential for strategic decision-making. These measures inform fund transfer pricing, the transmission of monetary policy, and competitive dynamics within the banking sector, especially in environments where deposit and loan pricing are interdependent.

Finally, while the banking industry is undergoing a profound technological shift—what some have referred to as a "third phase of fundamental transformation" [Thakor, 2020]—such innovations will only prove transformative if they fundamentally alter the nature of maturity transformation. Future research should prioritize identifying technological (or other) innovations that, like the deposit franchise, significantly reshape the core intermediation functions of banks.

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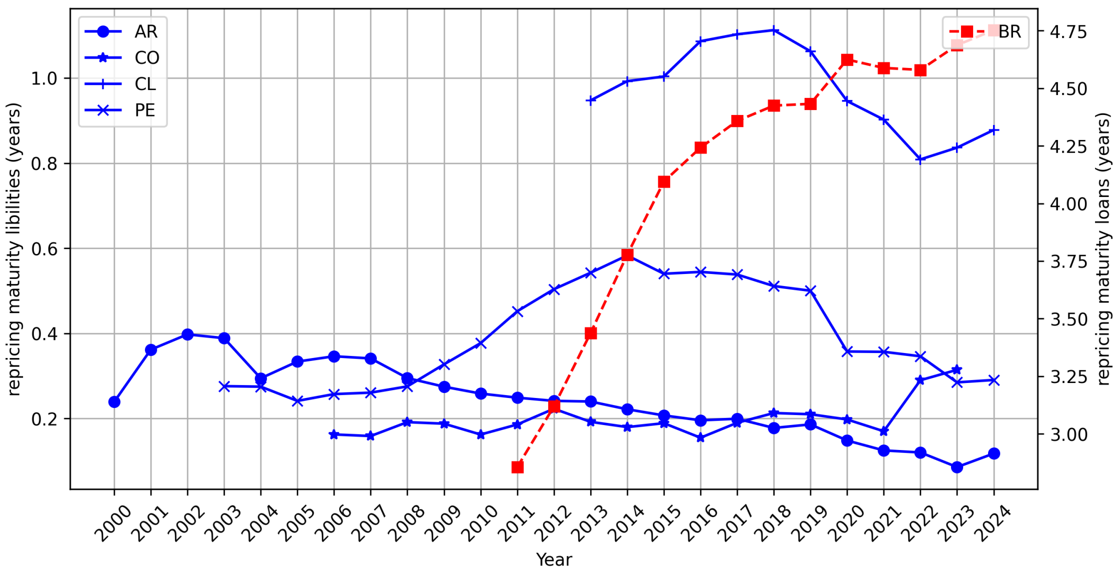

Figure 1: Evolution of repricing maturity for liabilities and loans (only Brazil) as estimated from the balance sheet and expressed in years. The repricing maturities for liabilities (left-hand side in blue) are estimated end-of-year balance sheet data for all commercial banks as reported by the bank regulators for Argentina (AR), Colombia(CO), Chile(CL) and Peru(PE). The repricing maturity of loans in Brazil(BR) (red dashed line) is estimated and reported monthly by the Central Bank.

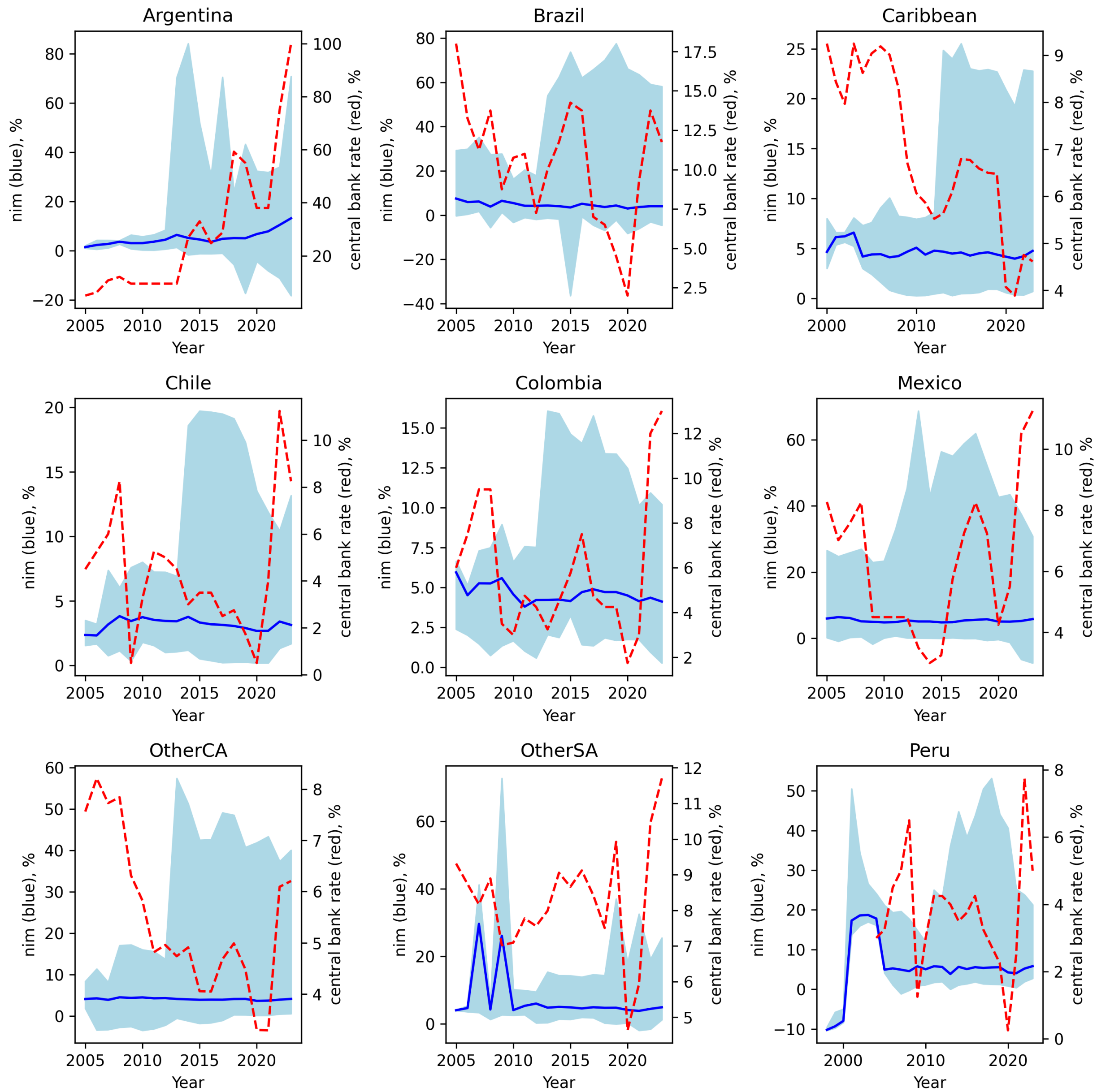

Figure 2: Time series of aggregate net interest margin (blue, thick line) and observed or average (for Caribbean economies, central American countries different from Mexico, and other South American countries) central bank policy rate (red, dashed line). The bounded area defined by light blue is determined by the maximum and minimum net interest margins estimated within the banks in the country or region sample at teach point in time.

