

Digital Money and Remittances Costs in Central America, Panama, and the Dominican Republic

Alina Carare, Lavinia Franco, Metodij Hadzi-Vaskov,
Justin Lesniak, Dmitry Vasilyev, and Yorbol Yakhshilikov

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ABSTRACT: This paper investigates factors that predict variation in digital and non-digital remittance fees over time and across countries, exploring differences between CAPDR and other regions. The paper fills a void in the literature on how country- and corridor-specific factors relate to remittance fees at different levels of digitalization of the transaction mode. It also complements stylized facts and regression analysis with a survey analysis of the CAPDR authorities' views on the latest developments, possibilities, and risks related to digital remittances with a view to gauging the authorities' potential role in further reducing the cost of cross-border payments more generally and remittances fees in particular. The paper finds a clear trend of declining remittance fees across countries and at any level of digitalization, albeit they remain higher for CAPDR countries relative to non-CAPDR countries. More competition, financial and digital development in receiving countries—such as debit/credit card ownership or bank branch penetration—are associated with lower remittance fees, especially in CAPDR. The surveyed authorities actively explore the use of digital money to advance domestic payment systems, expedite financial inclusion, and lower remittances fees, yet see considerable risks, especially for preserving monetary sovereignty in CAPDR.

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I. Introduction

International efforts have been made to reduce the transaction cost of transferring remittances since those gains would support households in developing countries. In 2009, the G8 set a target, later embraced by the G20, to lower, within five years, the cost of remittances from 10 percent to 5 percent. More recently, the United Nations' Sustainable Development Goals included the objective to reach sub-3 percent remittance costs. Despite a general reduction in remittance costs in the past decade, the UN goal of sub-3 percent costs has yet to be met in many corridors. Country-specific structural factors might be preventing a steeper decline, but stronger competition and digitalization can facilitate the path towards the UN goal (Beck et al., 2022).

Remittances are a significant source of income for the countries in Latin America and the Caribbean (LAC), but their transaction costs remain above the UN goal. In 2021, on aggregate, remittances amounted to about 3 percent of GDP of the LAC region. In some countries of Central America, Panama, and the Dominican Republic (CAPDR), remittances have been especially important, exceeding 10 percent of GDP in Guatemala and Nicaragua, and even 20 percent of GDP in El Salvador and Honduras. In terms of transaction costs, in CAPDR, remittance fees are still above the UN goal (about 4 percent in 2021). Kpodar and Imam (2022) show that lowering transaction costs also helps increase remittance flows. Nonetheless, digital remittances, which could lower costs, are still limited in the region.

This paper explores factors that predict variation in digital and non-digital remittance fees over time and across countries and if those determinants are different for CAPDR relative to other regions. The paper fills a void in the literature on how country- and corridor-specific factors relate to remittance fees at different levels of digitalization of the transaction mode. To our knowledge, this paper is the first attempt to classify data into various types of digital remittances and rigorously analyze the role that digital money plays in reducing the transaction costs of remittances. Moreover, the paper analyzes CAPDR authorities' views on the latest developments, possibilities, and risks related to digital remittances in particular, and compares them with the rest of LAC, to gauge how the authorities could play a role in further reducing the remittances fees, and analyze the role digital money could play in the region more broadly.

Based on our sample, using data over 2013-2021 from 44 corridors, we find a clear trend of declining remittance fees across countries and at any level of digitalization. The dataset suggests considerable heterogeneity in remittance fees across regions outside CAPDR that we label together as non-CAPDR here. For instance, corridors involving Sub-Saharan Africa typically have higher fees than CAPDR, while South Asia generally shows lower remittance fees than CAPDR. Recognizing these important differences, we find that overall remittance fees for CAPDR countries are larger than those for non-CAPDR countries, particularly for certain digital transaction modes. More competition is associated with lower fees in general and especially in non-digital transactions, but not necessarily in CAPDR (where more research is needed to understand what market conditions in the region prevent decrease in fees). Lower remittances fees tend to be associated with other factors capturing financial and digital development in receiving countries, like financial access and financial development factors, such as debit/credit card ownership or bank branch penetration, especially in CAPDR. Surveyed, the LAC authorities indicated that they are exploring the use of digital money to advance domestic payment systems, expedite financial inclusion, and lower remittances fees, but see considerable risks, especially to CAPDR monetary sovereignty.

The rest of this paper is organized as follows. Section II underscores the opportunity that fintech and digital money offer for reduction of remittance fees and motivates the analytical insights in the following sections. Section III provides empirical evidence on the drivers of digital remittances as well as points at some differences between CAPDR and other regions. Section IV complements the empirical analysis with the results from a survey conducted among the authorities of CAPDR as well as other economies in the LAC region, highlighting the similarities and differences across them. Section V provides some concluding remarks and traces possible venues for future research.

II. Digital Money Offers an Opportunity to Reduce Remittance Fees

The expansion of the fintech sector and the proliferation of new and innovative digital tools/solutions provides ample opportunities to lower the costs of cross-border transactions, and remittances in particular. That is because fintech and digital money entail considerably lower and declining costs of transfers compared to cash-based transactions.

Notwithstanding the profound potential benefits of using digital money and fintech solutions (see Bersch et al., 2021), their adoption for remittance transfers in CAPDR remains relatively low compared to other regions. This persists despite the generally broad adoption of information technology and mobile penetration in the CAPDR / LAC region (GSMA, 2021).

Hence, these findings suggest that the underlying reasons for CAPDR's relatively low adoption of digital remittances would likely be related to more structural factors, such as:

- The prevalence of cash in LAC economies, which tend to have higher rates of informality (Bersch et al., 2021), and therefore use more cash;
- Low financial inclusion of the sending migrant population in the US; and
- Gaps in the regulatory environment. For example, according to the GSMA Mobile Money Regulatory Index (MMRI)—which captures some of the aspects relevant for digitalization of remittances—some LAC countries score among the lowest in the world, and lag behind especially in Know Your Customer (KYC) regulation, which would typically put additional burden and checks on digital transactions.

In this context, addressing key structural factors, such as tackling informality, improving financial inclusion and aligning domestic regulatory frameworks with international standards, will be key to reap the full benefits of new digital technologies in the region. Raising the uptake in digital remittances, which has been limited by constraints in the use of digital money (Bersch et al., 2021) and aiming for a balance between curbing illegal activities and not imposing unnecessary burden on remittance service providers is essential in lowering remittance costs (Da Silva Filho, 2021).²

² Digital remittances provided support to consumption across the broader LAC region during the Covid-19 crisis, albeit it may reflect adaptation to mobility restrictions rather than an increased adoption of the digital services (Frisancho and Parrado, 2021).

III. Drivers of Digital and Non-Digital Remittances in CAPDR

Data and Sample

Data on digital remittances are so far limited globally. For our analysis, we rely on the data published by the World Bank in the Remittance Prices Worldwide (RPW) database, which is currently the most comprehensive and reliable source for quantitative analysis in this field. The World Bank database covers 367 country corridors (pairs of sender and receiver countries) worldwide. Data includes details on the fee paid by the sender of remittance and on the form of transaction (e.g., cash, bank account transfer, etc.).³ These details are gathered manually, by researchers acting as clients, or in automated way.

We focus on a list of six sending countries (US, Spain, UK, Singapore, UAE and Saudi Arabia) because these countries represent some of the most relevant hubs for remittance transactions across different regions. The U.S. hub covers the largest share of remittances to CAPDR countries (over 90 percent for most countries), with Spain being the second most relevant. We then include other major sending countries across the world to build an appropriate control group in terms of geographic location, data quality, as well as various degrees of digitalization and fintech solutions adoption.

After having identified the relevant sending countries, we focus on the top 12 receiving countries (in terms of relative importance of the corridor) for each of them.⁴ This allows us to consider the CAPDR and non-CAPDR corridors that are most relevant (in terms of remittance volume) conditional on our relevant list of sending countries. Our largest specification includes 44 corridors over the period 2013-2021 (unbalanced sample).⁵

The next step is to identify what is a digital remittance. The World Bank definition is “A digital remittance must be sent via a payment instrument in an online or self-assisted manner, and received into a transaction account, i.e., bank account, transaction account maintained at a non-bank deposit taking institution (say a post office), mobile money or e-money account”.⁶ Given this definition, we sort data per corridor within four categories capturing thereby various levels of digitalization in the transaction mode:

- *Non-Digital*: remittances are sent in a non-digital manner and received in cash;
- *Partially Digital*: remittances are sent in a digital manner *or* remittances are received in a digital manner (despite the other side of the transaction being executed in a non-digital manner);
- *Digital*: remittances are sent and received in a digital manner (excluding those remittances that are received into a mobile wallet);
- *Premium Digital*: remittances are sent in a digital manner and received into a mobile wallet.

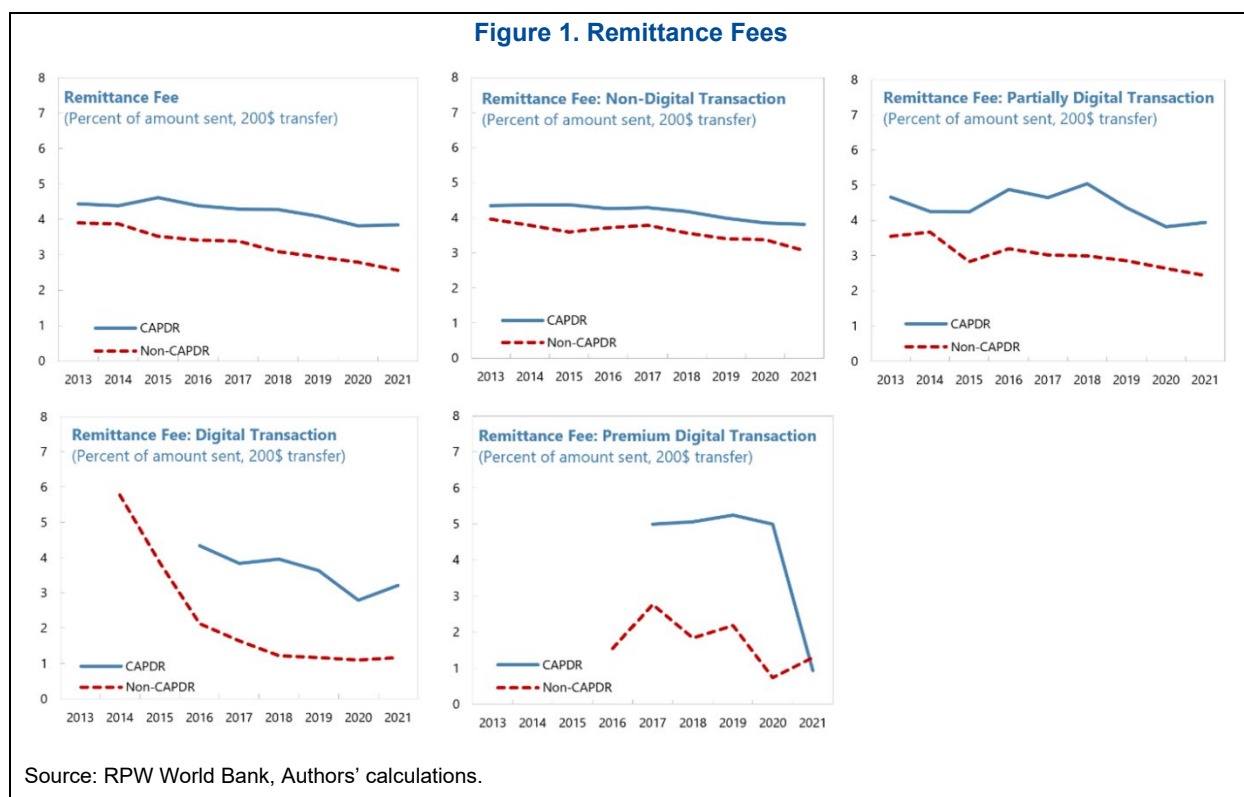
³ Data also includes information on the Exchange Rate Margin, which is a portion of the remittance cost. As the most noticeable cost component—remittance fee—is the focus of our investigation.

⁴ Since the majority of remittances received in CAPDR have the US as sending country, all CAPDR corridors with the US as sending country are included by these criteria with the exception of the US-Nicaragua corridor, which we add as an exception.

⁵ The analysis is restricted to 44 corridors as not all control variables are available for the full selection.

⁶ Remittance Prices Worldwide Quarterly, Issue 42, June 2022, p. 7.

Based on this classification and data from our sample, Figure 1 illustrates how remittance fees have evolved over time across these four transaction modes (plus the average of all modes) in CAPDR and non-CAPDR countries. On aggregate, we find that fees are higher for CAPDR countries relative to non-CAPDR countries, particularly for digital and partially digital transaction modes. In turn, the potential benefits for CAPDR from further adoption of fully digital remittances seem particularly large given the important gap with respect to non-CAPDR. With a caveat about the limited number of observations, for premium digital transactions we observe a recent convergence of CAPDR countries' fees towards other countries. In general, however, a clear trend of declining remittance fees is observable across countries and categories.



Hypotheses and model

To assess quantitatively the role of various determinants of remittance fees in CAPDR and non-CAPDR countries, we formulate a few hypotheses, and test them using regression analysis (following Beck et al., 2022). This section describes our core hypotheses, introduces the explanatory variables, and presents the model.

Our main hypotheses, based on the existing literature, are as follows. Lower fees are likely associated with:

- (i) larger volumes (given by economies of scale);
- (ii) more competition (as the ability of providers to charge higher mark-ups decreases);
- (iii) greater financial and digital development (as individuals can access services more efficiently and at lower costs).

We look at the macro and market determinants of digital and non-digital remittance fees by using both corridor- and country-specific factors. Our analysis includes two corridor-specific factors: the size and the degree of

competition of the remittances market. We measure the market size by using the bilateral remittance volume between sending and receiving country from KNOMAD.⁷ Higher volumes are likely associated with lower costs due to lower per-unit fixed cost and also to the greater competition that may arise when the market size is larger (Beck et al., 2022).

The proxy we use for competition is the number of providers in a corridor over time (obtained from the WB's RPW), as an aggregate or split by transaction modes. Our underlying assumption is that a larger number of providers should decrease their ability to charge higher marks-up, therefore reducing the costs to customers.

We include data on financial and digital development at country-level, like debit/credit card ownership and bank branch penetration (respectively from The Global Findex Database and the IMF Financial Access Survey) for both sending and receiving countries. We also collect data (from GSMA) on the receiving country's mobile money services on two specific variables:⁸ (a) the Know Your Customer (KYC) regulatory score for mobile money services; and (b) the number of mobile money services available in a given receiving country. In general, we expect that a higher level of financial and digital development is associated with lower fees, as more developed financial institutions and financial markets allow a more efficient access to financial services and at a lower cost. Moreover, the presence of alternative digital services solutions (as mobile money services) may increase the degree of competition and put downward pressure on the fees offered by traditional providers.⁹ In addition, at country-level, we include GDP per capita (from the WB and OECD National Accounts) to control for the level of economic development of both the sending and the receiving country. Lastly, we include a time trend to control for potential omitted information that could help us explain the downward trajectory of remittance fees for most countries observed in past years. While we are relatively confident that our factors properly describe the core determinants of remittance fees, the inclusion of this variable gives us additional confidence in our regression output.

In summary, remittance fees are analyzed as a function of both corridor-specific and sending and receiving country characteristics, using a panel regression model of the form:

$$Fee_{srt} = \alpha + \beta_1 Remittance\ volume_{srt} + \beta_2 Number\ of\ providers_{srt} + \beta_3 Time\ trend_t + \beta_4 X_{st} + \beta_5 X_{rt} + \beta_6 GDPPC_{st} + \beta_7 GDPPC_{rt} + \varepsilon_{srt} \quad (1)$$

where s indicates the sending country, r the receiving country, and t the time. The dependent variable is the average remittance fee in corridor sr in year t .¹⁰ The variable X stands for country-specific factors. All explanatory variables (except the *number of providers*) are lagged. We test model (1) for the four transaction modes discussed above (non-digital, partially digital, digital and premium digital). Our largest specification covers 44 corridors over the period 2013-2021.

⁷ KNOMAD includes data until 2018. We enlarge the series using balance of payments data for 2019-2021.

⁸ Based on GSMA's definition, mobile money services "include transferring money and making and receiving payments using the mobile phone". For more details on mobile money services, see GSMA's website <https://www.gsma.com/mobilemoneymetrics/#regulatory-index?y=2021>.

⁹ GSMA (2016) "shows that global Money Transfer Operators tend to offer their services at lower prices in markets where they are in competition with mobile money providers" (p. 5).

¹⁰ Unless otherwise specified, t refers to the year. On a few occasions, we use quarterly frequency.

Findings

This section describes the main empirical findings reported first from testing model (1) for the four transaction modes (plus the average of all modes), and then by adding CAPDR-specific controls.

Results across transaction modes

To assess the determinants of remittance fees across the four transaction modes (non-digital, partially digital, digital and premium digital), we start by testing a reduced version of model (1), which includes two key characteristics of the remittance market: size and competition. We include a time trend and the level of GDP per capita as control variables. There are several relevant findings presented in Table 1.¹¹

First, higher remittance volumes are associated with lower average fees (column 1). In terms of economic magnitude, we find that a US\$1 billion increase in yearly volumes is associated with a 0.033 percentage points lower average remittance fees.¹² Second, higher market competition (proxied by the yearly number of providers in each corridor) is associated with lower remittance fees, on average. This is particularly the case for non-digital remittances (column 2), where the presence of an additional provider is associated with about 0.3 percentage points lower remittance fees. However, the coefficient is insignificant for other digital transactions (although still with negative sign). Third, we find that remittance fees decline over time across all transaction modes, and more so for digital remittances.¹³

Table 1. Baseline - Remittance fees across transaction modes

	(1) Average Fee	(2) Non-Digital Fee	(3) Part. Digital Fee	(4) Digital Fee	(5) Premium Digital Fee
Remittance volume	-0.033*** (0.008)	0.008 (0.016)	-0.020* (0.010)	-0.028 (0.019)	0.433*** (0.092)
Number of providers	-0.098*** (0.017)	-0.293*** (0.060)	-0.090** (0.038)	-0.094 (0.067)	-0.066 (0.075)
Time trend	-0.110*** (0.021)	-0.191** (0.077)	-0.284*** (0.105)	-0.202** (0.078)	-0.327* (0.160)
Ln(GDPPC) sending country	0.718*** (0.156)	-2.168*** (0.465)	1.780*** (0.406)	1.008** (0.397)	0.886 (0.770)
Ln(GDPPC) receiving country	0.594*** (0.084)	0.501** (0.193)	0.651*** (0.166)	0.624*** (0.163)	0.485 (0.340)
Constant	-7.516*** (1.594)	25.989*** (5.559)	-18.865*** (4.322)	-12.587*** (4.381)	-9.521 (8.616)
N	377	135	135	135	29
R ²	0.329	0.384	0.352	0.215	0.798

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variable is the average remittance fee across all modes and in the 4 transaction modes (non-digital, partially digital, digital and premium digital). The regressors (except the number of providers) are lagged by one year. Remittance fee is in percent of the amount sent. Remittance volume is expressed in US\$ billion. Robust standard errors.

¹¹ For non-digital, partially digital, digital transaction modes we are able to use balanced panel (balanced across corridors), while we have to be more careful on the interpretation of the premium digital mode for which we have a reduced number of observations.

¹² We disregard the interpretation across transaction modes as remittance volumes are not differentiated by transaction. However, we still include them in all specifications to control for the corridor's size.

¹³ Related aspects that requires further analysis are the degree of segmentation of the market and the degree of competition across transaction modes and the implications they produce for the fees on digital relative to fees on non-digital transactions.

Adding financial and digital development

Tables 2 and 3 present results from a specification that augments model (1) with country-specific factors related to financial and digital development.