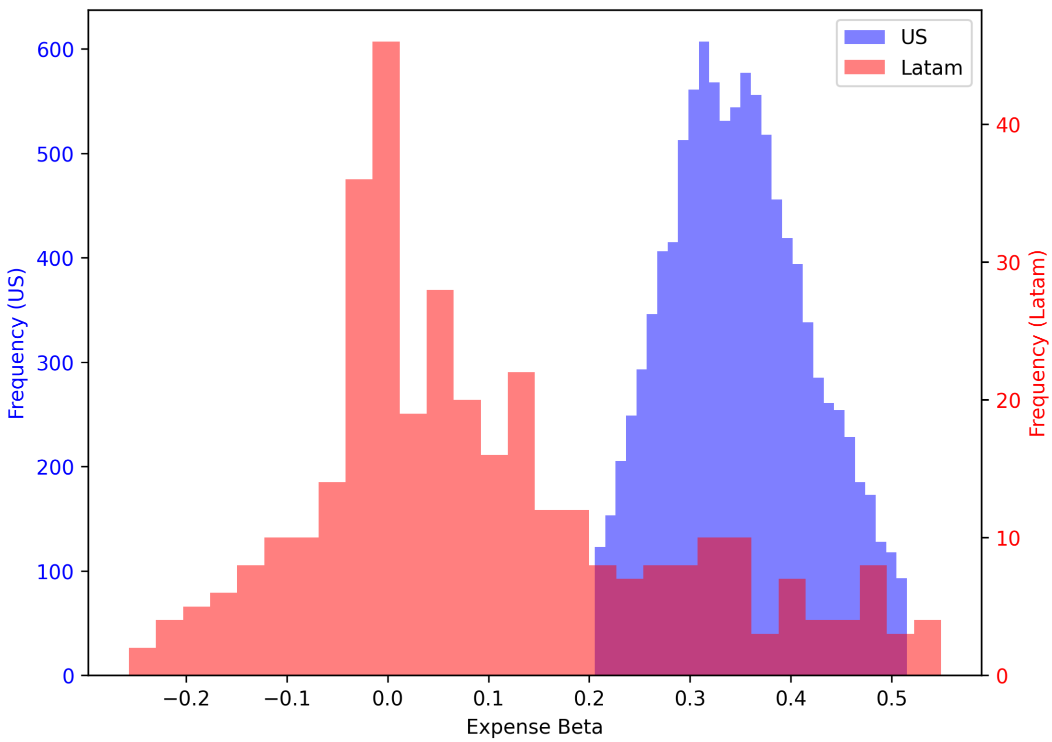

Figure 3: Distribution of interest expense betas for Latin American (red) and US banks (blue). For the US betas quarterly data is used for banks from 1984 to 2023. For Latin American banks estimated betas the sample is yearly from 2000 to 2023. The betas are winzorized at the 5% level.