We find that greater access to financial services in the receiving country is generally associated with lower remittance fees (Table 2). In particular, for transaction modes that have some sort of digitalization, there is a negative and significant relationship between debit/credit card ownership (as a share of adult population) in the receiving country and remittance fees. For instance, for a 1 percentage point increase in card ownership in the receiving country, digital fees decrease by 0.03 percentage points (column 4). Furthermore, looking at bank branch penetration, which we use as an alternative measure of financial access, we find a negative relationship between the number of commercial bank branches per 1,000 km²—in both sending and receiving countries—and remittance fees in most specifications. In the receiving country, the presence of an extra bank branch per 1000 km² is associated with a decrease of 0.024 percentage points in the average fee (column 6).

Turning to the role of digital development, we find that, across most transaction modes, lower remittance fees are associated with greater digital development (Table 3). First, we start by looking at the development of digital services regulation using the score of KYC regulation for mobile money (from 0—minimum score—to 100). For an additional point of the KYC score in the receiving country, the average remittance fee decreases by 0.005 percentage points (column 1).¹⁴ Second, we look at the presence of mobile money services as a measure of digital development of the receiving countries. On average, an additional mobile money service offered is associated with 0.26 percentage points decrease in the remittances fee (column 6).

¹⁴ In principle, improving the KYC score could have an ambiguous effect on remittance fees. Aligning the domestic regulator frameworks with international standards can reduce the costs of implementation for intermediaries, but there is a possibility that introducing KYC requirements to entities that were previously less regulated could increase their costs and thus translate into higher fees. The latter possibility—together with the more limited sample—may help explain the result that better KYC regulation is associated with higher remittance fees for the premium digital remittance mode (column 5) in Table 3.

Table 2. Remittance fees across transaction modes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Average	Non-Dig.	Part. Dig.	Dig.	Prem. Dig.	Average	Non-Dig.	Part. Dig.	Dig.	Prem. Dig.
Remittance volume	-0.016 (0.010)	0.018 (0.018)	-0.034** (0.016)	-0.042 (0.037)	0.079 (0.107)	-0.034*** (0.008)	-0.028 (0.018)	-0.041** (0.018)	-0.049** (0.021)	0.407*** (0.088)
Number of providers	-0.143*** (0.018)	-0.265*** (0.056)	-0.089** (0.040)	-0.050 (0.071)	0.113 (0.078)	-0.090*** (0.018)	-0.305*** (0.050)	-0.071 (0.063)	-0.015 (0.079)	0.035 (0.105)
Time trend	-0.109*** (0.021)	-0.192*** (0.073)	-0.273** (0.109)	-0.194** (0.078)	-0.422*** (0.132)	-0.098*** (0.020)	-0.161*** (0.058)	-0.256*** (0.082)	-0.208*** (0.077)	-0.303 (0.189)
Owens a debit/credit card sending country	0.059*** (0.008)	0.074*** (0.014)	0.005 (0.013)	0.028* (0.017)	-0.133*** (0.033)					
Owens a debit/credit card receiving country	0.005 (0.004)	-0.011 (0.008)	-0.013* (0.007)	-0.029*** (0.010)	-0.036*** (0.010)					
Bank branches per 1,000 km2 sending country						-0.001 (0.000)	-0.004*** (0.001)	-0.002 (0.001)	-0.003*** (0.001)	-0.002 (0.003)
Bank branches per 1,000 km2 receiving country						-0.024*** (0.003)	-0.019*** (0.005)	-0.031*** (0.008)	-0.017** (0.007)	0.038*** (0.009)
Ln(GDPPC) sending country	-0.197 (0.170)	-2.442*** (0.454)	1.782*** (0.409)	0.857** (0.382)	2.487*** (0.841)	0.992*** (0.141)	-0.579* (0.349)	2.939*** (0.287)	2.008*** (0.484)	-0.050 (1.294)
Ln(GDPPC) receiving country	0.364*** (0.111)	0.571** (0.226)	0.863*** (0.219)	1.077*** (0.216)	1.166*** (0.278)	0.439*** (0.078)	0.354** (0.164)	0.417*** (0.125)	0.464*** (0.169)	0.438* (0.215)
Constant	-0.766 (1.884)	21.912*** (5.084)	-20.662*** (4.718)	-16.321*** (4.850)	-17.876** (8.167)	-8.794*** (1.503)	10.978*** (4.068)	-28.769*** (3.207)	-21.447*** (5.183)	0.027 (14.269)
N	353	132	132	132	28	377	135	135	135	29
R ²	0.411	0.468	0.365	0.291	0.877	0.472	0.624	0.558	0.342	0.865

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variable is the average remittance fee across all modes and in the 4 transaction modes (non-digital, partially digital, digital and premium digital). The regressors (except the number of providers) are lagged by one year. Remittance fee is in percent of the amount sent. Remittance volume is expressed in US\$ billion. Robust standard errors.

Table 3. Remittance fees across transaction modes

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Average	Non-Dig.	Part. Dig.	Dig.	Prem. Dig.	Average	Non-Dig.	Part. Dig.	Dig.	Prem. Dig.
Remittance volume	-0.035*** (0.009)	0.014 (0.013)	-0.015 (0.012)	-0.022 (0.017)	0.423*** (0.092)	-0.032*** (0.004)	-0.002 (0.008)	-0.022*** (0.006)	-0.037*** (0.012)	0.345*** (0.060)
Number of providers	-0.082*** (0.022)	-0.225*** (0.055)	-0.017 (0.064)	0.129** (0.062)	0.045 (0.081)	-0.070*** (0.011)	-0.245*** (0.034)	-0.079*** (0.028)	-0.156*** (0.045)	0.004 (0.056)
Time trend	-0.118*** (0.024)	-0.164** (0.065)	-0.344*** (0.117)	-0.258*** (0.072)	-0.394** (0.170)	-0.028*** (0.003)	-0.057*** (0.012)	-0.074*** (0.018)	-0.041*** (0.011)	-0.105*** (0.026)
KYC receiving country	-0.005*** (0.001)	-0.014*** (0.003)	-0.009** (0.004)	-0.013*** (0.004)	0.014** (0.005)					
Number of MM services receiving country						-0.261*** (0.023)	-0.265*** (0.056)	-0.333*** (0.066)	-0.504*** (0.061)	-0.102 (0.119)
Ln(GDPPC) sending country	0.559*** (0.179)	-1.936*** (0.420)	1.080* (0.610)	0.167 (0.416)	2.263** (0.815)	0.609*** (0.080)	-2.120*** (0.256)	1.541*** (0.239)	1.208*** (0.223)	0.950* (0.539)
Ln(GDPPC) receiving country	0.605*** (0.116)	0.339* (0.176)	0.632** (0.271)	0.855*** (0.165)	0.679** (0.320)	0.356*** (0.052)	0.412*** (0.137)	0.373*** (0.138)	0.134 (0.122)	0.855*** (0.161)
Constant	-5.726*** (2.125)	24.883*** (5.018)	-10.707 (7.373)	-4.798 (4.466)	-26.143*** (8.847)	-4.554*** (0.935)	26.221*** (3.111)	-13.792*** (2.914)	-10.307*** (2.652)	-12.441** (6.161)
N	315	114	114	114	28	1,406	435	435	435	89
R ²	0.268	0.361	0.293	0.259	0.831	0.330	0.383	0.362	0.326	0.744

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variable is the average remittance fee across all modes and in the 4 transaction modes (non-digital, partially digital, digital and premium digital). The regressors (except the number of providers) are lagged by one year (or by one quarter, in columns 6-10, when quarterly data are available). Remittance fee is in percent of the amount sent. Remittance volume is expressed in US\$ billion. "MM" refers to mobile money. Columns 6-10 have been estimated at quarterly level. Robust standard errors.

CAPDR-specific results

To assess how the determinants identified above differ between CAPDR and non-CAPDR countries, we test a version of model (1) with market size and competition indicators and introduce CAPDR-specific controls. More specifically, we introduce a CAPDR dummy variable (which takes a value of 1 when the receiving country belongs to CAPDR and 0 otherwise) and its interaction with the competition variable.¹⁵ The findings (presented in Table 4) are as follows.¹⁶

First, the general results hold: lower remittance fees are associated, on average, with larger corridors, and competition, and remittances have declined over time. More research is needed to analyze the role of competition in CAPDR. That is because the specification used below, which uses a CAPDR dummy as well as a CAPDR dummy interacted with the number of providers, leads to some different results compared to the general specification in Table 1 (for example for non-digital transaction mode, Column 2, the coefficient on the interaction for the number of providers variable with the CAPDR dummy variable is positive and significant, and of similar size as the negative coefficient for the number of providers variable).^{17 18}

Table 4. Remittance fees across transaction modes – CAPDR interactions

	(1)	(2)	(3)	(4)
	Average Fee	Non-Digital Fee	Part. Digital Fee	Digital Fee
Remittance volume	-0.033*** (0.010)	0.025 (0.020)	-0.013 (0.010)	-0.011 (0.015)
Number of providers	-0.098*** (0.020)	-0.449*** (0.063)	-0.014 (0.056)	0.086 (0.057)
Time trend	-0.116*** (0.021)	-0.187** (0.073)	-0.288** (0.117)	-0.250*** (0.076)
CAPDR	-0.055 (0.336)	-1.473*** (0.494)	2.139** (0.994)	2.192*** (0.501)
Number of providers x CAPDR	0.066** (0.030)	0.496*** (0.082)	-0.123 (0.129)	0.153 (0.233)
Ln(GDPPC) sending country	0.491** (0.193)	-3.816*** (0.508)	0.560 (0.578)	-0.763** (0.337)
Ln(GDPPC) receiving country	0.581*** (0.087)	0.374** (0.175)	0.556*** (0.186)	0.453*** (0.134)
Constant	-5.056** (2.029)	45.333*** (6.005)	-5.668 (6.366)	7.244* (3.669)
N	377	135	135	135
R ²	0.352	0.523	0.469	0.521

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variable is the average remittance fee across all modes and in the non-digital, partially digital and digital transaction modes. The regressors (except the number of providers) are lagged by one year. Remittance fee is in percent of the amount sent. Remittance volume is expressed in US\$ billion. Robust standard errors

¹⁵ We obtain qualitatively similar results when using an alternative specification to test for the difference between CAPDR and non-CAPDR by splitting the sample in two. Results are available upon request.

¹⁶ Given the limited number of observations, we excluded Premium Digital transaction mode from these specifications.

¹⁷ The p-value of the sum of the number of providers coefficient and of its interaction with CAPDR does not indicate statistical significance.

¹⁸ The result is robust if the median fee is used instead. However, performing an analysis at the intermediary-corridor level could deepen the understanding of the competition role, in particular as new intermediaries enter the market versus the behavior of existing intermediaries.

We also test model (1) including country-specific factors, associated with financial development, and CAPDR-specific controls. We interact the CAPDR dummy with the debit/credit card ownership and bank branches penetration variables. Table 5 presents the results.

First, the favourable effect of debit/credit card ownership on digital fees (presented in Table 2) seems to be driven by CAPDR. Indeed, while the number of debit/credit card ownership is not statistically significant by itself, its interaction with the CAPDR dummy is negative and significant, suggesting that debit/credit card ownership in CAPDR countries is negatively associated with digital remittance fees (column 4).¹⁹ Also, greater bank branches penetration in CAPDR countries seems to be associated with lower remittance fees. In this case, the interactions for the bank branches variable with the CAPDR dummy variable are insignificant, indicating that the same relationships hold in CAPDR as elsewhere.

Table 5. Remittance fees across transaction modes – CAPDR interactions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Average	Non-Dig.	Part. Dig.	Dig.	Average	Non-Dig.	Part. Dig.	Dig.
Remittance volume	-0.010 (0.010)	0.036*** (0.013)	-0.016 (0.015)	-0.014 (0.023)	-0.029*** (0.008)	-0.067*** (0.022)	-0.021 (0.021)	0.033* (0.017)
Number of providers	-0.130*** (0.019)	-0.294*** (0.052)	-0.056 (0.051)	0.024 (0.066)	-0.093*** (0.019)	-0.248*** (0.042)	-0.067 (0.074)	0.037 (0.052)
Time trend	-0.126*** (0.019)	-0.187*** (0.066)	-0.300*** (0.105)	-0.227*** (0.073)	-0.095*** (0.020)	-0.198*** (0.055)	-0.239*** (0.079)	-0.175*** (0.065)
CAPDR	1.791*** (0.224)	2.142*** (0.373)	2.489*** (0.467)	3.749*** (0.401)	0.193 (0.224)	-1.692*** (0.522)	1.265*** (0.471)	4.106*** (0.518)
Owens a debit/credit card sending country	0.057*** (0.009)	0.074*** (0.015)	0.002 (0.013)	0.026** (0.012)				
Owens a debit/credit card receiving country	0.021*** (0.004)	0.012 (0.008)	0.016* (0.009)	0.010 (0.008)				
Owens a debit/credit card receiving x CAPDR	-0.028*** (0.007)	-0.023** (0.011)	-0.026 (0.018)	-0.043*** (0.016)				
Bank branches per 1,000 km2 sending country					0.000 (0.001)	-0.007*** (0.001)	-0.000 (0.002)	0.005*** (0.001)
Bank branches per 1,000 km2 receiving country					-0.025*** (0.003)	-0.020*** (0.006)	-0.030*** (0.009)	-0.017*** (0.005)
Bank branches per 1,000 km2 receiving x CAPDR					0.015 (0.009)	0.008 (0.017)	-0.029 (0.031)	-0.035 (0.029)
Ln(GDPPC) sending country	-0.753*** (0.214)	-3.587*** (0.457)	0.478 (0.638)	-0.945** (0.361)	0.698*** (0.214)	1.600** (0.663)	1.854*** (0.483)	-2.480*** (0.617)
Ln(GDPPC) receiving country	0.116 (0.128)	0.147 (0.264)	0.371 (0.336)	0.394* (0.225)	0.411*** (0.079)	0.442*** (0.166)	0.420*** (0.115)	0.335** (0.131)
Constant	6.647*** (2.544)	36.724*** (4.926)	-3.738 (7.876)	6.963 (4.462)	-5.577** (2.222)	-12.432* (7.367)	-17.742*** (5.357)	25.635*** (6.499)
N	353	132	132	132	377	135	135	135
R ²	0.479	0.551	0.490	0.575	0.482	0.661	0.577	0.603

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: The dependent variable is the average remittance fee across all modes and in the non-digital, partially digital and digital transaction modes. The regressors (except the number of providers) are lagged by one year. Remittance fee is in percent of the amount sent. Remittance volume is expressed in US\$ billion. Robust standard errors.

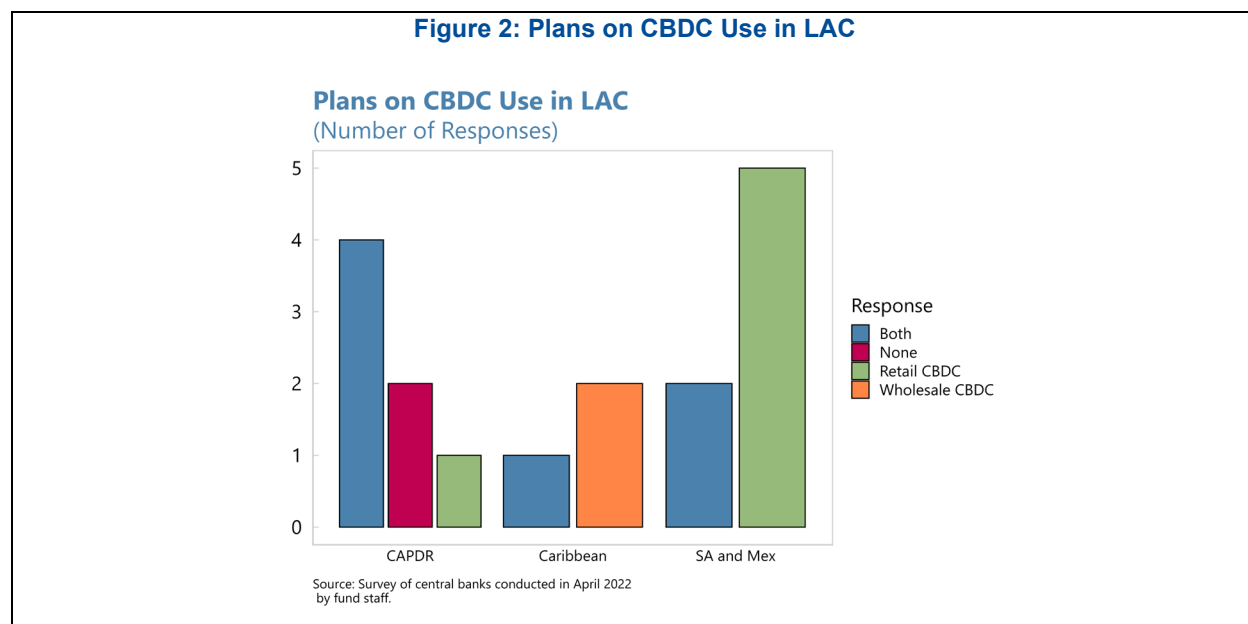
¹⁹ The p-value of the sum of the debit/credit card ownership coefficient and its interaction with CAPDR is statistically significant.

IV. Authorities' Survey Results

Considering the limitations of official data in the novel and rapidly evolving area of digital remittances, we complement the official data sources, described in Section III, with findings from a survey conducted among central bank authorities in LAC regarding the intent to use digital money in general, and for cross-border payments and remittances in particular.²⁰ This allows us to gauge the authorities' views and assessment on the latest developments, possibilities, and risks related to digital remittances. For ease of exposition and analysis, we classify the responses in the following three country groups: CAPDR, the Caribbean, and South America and Mexico. All CAPDR country authorities provided responses, while the response rate was lower for the Caribbean and South America and Mexico.

CBDCs

CBDCs offer various potential opportunities for facilitating cross-border payments, including through cheaper and more accessible remittances (BIS, IMF, and World Bank, 2021). The survey results suggest that the authorities considering CBDCs in LAC primarily concentrate on retail CBDCs, either individually or jointly with wholesale CBDCs, which entail potential opportunities for wider penetration of digital remittances.