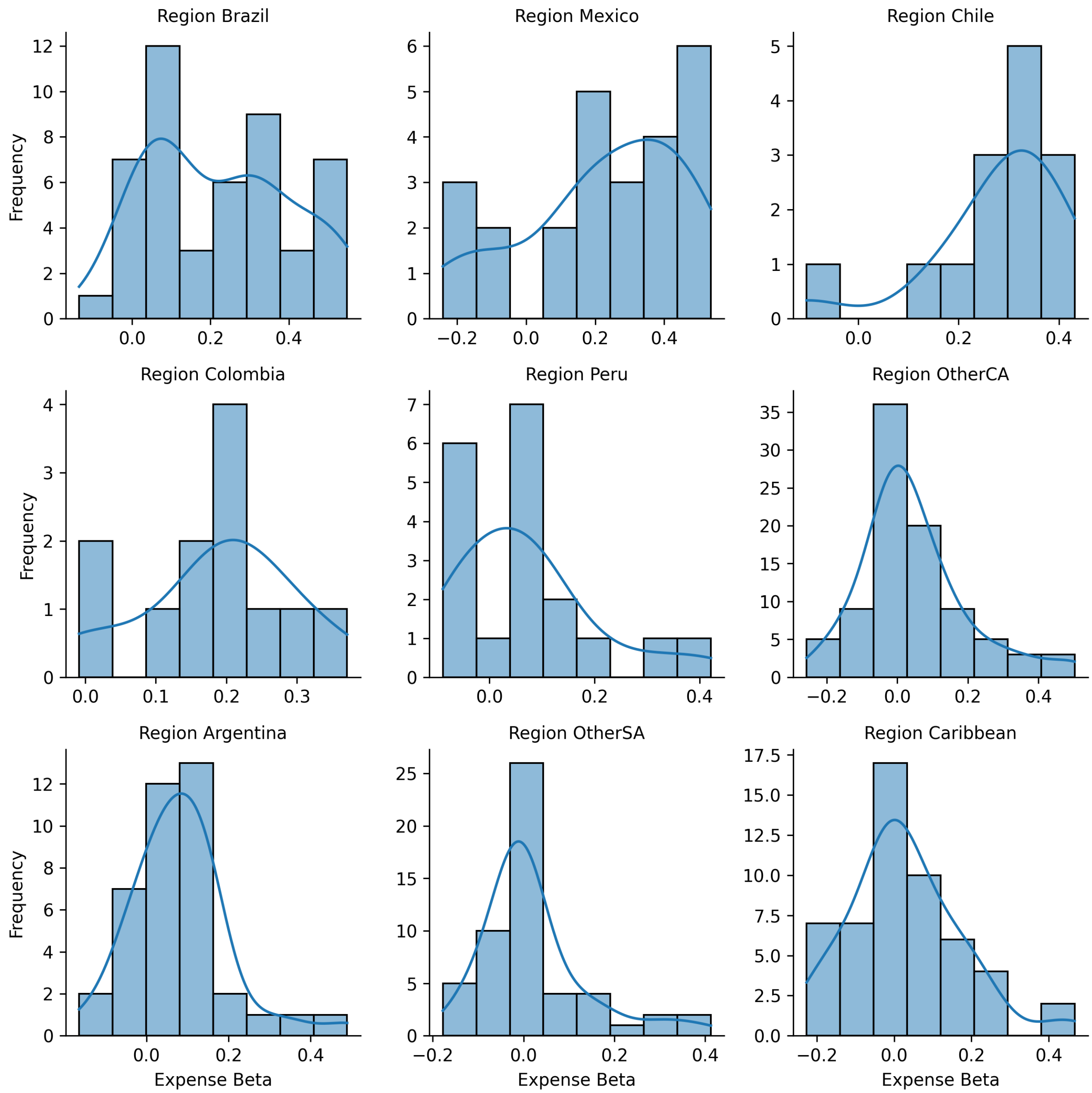

Figure 4: Distribution of interest expense betas for countries and regions in Latin American. OtherCA denotes central America except Mexico and Other South America (Ecuador, Uruguay, Venezuela, Bolivia, Guyana, Suriname) contains the information of other South American countries not explicitly considered. The betas are winzorized at the 5% level.

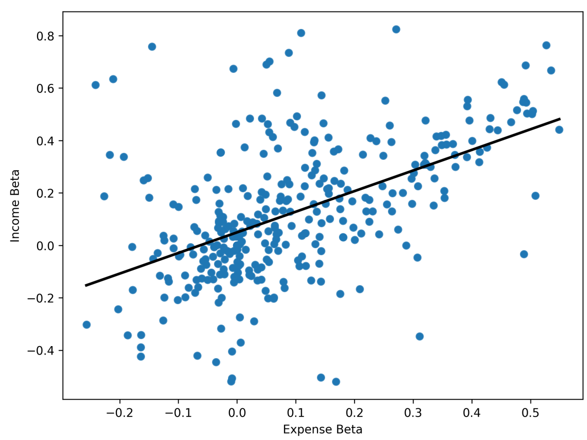

Figure 5: Interest expense and interest income beta.

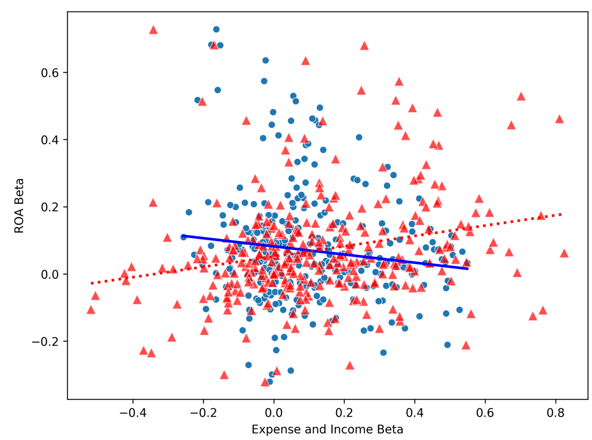

Figure 6: Interest expense, interest income and roa (net overall income) beta.

The scatter plots relate the estimates bank betas based on interest expenses, interest income and roa (net over all income). The right-side figure shows the estimated interest expense betas (in blue circles) and interest income betas (in red triangles). The betas are winzorized at the 5% level.

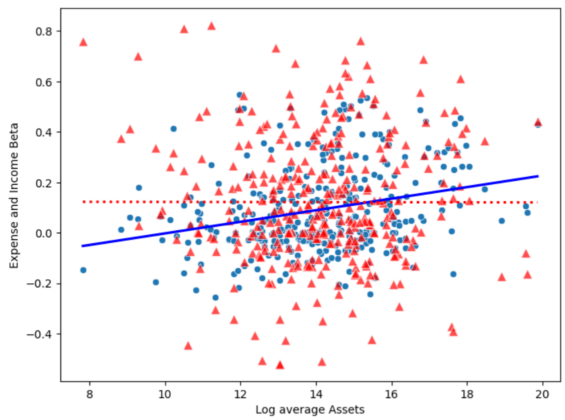

Figure 7: Bank size (assets) and expense, income betas

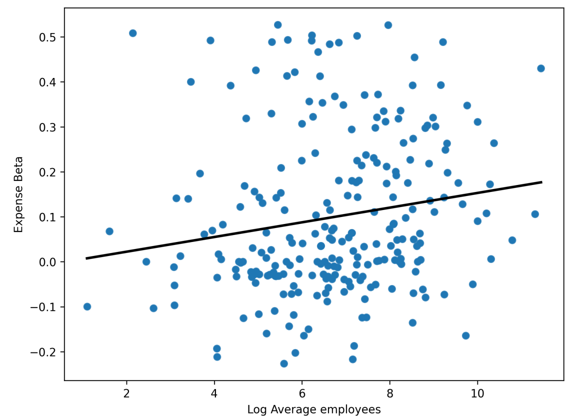

Figure 8: Bank size (employees) and expense betas

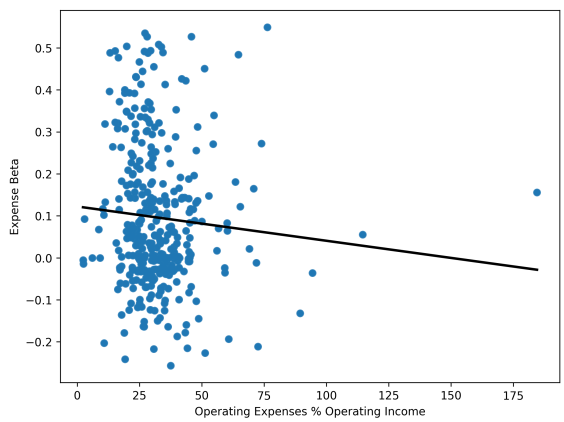

Figure 9: Overhead (overall income ratio) and expense betas

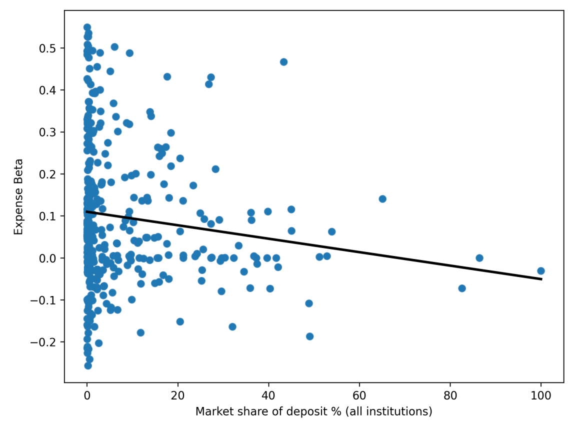

Figure 10: Market share % in deposits and expense betas

The scatter plot 7 explores the relationship between bank size measured in terms of assets and the estimated interest expense betas (in blue circles) and interest income betas (in red triangles). The additional scatter plots explore the relationship between the magnitude that banks can take advantage of bank franchise (low interest expense betas) and the cost and market power. The cost is measured in terms of the log of the average number of employees and overhead (measured as the ratio between total operating expenses and total income). For the market share of deposits, we include all deposit-taking institutions.

	β_i^{exp}	β_i^{exp}
log Assets	0.0234***	−0.00495
	(0.00621)	(0.0106)
overhead	−0.252*	−0.313*
	(0.112)	(0.146)
mkt share$_{dep}$	−0.248***	−0.0164
	(0.0615)	(0.123)
Constant	−0.143	0.158
	(0.110)	(0.111)
Country FE	NO	YES
Observations	232	232
R^2	0.127	0.384

Standard errors in parentheses
* ($p < 0.05$), ** ($p < 0.01$), *** ($p < 0.001$)

Table 1: The table presents the estimates of a cross-section regression of the individual bank expense betas, the bank size (measured as log of average assets), the overhead (measured as the average ratio of operating expenses over total income) and the market share of deposits.

VARIABLES	(1) $\Delta\text{IntExp}_{ict}$	(2) $\Delta\text{IntExp}_{ict}$	(3) $\Delta\text{IntExp}_{ict}$	(4) $\Delta\text{IntExp}_{ict}$	(5) $\Delta\text{IntExp}_{ict}$	(6) $\Delta\text{IntExp}_{ict}$	(7) $\Delta\text{IntExp}_{ict}$
$\Delta\text{CBPoRate}_{ct}$	0.0659	0.0525	0.0257	0.0484	0.0472	0.0291	0.0415
	(0.0116)***	(0.0130)***	(0.0139)*	(0.0131)***	(0.0126)***	(0.0148)**	(0.0136)***
	[0.0118]***	[0.0166]***	[0.0160]	[0.0145]***	[0.0155]***	[0.0158]*	[0.0159]**
$\Delta\text{CBPoRate}_{ct-1}$	0.0886	0.0931	0.0619	0.0881	0.0917	0.0607	0.0766
	(0.0174)***	(0.0205)***	(0.0195)***	(0.0199)***	(0.0195)***	(0.0200)***	(0.0219)***
	[0.0245]***	[0.0436]**	[0.0133]***	[0.0401]**	[0.0400]**	[0.0134]***	[0.0316]**
Bank FE	NO	NO	YES	NO	YES	NO	YES
Year FE	NO	NO	YES	NO	NO	YES	YES
Country FE	NO	NO	NO	YES	NO	YES	NO
Macro Controls	NO	YES	NO	YES	YES	NO	YES
Observations	4,332	4,188	4,332	4,188	4,188	4,332	4,188
Number of i	393	385	393	385	385	393	385
(Within) R^2	0.022	0.035	0.043	0.035	0.035	0.043	0.057

Standard errors in parentheses clustered at the bank level.
Standard errors in square brackets clustered at the country level.
*** p<0.01, ** p<0.05, * p<0.1

Table 2: The table presents the estimates of a panel regression of the change in interest expenses normalized by total assets, on the change in the policy rate and various fixed effects and macro controls. Standard errors in parenthesis are clustered at the bank level. Standard errors in square brackets are clustered at the country level (32 clusters).

VARIABLES	(1) $\Delta\text{IntInc}_{ict}$	(2) $\Delta\text{IntInc}_{ict}$	(3) $\Delta\text{IntInc}_{ict}$	(4) $\Delta\text{IntInc}_{ict}$	(5) $\Delta\text{IntInc}_{ict}$	(6) $\Delta\text{IntInc}_{ict}$	(7) $\Delta\text{IntInc}_{ict}$
$\Delta\text{CBPoRate}_{ct}$	0.0390	-0.0295	0.00762	-0.0392	-0.0396	0.00634	-0.0186
	(0.0264)	(0.0357)	(0.0340)	(0.0365)	(0.0365)	(0.0336)	(0.0409)
	[0.0146]***	[0.0209]	[0.0214]	[0.0169]**	[0.0179]**	[0.0210]	[0.0307]
$\Delta\text{CBPoRate}_{ct-1}$	0.0709	0.0470	0.0242	0.0324	0.0299	0.0238	0.0110
	(0.0323)**	(0.0411)	(0.0364)	(0.0422)	(0.0427)	(0.0370)	(0.0470)
	[0.0495]	[0.0788]	[0.0323]	[0.0766]	[0.0769]	[0.0326]	[0.0655]
Bank FE	NO	NO	YES	NO	YES	NO	YES
Year FE	NO	NO	YES	NO	NO	YES	YES
Country FE	NO	NO	NO	YES	NO	YES	NO
Macro Controls	NO	YES	NO	YES	YES	NO	YES
Observations	4,387	4,243	4,387	4,243	4,243	4,387	4,243
Number of i	394	387	394	387	387	394	387
(Within) R^2	0.002	0.009	0.017	0.009	0.009	0.017	0.018

Standard errors in parentheses clustered at the bank level.
Standard errors in square brackets clustered at the country level.
*** p<0.01, ** p<0.05, * p<0.1

Table 3: The table presents the estimates of a panel regression of the change in interest income normalized by total assets, on the change in the policy rate and various fixed effects and macro controls. Standard errors in parenthesis are clustered at the bank level. Standard errors in square brackets are clustered at the country level (32 clusters).