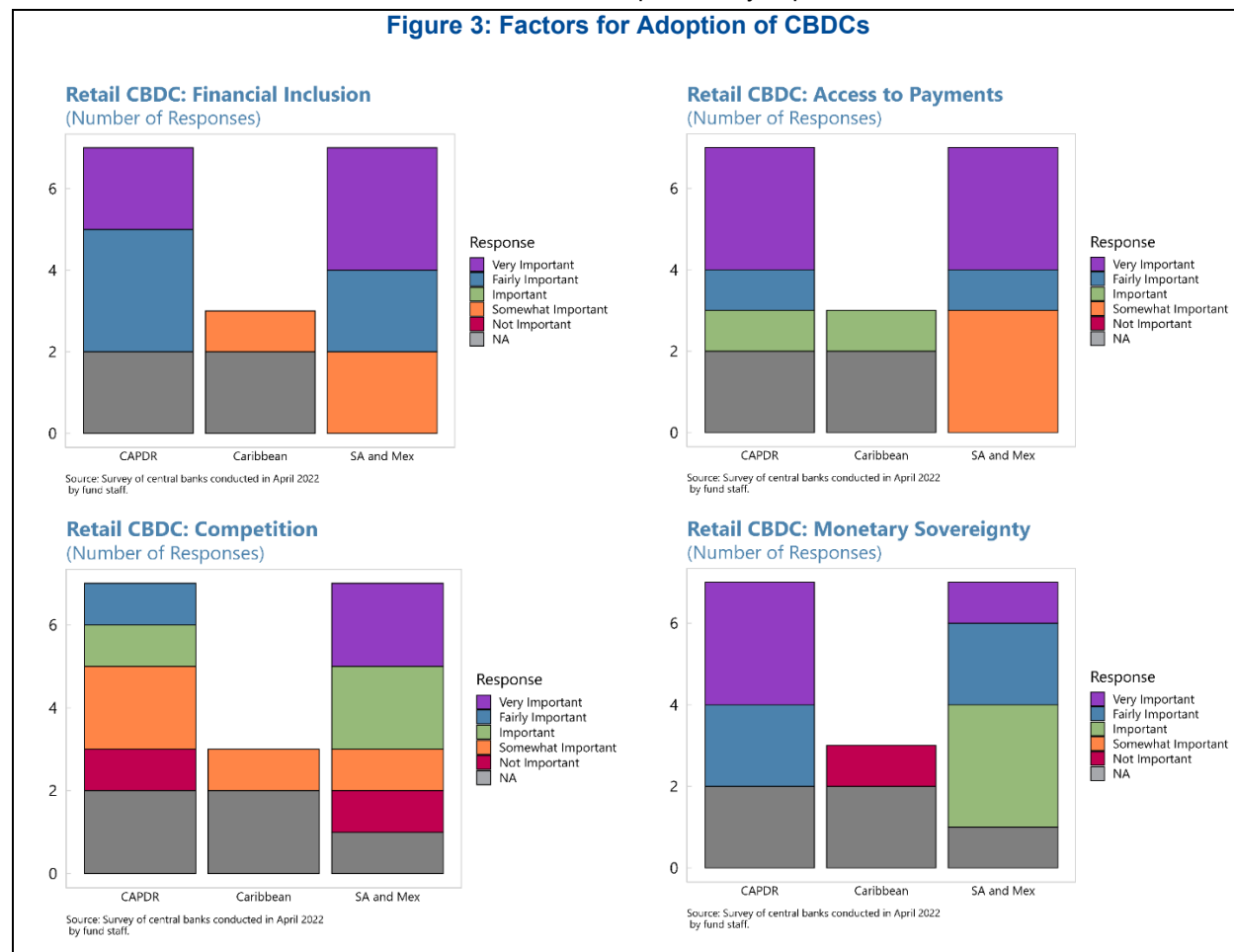


Nonetheless, progress towards the adoption of CBDCs is generally in the early stages, mainly focused on research, planning, and regulatory screening. In particular, most CAPDR countries are researching different implications of an introduction of CBDCs, albeit they have not undertaken any specific action yet, seeing such adoption within 4-6 years (see Annex II).

²⁰ The regional survey conducted among authorities in LAC is part of a larger survey on CBDCs, cryptoassets and stablecoins, presented in the forthcoming IMF working paper/WHd departmental paper "Digital Currencies in LAC: Opportunities and Risks" by Appendino et al..

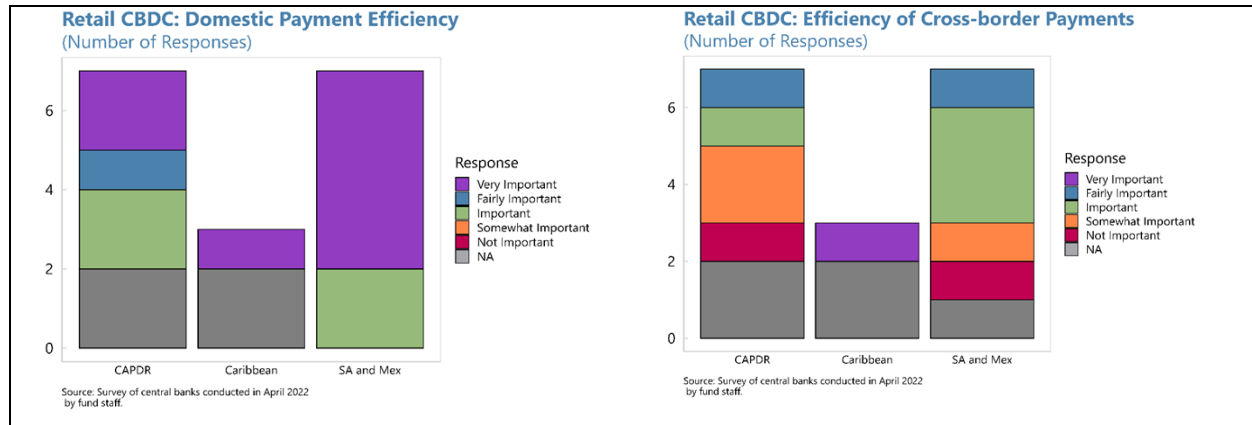
Financial inclusion, access to payments, and monetary sovereignty are seen as key drivers for adoption of CBDCs across LAC and in CAPDR. Monetary sovereignty, seen as the ability to retain control over monetary emission within the national boundaries, is considered a particularly important driver in CAPDR.

Figure 3: Factors for Adoption of CBDCs



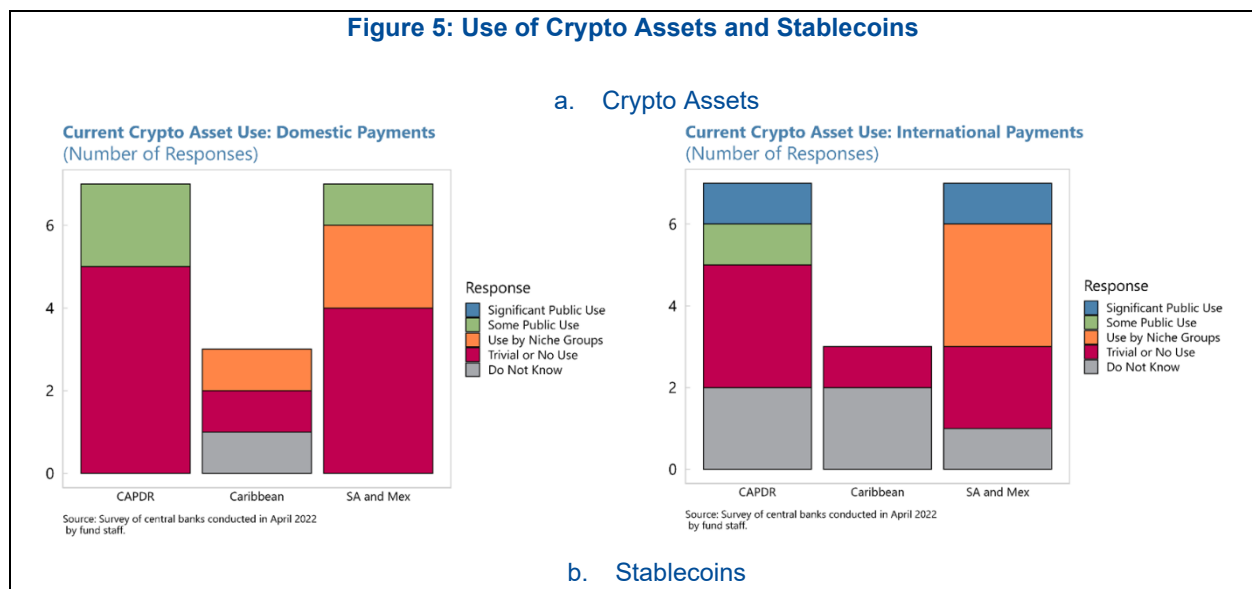
The efficiency of domestic payments is seen by the authorities as a considerably more important factor than the efficiency of cross-border payments for introducing CBDCs, highlighting that the authorities place higher priority on improving the domestic payment systems through digitalization.

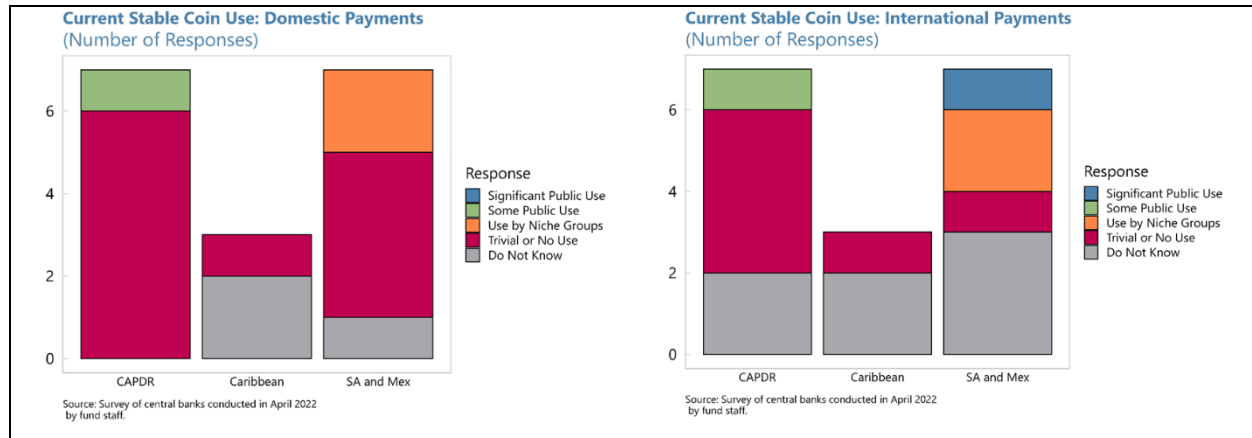
Figure 4: Domestic vs. Cross-Border Payment Efficiency



Crypto Assets and Stablecoins

The use of non-public types of digital money—such as crypto assets and stablecoins—is limited beyond a few countries in the region. There is a perception that the use of crypto assets and stablecoins is particularly limited for domestic payments across LAC, with a few exceptions of countries reporting some public use and use by niche groups, and others mentioning limited knowledge about the use of crypto assets and stablecoins.

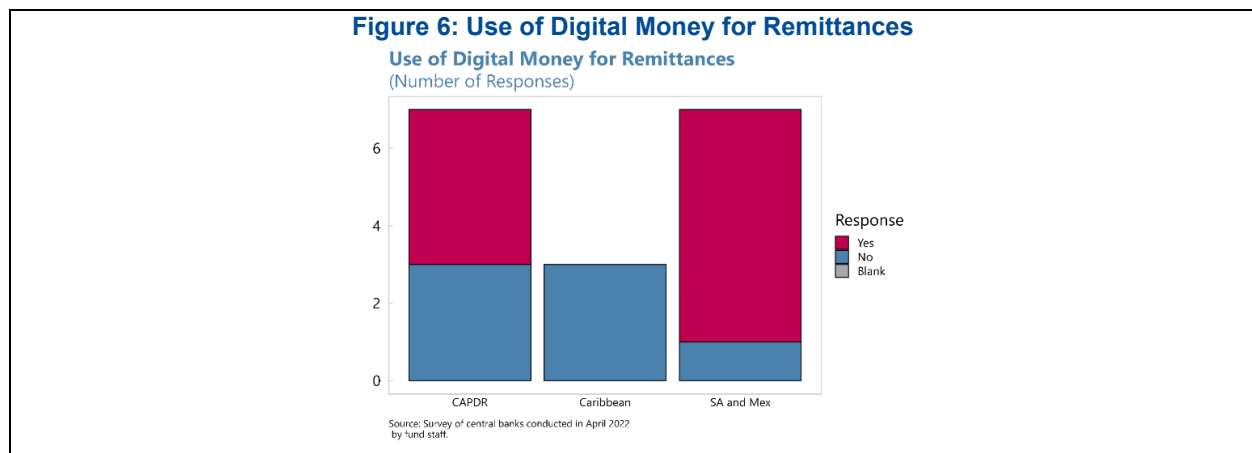




Whenever the authorities have views about the trend in use of crypto assets and stablecoins, it seems to be increasing for both (see Annex II). Most of the authorities are studying the implications from wider use of crypto assets and stablecoins for financial stability, financial integrity, and the legal framework (see Annex II).