VARIABLES	(1) $\Delta\text{NetInc}_{ict}$	(2) $\Delta\text{NetInc}_{ict}$	(3) $\Delta\text{NetInc}_{ict}$	(4) $\Delta\text{NetInc}_{ict}$	(5) $\Delta\text{NetInc}_{ict}$	(6) $\Delta\text{NetInc}_{ict}$	(7) $\Delta\text{NetInc}_{ict}$
$\Delta\text{CBPoRate}_{ct}$	-0.0235	-0.0803	-0.0195	-0.0858	-0.0860	-0.0206	-0.0599
	(0.0257)	(0.0335)**	(0.0306)	(0.0343)**	(0.0344)**	(0.0305)	(0.0370)
	[0.0144]	[0.0125]***	[0.0205]	[0.0117]***	[0.0113]***	[0.0201]	[0.0214]***
$\Delta\text{CBPoRate}_{ct-1}$	-0.0159	-0.0454	-0.0367	-0.0557	-0.0580	-0.0369	-0.0626
	(0.0254)	(0.0324)	(0.0297)	(0.0341)	(0.0346)*	(0.0300)	(0.0388)
	[0.0255]	[0.0369]	[0.0200]*	[0.0379]	[0.0376]	[0.0203]*	[0.0355]*
Bank FE	NO	NO	YES	NO	YES	NO	YES
Year FE	NO	NO	YES	NO	NO	YES	YES
Country FE	NO	NO	NO	YES	NO	YES	NO
Macro Controls	NO	YES	NO	YES	YES	NO	YES
Observations	4,387	4,243	4,387	4,243	4,243	4,387	4,243
Number of i	394	387	394	387	387	394	387
(Within) R^2	0.001	0.005	0.008	0.005	0.005	0.008	0.010

Standard errors in parentheses clustered at the bank level.
Standard errors in square brackets clustered at the country level.
*** p<0.01, ** p<0.05, * p<0.1

Table 4: The table presents the estimates of a panel regression of the change in net interest income normalized by total assets, on the change in the policy rate and various fixed effects and macro controls. Standard errors in parenthesis are clustered at the bank level. Standard errors in square brackets are clustered at the country level (32 clusters).

VARIABLES	(1) Log(Price$_{ict}$)	(2) Log(Price$_{ict}$)	(3) Log(Price$_{ict}$)	(4) Log(Price$_{ict}$)	(5) Log(Price$_{ict}$)	(6) Log(Price$_{ict}$)	(7) Log(Price$_{ict}$)
ΔCBPoRate$_{ct}$	-0.0269	0.00365	-0.0173	0.00361	0.00361	-0.0176	0.00543
	(0.0130)**	(0.00341)	(0.00955)*	(0.00345)	(0.00341)	(0.00974)*	(0.00264)**
	[0.0224]	[0.00574]	[0.0172]	[0.00582]	[0.00576]	[0.0176]	[0.00218]**
ΔCBPoRate$_{ct-1}$	0.00519	0.00655	0.0188	0.00659	0.00659	0.0187	0.00407
	(0.0132)	(0.00451)	(0.0220)	(0.00454)	(0.00449)	(0.0222)	(0.00402)
	[0.0198]	[0.00533]	[0.0366]	[0.00538]	[0.00532]	[0.0368]	[0.00289]
Bank FE	NO	NO	YES	NO	YES	NO	YES
Year FE	NO	NO	YES	NO	NO	YES	YES
Country FE	NO	NO	NO	YES	NO	YES	NO
Macro Controls	NO	YES	NO	YES	YES	NO	YES
Observations	651	637	651	637	637	651	637
Number of i	66	63	66	63	63	66	63
(Within) R^2	0.025	0.159	0.103	0.159	0.159	0.103	0.236

Standard errors in parentheses clustered at the bank level.
Standard errors in square brackets clustered at the country level.
*** p<0.01, ** p<0.05, * p<0.1

Table 5: The table presents the estimates of a panel regression of the log of stock prices, on the change in the policy rate and various fixed effects and macro controls. Standard errors in parenthesis are clustered at the bank level. Standard errors in square brackets are clustered at the country level (32 clusters).

VARIABLES	(1) Overhead$_{ict}$	(2) Overhead$_{ict}$	(3) Overhead$_{ict}$	(4) Overhead$_{ict}$	(5) Overhead$_{ict}$	(6) Overhead$_{ict}$	(7) Overhead$_{ict}$
ΔCBPoRate$_{ct}$	-0.0742	-0.0471	-0.0601	-0.0409	-0.0403	-0.0600	-0.0328
	(0.0490)	(0.0289)	(0.0518)	(0.0286)	(0.0284)	(0.0521)	(0.0317)
	[0.0349]**	[0.0249]*	[0.0329]*	[0.0262]	[0.0260]	[0.0331]*	[0.0203]
ΔCBPoRate$_{ct-1}$	-0.223	-0.180	-0.167	-0.168	-0.168	-0.167	-0.0933
	(0.0213)***	(0.0581)***	(0.0274)***	(0.0581)***	(0.0578)***	(0.0273)***	(0.0665)
	[0.0563]***	[0.0610]***	[0.0409]***	[0.0611]***	[0.0614]**	[0.0412]***	[0.0407]**
Bank FE	NO	NO	YES	NO	YES	NO	YES
Year FE	NO	NO	YES	NO	NO	YES	YES
Country FE	NO	NO	NO	YES	NO	YES	NO
Macro Controls	NO	YES	NO	YES	YES	NO	YES
Observations	4,057	3,926	4,057	3,926	3,926	4,057	3,926
Number of i	355	345	355	345	345	355	345
(Within) R^2	0.021	0.024	0.040	0.025	0.025	0.040	0.044

Standard errors in parentheses clustered at the bank level.
Standard errors in square brackets clustered at the country level.
*** p<0.01, ** p<0.05, * p<0.1

Table 6: The table presents the estimates of a panel regression of bank overhead (measured as the average ratio of operating expenses over total income), on the change in the policy rate and various fixed effects and macro controls. Standard errors in parenthesis are clustered at the bank level. Standard errors in square brackets are clustered at the country level (32 clusters).

VARIABLES	(1) ΔIntExp$_{ict}$	(2) ΔIntExp$_{ict}$	(3) ΔIntExp$_{ict}$	(4) ΔIntExp$_{ict}$	(5) ΔIntExp$_{ict}$	(6) ΔIntExp$_{ict}$	(7) ΔIntExp$_{ict}$
ΔCBPoRate$_{ct}$	0.0974	0.0784	0.0634	0.0775	0.0795	0.0641	0.0693
	(0.0182)***	(0.0199)***	(0.0215)***	(0.0205)***	(0.0220)***	(0.0206)***	(0.0225)***
	[0.0126]***	[0.0216]***	[0.0165]***	[0.0197]***	[0.0234]***	[0.0143]***	[0.0219]***
ΔCBPoRate$_{ct-1}$	0.0911	0.0886	0.0686	0.0855	0.0879	0.0677	0.0752
	(0.0167)***	(0.0201)***	(0.0197)***	(0.0194)***	(0.0195)***	(0.0198)***	(0.0218)***
	[0.0222]***	[0.0374]**	[0.0146]***	[0.0347]**	[0.0355]**	[0.0143]***	[0.0269]***
Overhead$_{ict-1}$*ΔCBPoRate$_{ct}$	-0.000803	-0.000814	-0.000820	-0.000910	-0.00101	-0.000813	-0.000944
	(0.000361)**	(0.000382)**	(0.000422)*	(0.000407)**	(0.000492)**	(0.000376)**	(0.000479)**
	[0.000158]***	[0.000172]***	[0.000230]***	[0.000198]***	[0.000325]***	[0.000155]***	[0.000316]***
Overhead$_{ict-1}$	0.0136	0.0134	0.0300	0.0169	0.0354	0.0155	0.0348
	(0.00331)***	(0.00354)***	(0.00775)***	(0.00501)***	(0.0113)***	(0.00415)***	(0.0114)***
	[0.00476]***	[0.00435]***	[0.00848]***	[0.00594]***	[0.0120]***	[0.00486]***	[0.0119]***
Bank FE	NO	NO	YES	NO	YES	NO	YES
Year FE	NO	NO	YES	NO	NO	YES	YES
Country FE	NO	NO	NO	YES	NO	YES	NO
Macro Controls	NO	YES	NO	YES	YES	NO	YES
Observations	4,014	3,894	4,014	3,894	3,894	4,014	3,894
Number of i	354	349	354	349	349	354	349
(Within) R^2	0.051	0.063	0.091	0.064	0.068	0.089	0.101