Use of Digital Money for Remittances

This section summarizes the authorities' views about the use of digital money for remittance transfers and their assessment about potential risks. In general, the authorities perceive that digital money is currently being used for remittance transfers in several economies in CAPDR as well as in South America and Mexico.

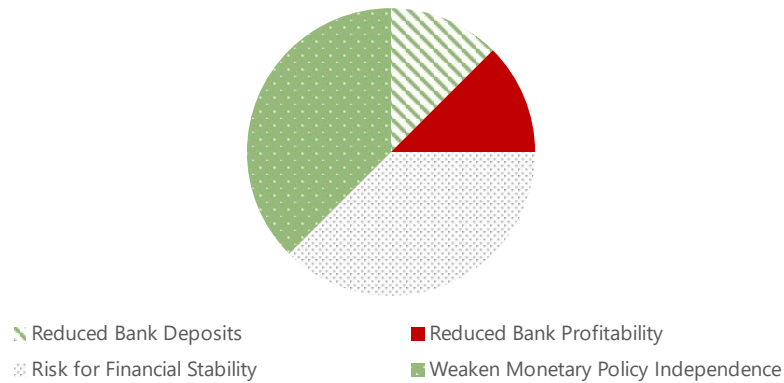


For most LAC authorities, remittance transfers via digital money are perceived as involving risks (see Annex II). In turn, such risks are currently being addressed with the legislation in place in several countries in CAPDR and South America and Mexico. Several other jurisdictions, mainly in CAPDR, are in the process of legislative adjustments aimed at addressing such risks.

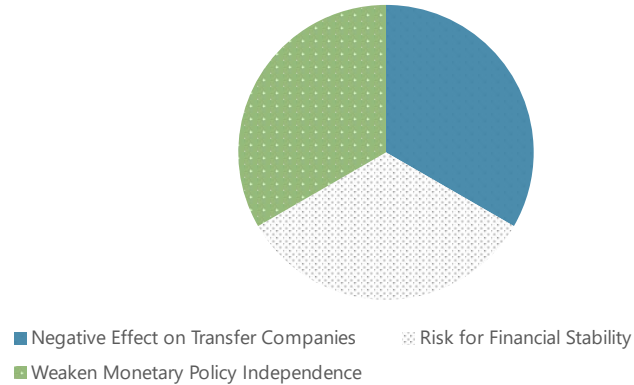
The risks that CAPDR authorities are more concerned with are related to monetary independence and financial stability (Figure#), more so than for other country groups in LAC. The authorities in LAC perceive also other risks associated with digital remittances, such as reduced bank profitability and lower bank deposits (CAPDR and South America and Mexico) as well as negative implications for the transfer companies (mainly in the Caribbean; see Annex II).

Figure 7: Authorities' Perception of Risks from Digital Remittances

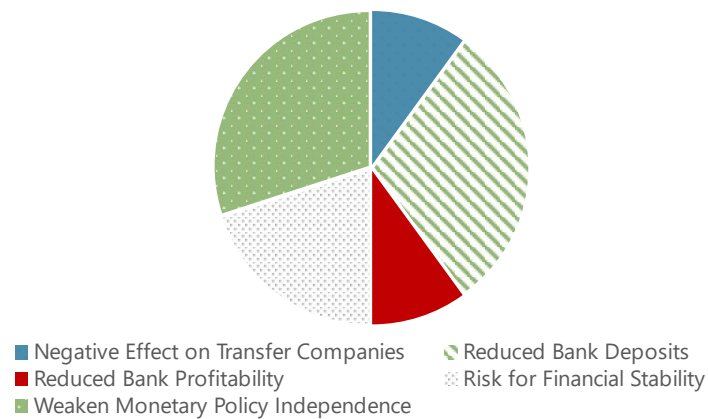
Risks of Remittances via Digital Money in CAPDR



Risks of Remittances via Digital Money in Carribean



Risks of Remittances via Digital Money in SA and Mex



Source: Survey of central banks conducted by IMF staff.

V. Concluding remarks

The expansion of the fintech sector and the proliferation of new and innovative digital tools/solution provides ample opportunities to lower the costs of cross-border transactions, and remittances in particular. This paper focuses on remittances, a key cross-border flow for most countries in CAPDR, and explores the factors that could reduce remittance fees, and if digitalization of remittances plays such a role. To our knowledge, this is the first paper that attempts to consistently measure and classify digital remittances, rigorously analyze what role digital money plays in lowering transaction fees of remittances, and explain what the authorities could and plan to do in the area of digital money in CAPDR.

Based on our sample, using data over 2013–2021 from 44 corridors, we find a clear trend of declining remittance fees across countries and at any level of digitalization. However, remittances fees are, on average, higher for CAPDR countries relative to non-CAPDR countries, particularly for certain digital transaction modes.

Using regression analysis to assess the relationship between remittance fees and country- or corridor-specific factors, we find that more competition is most of the time associated with lower fees, especially in non-digital transactions, although more research is needed for CAPDR. Other factors capturing financial and digital development in receiving countries tend to be associated with lower remittances fees, such as debit/credit card ownership or bank branch penetration, across most digital and non-digital transaction modes, especially in CAPDR.

Given the results of our empirical analysis, we could see that increasing further financial access through digitalization means, is particularly important to reduce remittances fees in CAPDR, and to meet the UN development goal to lower below 3 percent. The use of existing digital money in CAPDR—such as debit/credit cards—is limited by several structural factors, including (a) prevalent cash use; (b) low financial inclusion; and (c) regulatory gaps, especially in Know Your Customer. These factors seem to explain higher fees for digital remittances paid online with debit/credit card or using mobile money in CAPDR relative to other regions. Therefore, the national authorities could: (i) widen access to digital financial services; (ii) grant access to more payment providers; and (iii) align Know Your Customer regulations with international standards in order to reduce remittances fees and, most importantly, promote the use of digital money.

The LAC and CAPDR authorities are indeed exploring the use of public CBDC and non-public digital money systems in their goals to advance domestic payment systems, expedite financial inclusion, and lower remittances fees. While adoption of retail CBDCs and non-public digital money systems could achieve the set goals, there are considerable risks identified by national authorities in CAPDR, such as risks to monetary sovereignty.

Digital remittances, as a novel and rapidly evolving phenomenon, is a promising field for future research. In particular, there is a need for more granular studies that shed light on digital remittances and associated fees using firm-level data of remittances service providers in CAPDR, and intermediary-corridor level data. In turn, such granular studies would improve the understanding of the broader economic implications of digital remittances, including for the stability, profitability and future evolution of the banking systems in the recipient countries.

Annex I. Drivers of Digital Remittances

Summary statistics

Annex Table 1. Summary statistics

	Obs	Mean	Std.Dev.	Min	Max
Remittance Fee (in percent of amount sent)	377	3.40	1.27	0.92	9.54
Remittance volume (US\$ billion)	377	2.88	5.18	0.03	41.84
Number of providers	377	8.53	3.75	1.00	24.00
Owens a debit/credit card sending country	377	84.04	9.72	65.58	96.86
Owens a debit/credit card receiving country	353	29.21	18.53	1.70	83.57
Bank branches per 1,000 km ² sending country	377	85.28	151.88	0.80	431.25
Bank branches per 1,000 km ² receiving country	377	18.65	20.03	0.47	82.43
Ln(GDPPC) sending country	377	10.59	0.38	9.90	11.11
Ln(GDPPC) receiving country	377	8.12	0.81	6.45	9.92
KYC receiving country	315	55.31	34.74	0.00	100.00
Number of MM services receiving country	1406	1.00	1.26	0.00	4.00

Sources: GSMA, IMF Financial Access Survey, KNOMAD, OECD and World Bank National Accounts, The Global Findex Database and Remittance Prices Worldwide (RPW) by The World Bank.

Notes: The largest specification covers 44 corridors for the period 2013–2021. Remittance fee is in percent of the amount sent, 200\$ transfer. The fees refer to transaction with execution by next day or less. Extreme values, non-transparent transactions have been dropped and additional cleaning of remittance fees data have been conducted. The variable “Owens a debit or credit card” is in percent of population 15+ age. “KYC” indicates the Know Your Customer score (where a higher score is associated with a more enabling regulatory framework for mobile money adoption, from 0—minimum score—to 100). The “Number of Mobile Money (MM) services” is calculated using GSMA data. It refers to the number of mobile money services that allow to receive international remittance in a country. Countries that according to GSMA do not have MM services or that are not in GSMA sample have been assigned a score of 0 or have been excluded from the analysis. The variables “Owens a debit or credit card”, “Bank branches” and “GDPPC” have been winsorized at the 1st and 99th percentiles. “Remittance volumes”, “Owens a debit or credit card”, “Bank branches”, “GDPPC”, “KYC” are lagged by one year while “Number of MM services” is lagged by one quarter due to a different frequency. If missing, data have been replaced with the closest available observation. Bilateral remittance volumes have been estimated for 2019 and 2020 from balance of payments data.

The distribution of remittance services by transaction mode

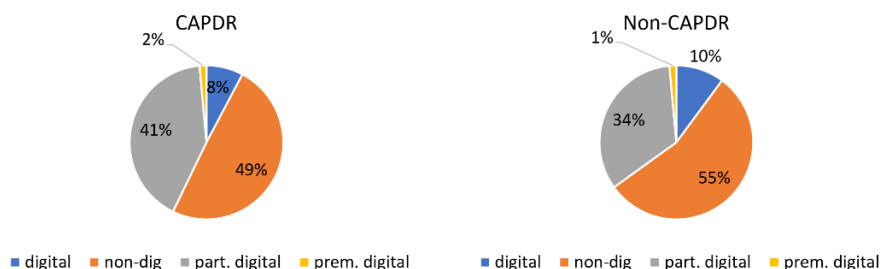
As data series on the volume of transactions are scarcely available, the aggregate share of transaction modes available to customers can serve as a good substitute to provide insights on the relative importance of different modes across regions. Using 2019 as a reference period, Figure 2 shows the distribution of providers by mode of transaction in CAPDR and non-CAPDR, as well as across CAPDR countries²¹. In our sample, in both CAPDR and non-CAPDR countries about 50 percent of available transaction modes are non-digital services. The remaining share offers some sort of digital services (digital, partially digital, and premium digital) – see Panel A.

²¹ For each provider, duplicates within transaction modes are dropped.

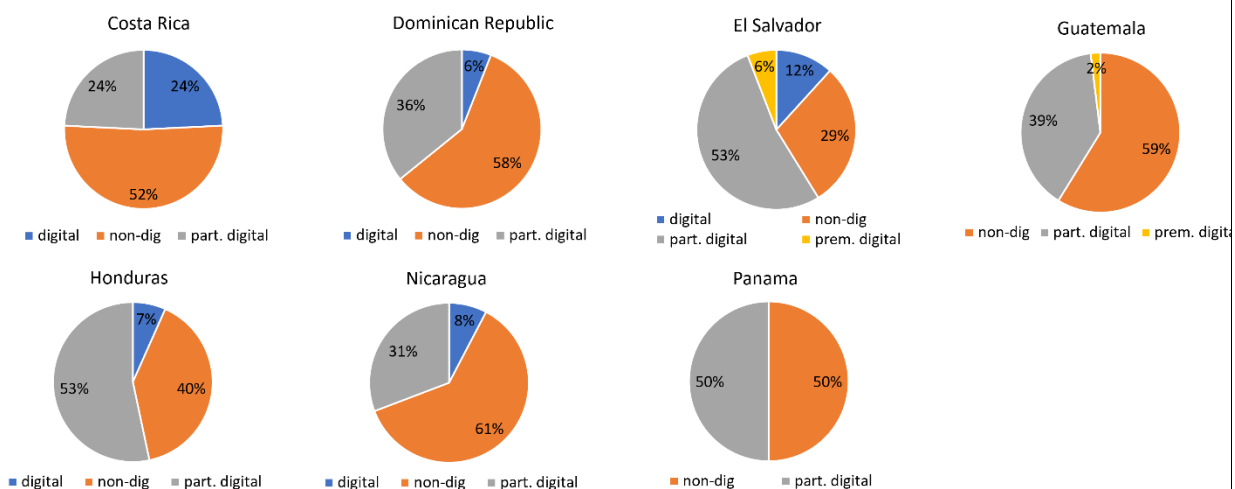
In most CAPDR countries, non-digital transaction modes account for 50 percent or more of the aggregate transaction modes available to customers, with only few countries offering premium digital services. However, there are some exceptions. In Honduras and El Salvador non-digital transaction modes are less frequent (40 percent and 30 percent respectively), and, together with Guatemala, El Salvador offers some premium service options – see Panel B.

Annex Figure 1. Shares of remittance services by mode of transaction, 2019

Panel A. CAPDR and Non-CAPDR



Panel B. CAPDR countries



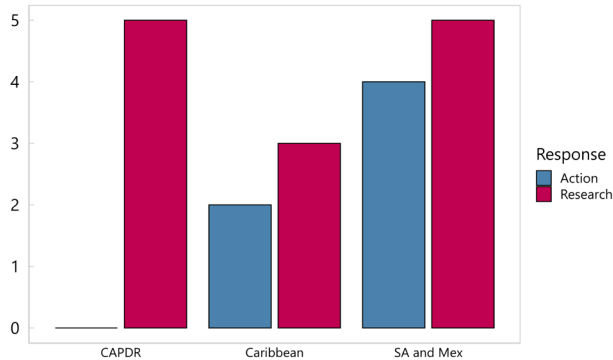
Source: RPW World Bank, Authors' calculations.

Annex II. Details from Authorities' Survey

Progress towards the adoption of CBDCs is generally in the early stages across LAC, mainly focused on research, planning, and regulatory screening

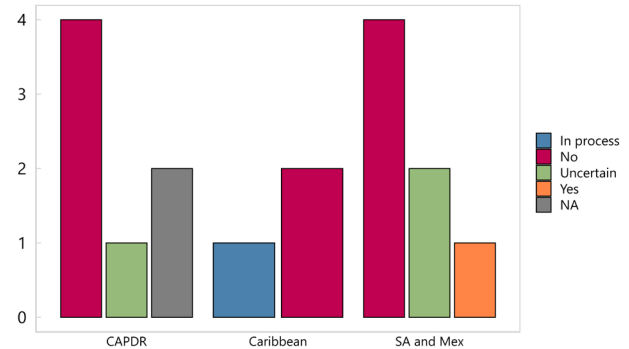
Annex Figure 2: CBDC Experimentation and Regulatory Frameworks

CBDC Experimentation in LAC
(Number of Responses)



Source: Survey of central banks conducted in April 2022 by fund staff.

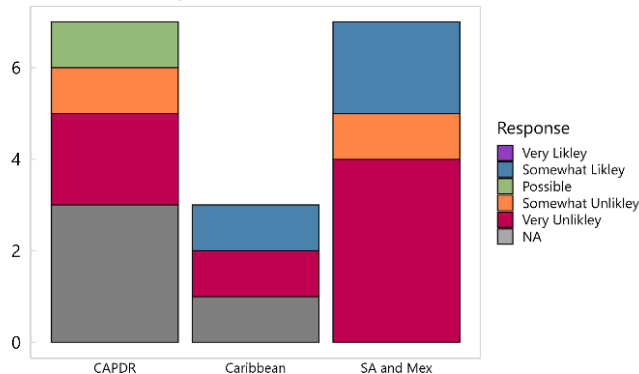
Can CB Legally Issue CBDC?
(Number of Responses)



Source: Survey of central banks conducted in April 2022 by fund staff.

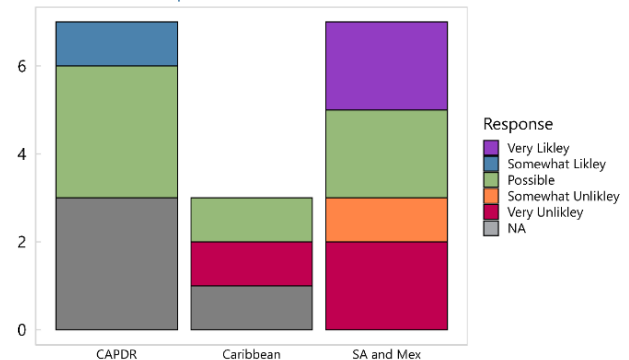
The authorities generally see a longer time horizon for the actual adoption of retail CBDC

Retail CBDC Within 3 Years
(Number of Responses)



Source: Survey of central banks conducted in April 2022 by fund staff.

Retail CBDC Within 4-6 Years
(Number of Responses)

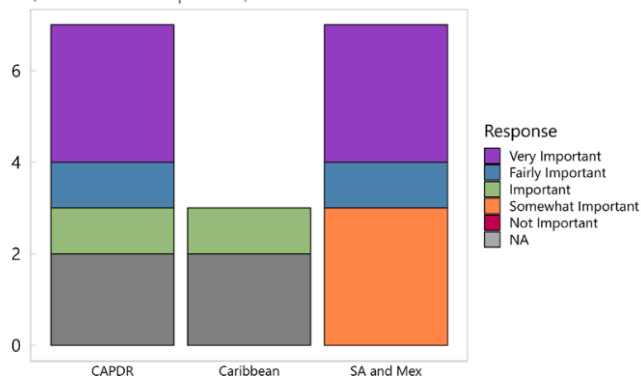


Source: Survey of central banks conducted in April 2022 by fund staff.

Access to payments and payments resilience are important factors for consideration of retail CBDCs, particularly in CAPDR and South America and Mexico. Efforts to reduce illicit use of money as well as the pandemic have played a role in some countries.

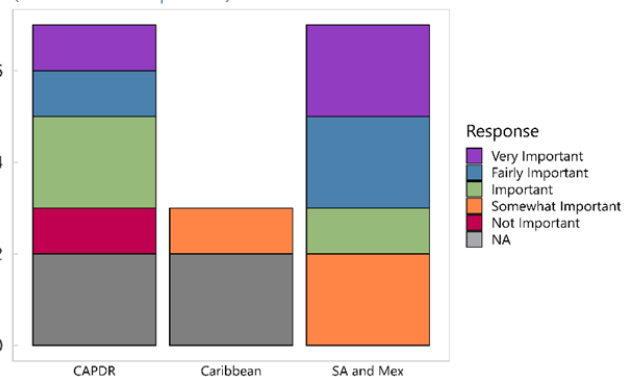
Annex Figure 3: Factors for Adoption of CBDCs

Retail CBDC: Access to Payments
(Number of Responses)



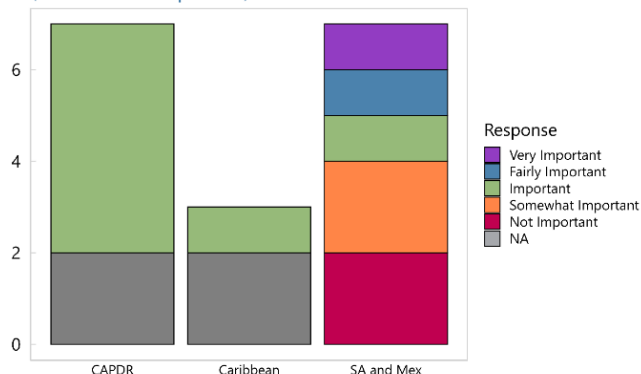
Source: Survey of central banks conducted in April 2022 by fund staff.