Standard errors in parentheses clustered at the bank level.
Standard errors in square brackets clustered at the country level.
*** p<0.01, ** p<0.05, * p<0.1

Table 7: The table presents the estimates of a panel regression of interest expenses as a function of the change in the policy rate, overhead (measured as the average ratio of operating expenses over total income) and various fixed effects and macro controls. Standard errors in parenthesis are clustered at the bank level. Standard errors in square brackets are clustered at the country level (32 clusters).

VARIABLES	(1) ΔDevA$_{ict}$	(2) ΔDevA$_{ict}$	(3) ΔDevA$_{ict}$	(4) ΔDevA$_{ict}$	(5) ΔDevA$_{ict}$	(6) ΔDevA$_{ict}$	(7) ΔDevA$_{ict}$
ΔCBPoRate$_{ct}$	0.0134	0.0140	0.0231	0.00724	0.0101	0.0226	0.000788
	(0.00884)	(0.0180)	(0.0118)*	(0.0153)	(0.0156)	(0.0114)**	(0.0159)
	[0.0233]	[0.0316]	[0.0199]	[0.0308]	[0.0310]	[0.0186]	[0.0219]
ΔCBPoRate$_{ct-1}$	-0.0150	-0.0217	0.00208	-0.0246	-0.0224	0.00474	-0.000638
	(0.00922)	(0.0184)	(0.0146)	(0.0216)	(0.0213)	(0.0143)	(0.0238)
	[0.0154]	[0.0358]	[0.00501]	[0.0406]	[0.0406]	[0.00525]	[0.0312]
ERgrowth$_{ct}$		0.0247		0.0280	0.0317		0.0445
		(0.0129)*		(0.0137)**	(0.0137)**		(0.0160)***
		[0.00890]***		[0.0115]**	[0.0161]*		[0.0209]*
ERgrowth$_{ct-1}$		-0.0108		-0.00896	-0.00591		0.00683
		(0.0119)		(0.0147)	(0.0154)		(0.0204)
		[0.00818]		[0.00891]	[0.00941]		[0.0175]
Bank FE	NO	NO	YES	NO	YES	NO	YES
Year FE	NO	NO	YES	NO	NO	YES	YES
Country FE	NO	NO	NO	YES	NO	YES	NO
Macro Controls	NO	YES	NO	YES	YES	NO	YES
Observations	1,417	1,407	1,417	1,407	1,407	1,417	1,407
Number of i	155	153	155	153	153	155	153
(Within) R^2	0.001	0.008	0.045	0.008	0.008	0.045	0.053

Standard errors in parentheses clustered at the bank level.
Standard errors in square brackets clustered at the country level.
*** p<0.01, ** p<0.05, * p<0.1

Table 8: The table presents the estimates of a panel regression of the change in derivatives on the asset side (normalized by total assets), on the change in the policy rate and various fixed effects and macro controls. Standard errors in parenthesis are clustered at the bank level. Standard errors in square brackets are clustered at the country level (32 clusters).

VARIABLES	(1) ΔDevL$_{ict}$	(2) ΔDevL$_{ict}$	(3) ΔDevL$_{ict}$	(4) ΔDevL$_{ict}$	(5) ΔDevL$_{ict}$	(6) ΔDevL$_{ict}$	(7) ΔDevL$_{ict}$
ΔCBPoRate$_{ct}$	0.00602	0.00306	0.0445	-0.00663	-0.00404	0.0415	-0.00110
	(0.00870)	(0.0155)	(0.0140)***	(0.0140)	(0.0148)	(0.0134)***	(0.0153)
	[0.0107]	[0.0277]	[0.0173]**	[0.0233]	[0.0253]	[0.0156]***	[0.0217]
ΔCBPoRate$_{ct-1}$	-0.0396	-0.0626	-0.0255	-0.0715	-0.0737	-0.0227	-0.0528
	(0.0130)***	(0.0245)**	(0.0181)	(0.0271)***	(0.0283)**	(0.0171)	(0.0304)*
	[0.0261]	[0.0333]*	[0.0189]	[0.0370]*	[0.0368]*	[0.0167]	[0.0199]**
ERgrowth$_{ct}$		0.0475		0.0520	0.0572		0.0708
		(0.0168)***		(0.0179)***	(0.0181)***		(0.0232)***
		[0.0101]***		[0.0122]***	[0.0160]***		[0.0207]***
ERgrowth$_{ct-1}$		-0.0327		-0.0309	-0.0301		-0.0158
		(0.0110)***		(0.0124)**	(0.0127)**		(0.0169)
		[0.00675]***		[0.00827]***	[0.0101]***		[0.0140]
Bank FE	NO	NO	YES	NO	YES	NO	YES
Year FE	NO	NO	YES	NO	NO	YES	YES
Country FE	NO	NO	NO	YES	NO	YES	NO
Macro Controls	NO	YES	NO	YES	YES	NO	YES
Observations	1,417	1,407	1,417	1,407	1,407	1,417	1,407
Number of i	155	153	155	153	153	155	153
(Within) R^2	0.001	0.008	0.045	0.008	0.008	0.045	0.053

Standard errors in parentheses clustered at the bank level.
Standard errors in square brackets clustered at the country level.
*** p<0.01, ** p<0.05, * p<0.1

Table 9: The table presents the estimates of a panel regression of the change in derivatives on the liability side (normalized by total assets), on the change in the policy rate and various fixed effects and macro controls. Standard errors in parenthesis are clustered at the bank level. Standard errors in square brackets are clustered at the country level (32 clusters).

VARIABLES	(1) ΔLog(Dep$_{ict}$)	(2) ΔLog(Dep$_{ict}$)	(3) ΔLog(Dep$_{ict}$)	(4) ΔLog(Dep$_{ict}$)	(5) ΔLog(Dep$_{ict}$)	(6) ΔLog(Dep$_{ict}$)	(7) ΔLog(Dep$_{ict}$)
ΔCBPoRate$_{ct}$	-0.00660	-0.00879	-0.00865	-0.00879	-0.00848	-0.00868	-0.00697
	(0.000995)***	(0.00118)***	(0.00125)***	(0.00119)***	(0.00119)***	(0.00126)***	(0.00133)***
	[0.00155]***	[0.00176]***	[0.00166]***	[0.00183]***	[0.00175]***	[0.00162]***	[0.00105]***
ΔCBPoRate$_{ct-1}$	-0.00519	-0.00342	-0.00449	-0.00327	-0.00287	-0.00467	-0.000793
	(0.00147)***	(0.00174)**	(0.00164)***	(0.00182)*	(0.00174)	(0.00170)***	(0.00199)
	[0.00260]**	[0.00191]*	[0.00176]**	[0.00172]*	[0.00175]	[0.00177]***	[0.00202]
Bank FE	NO	NO	YES	NO	YES	NO	YES
Year FE	NO	NO	YES	NO	NO	YES	YES
Country FE	NO	NO	NO	YES	NO	YES	NO
Macro Controls	NO	YES	NO	YES	YES	NO	YES
Observations	4,329	4,183	4,329	4,183	4,183	4,329	4,183
Number of i	393	380	393	380	380	393	380
(Within) R^2	0.013	0.026	0.040	0.040	0.026	0.040	0.046

Standard errors in parentheses clustered at the bank level.
Standard errors in square brackets clustered at the country level.
*** p<0.01, ** p<0.05, * p<0.1

Table 10: The table presents the estimates of a panel regression of the change in the log of deposits, on the change in the policy rate and various fixed effects and macro controls. Standard errors in parenthesis are clustered at the bank level. Standard errors in square brackets are clustered at the country level (32 clusters).

VARIABLES	(1) ΔLog(Loan$_{ict}$)	(2) ΔLog(Loan$_{ict}$)	(3) ΔLog(Loan$_{ict}$)	(4) ΔLog(Loan$_{ict}$)	(5) ΔLog(Loan$_{ict}$)	(6) ΔLog(Loan$_{ict}$)	(7) ΔLog(Loan$_{ict}$)
ΔCBPoRate$_{ct}$	-0.00816	-0.00752	-0.0111	-0.00770	-0.00743	-0.0112	-0.00750
	(0.000856)***	(0.00111)***	(0.00114)***	(0.00113)***	(0.00114)***	(0.00115)***	(0.00127)***
	[0.000940]***	[0.000731]***	[0.00100]***	[0.000727]***	[0.000685]***	[0.000960]***	[0.00102]***
ΔCBPoRate$_{ct-1}$	-0.00719	-0.00526	-0.00617	-0.00547	-0.00506	-0.00646	-0.00394
	(0.00147)***	(0.00143)***	(0.00150)***	(0.00149)***	(0.00129)***	(0.00160)***	(0.00147)***
	[0.00393]*	[0.00217]**	[0.00299]**	[0.00199]***	[0.00196]**	[0.00306]**	[0.00242]
Bank FE	NO	NO	YES	NO	YES	NO	YES
Year FE	NO	NO	YES	NO	NO	YES	YES
Country FE	NO	NO	NO	YES	NO	YES	NO
Macro Controls	NO	YES	NO	YES	YES	NO	YES
Observations	4,288	4,142	4,288	4,142	4,142	4,288	4,142
Number of i	390	377	390	377	377	390	377
(Within) R^2	0.020	0.043	0.066	0.043	0.043	0.066	0.079

Standard errors in parentheses clustered at the bank level.
Standard errors in square brackets clustered at the country level.
*** p<0.01, ** p<0.05, * p<0.1

Table 11: The table presents the estimates of a panel regression of the change in the log of net loans, on the change in the policy rate and various fixed effects and macro controls. Standard errors in parenthesis are clustered at the bank level. Standard errors in square brackets are clustered at the country level (32 clusters).

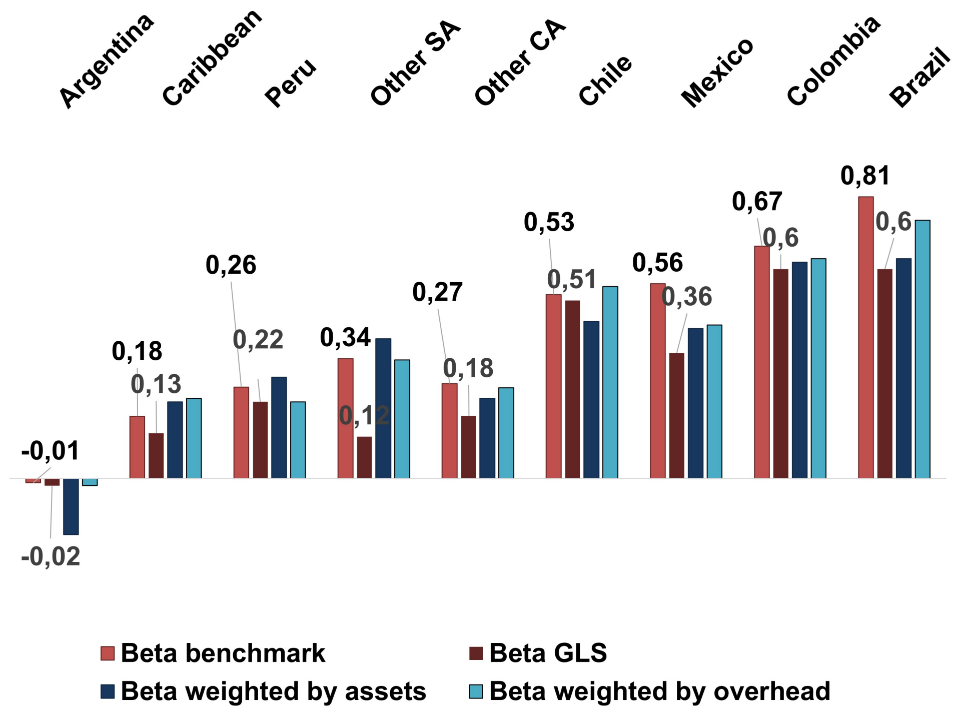

Figure 11: The table reports the results of a panel regression where the dependent variable is the change in interest expenses, normalized by total assets, and the key independent variable is the change in the policy rate. Column 1 presents the baseline specification estimated using OLS, including bank fixed effects and macroeconomic controls. Column 2 uses the same specification but is estimated with Generalized Least Squares (GLS), which excludes bank fixed effects. Columns 3 and 4 replicate the baseline specification from Column 1 but weight the observations by total assets (Column 3) and by overhead (Column 4), respectively. Standard errors are clustered at the bank level. The bars in the accompanying figure represent the sum of both statistically and non-statistically significant beta coefficients.