Retail CBDC: Payments Resilience
(Number of Responses)



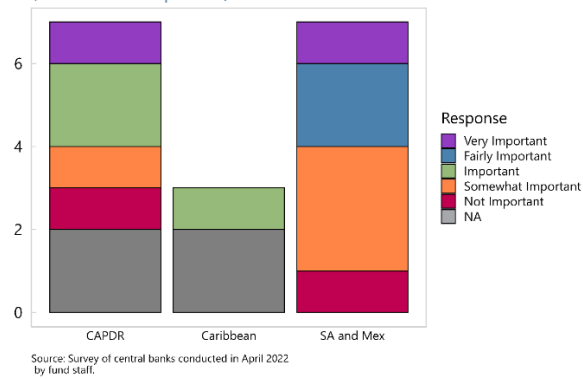
Source: Survey of central banks conducted in April 2022 by fund staff.

Retail CBDC: Pandemic
(Number of Responses)



Source: Survey of central banks conducted in April 2022 by fund staff.

Retail CBDC: Reduce Illicit Use of money
(Number of Responses)

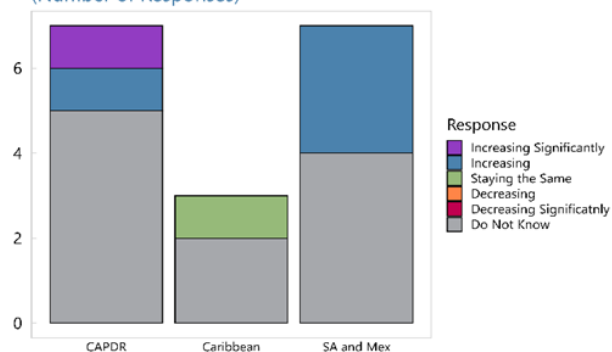


Source: Survey of central banks conducted in April 2022 by fund staff.

Information about the trends in use of crypto assets and stablecoins is generally scarce. When available, it generally points to increasing trends in their use.

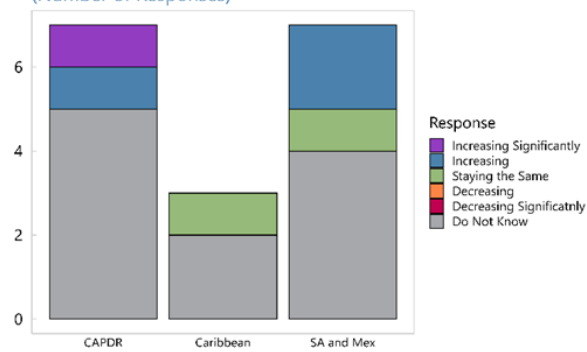
Annex Figure 4: Trends in Use of Crypto Assets

Trend in Crypto Asset Use: Domestic Payments
(Number of Responses)



Source: Survey of central banks conducted in April 2022 by fund staff.

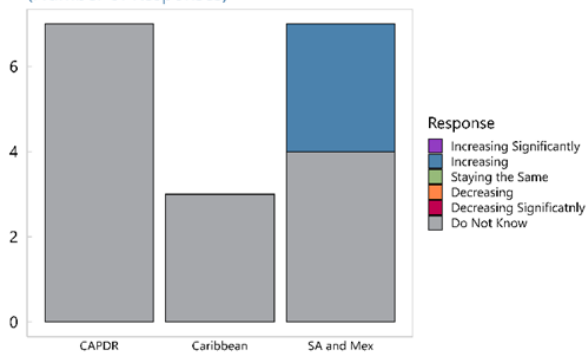
Trend in Crypto Asset Use: International Payments
(Number of Responses)



Source: Survey of central banks conducted in April 2022 by fund staff.

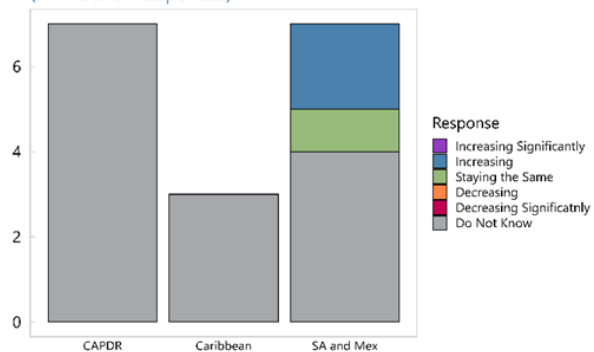
Annex Figure 5: Trends in Use of Stablecoins

Trend in Stable Coin Use: Domestic Payments
(Number of Responses)



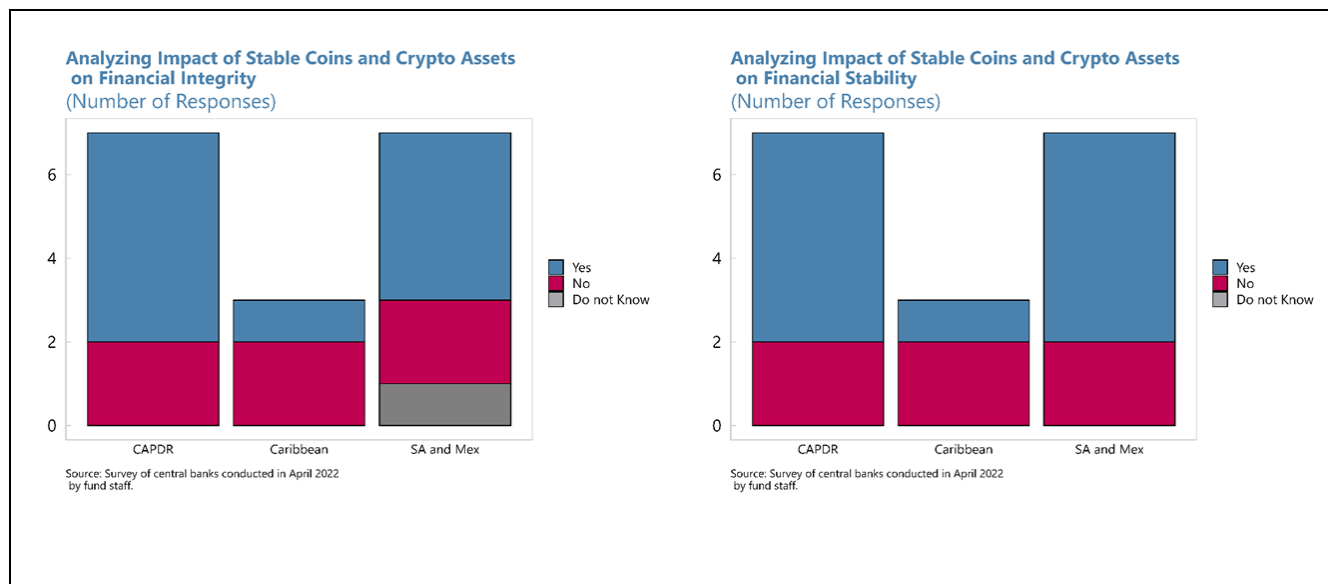
Source: Survey of central banks conducted in April 2022 by fund staff.

Trend in Stable Coin Use: International Payments
(Number of Responses)

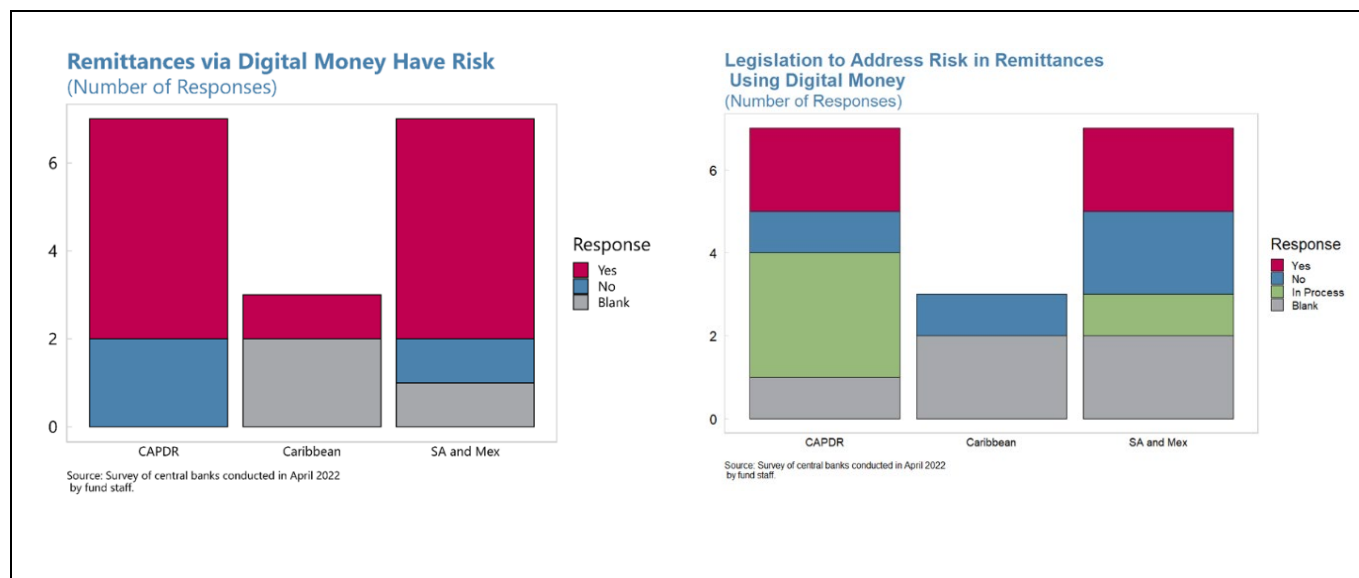


Source: Survey of central banks conducted in April 2022 by fund staff.

Most authorities in LAC are analyzing the implications of crypto assets and stablecoins for financial stability and integrity.



For most LAC authorities, remittance transfers via digital money are perceived as involving risks. Several jurisdictions, mainly in CAPDR, are in the process of legislative adjustments aimed at addressing such risks.



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