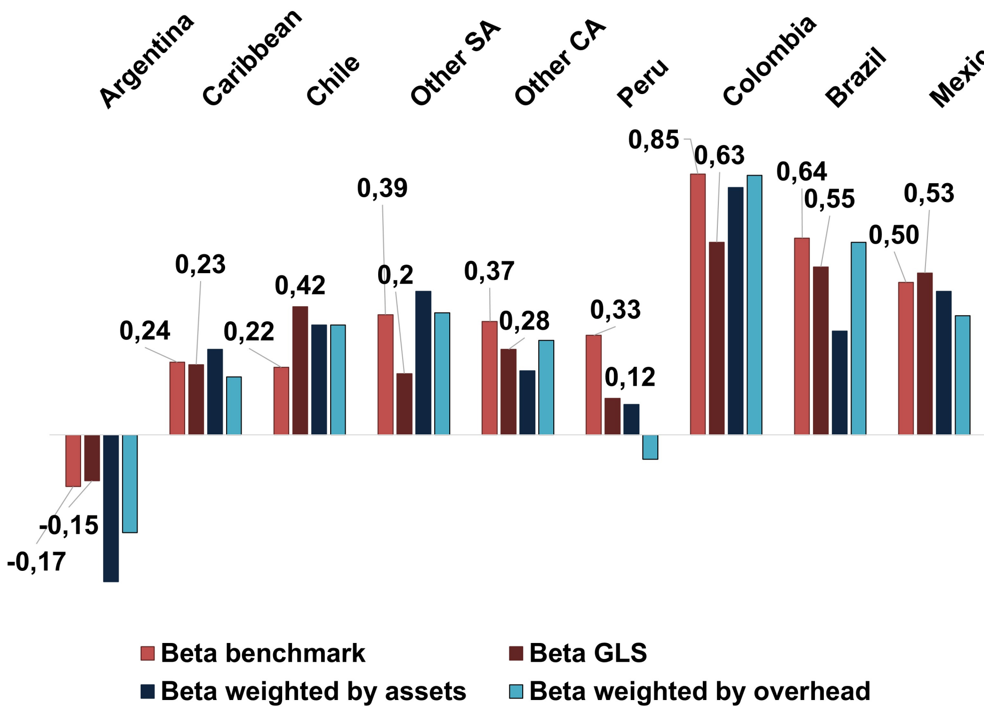

Figure 12: The table reports the results of a panel regression where the dependent variable is the change in interest income, normalized by total assets, and the key independent variable is the change in the policy rate. Column 1 presents the baseline specification estimated using OLS, including bank fixed effects and macroeconomic controls. Column 2 uses the same specification but is estimated with Generalized Least Squares (GLS), which excludes bank fixed effects. Columns 3 and 4 replicate the baseline specification from Column 1 but weight the observations by total assets (Column 3) and by overhead (Column 4), respectively. Standard errors are clustered at the bank level. The bars in the accompanying figure represent the sum of both statistically and non-statistically significant beta coefficients.

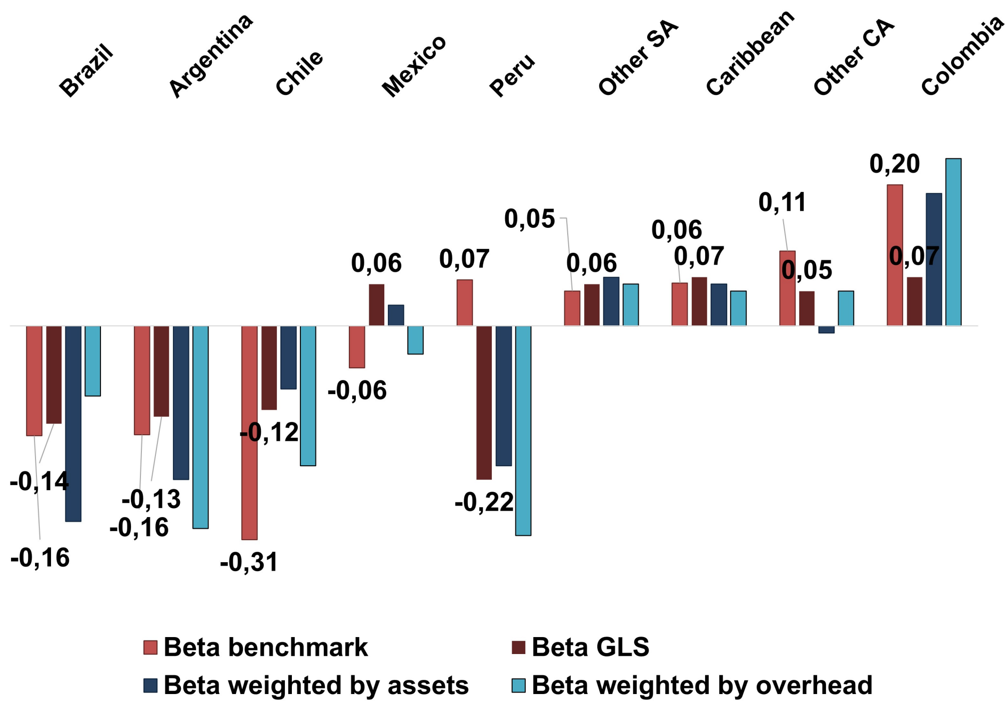

Figure 13: The table reports the results of a panel regression where the dependent variable is the change in net interest income, normalized by total assets, and the key independent variable is the change in the policy rate. Column 1 presents the baseline specification estimated using OLS, including bank fixed effects and macroeconomic controls. Column 2 uses the same specification but is estimated with Generalized Least Squares (GLS), which excludes bank fixed effects. Columns 3 and 4 replicate the baseline specification from Column 1 but weight the observations by total assets (Column 3) and by overhead (Column 4), respectively. Standard errors are clustered at the bank level. The bars in the accompanying figure represent the sum of both statistically and non-statistically significant beta coefficients.