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Do Capital Controls Slow Cross-Border Payments in the Last Mile? Preliminary Evidence

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ABSTRACT: Cross-border payments face multiple challenges that may result in slow transaction speed, particularly at the beneficiary leg, which constitutes the last mile of the payment process. This paper measures whether capital controls are associated with slower cross-border payments, using two novel cross-country datasets derived from microeconomic data. While it does not establish causality, preliminary evidence suggests that the effect is statistically significant and sizeable. A one-standard-deviation increase in the Financial Account Restriction Index, our measure of capital controls, is associated with a delay of 4 to 8 hours at the beneficiary leg. The effect is stronger in Emerging and Developing Economies, and heterogeneous across geographic regions.

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WORKING PAPERS

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I. Introduction

Efficient cross-border payments are foundational to global economic activity. Financial institutions, corporates, and individuals rely on payments to move value across borders. At the same time, some countries implement controls on capital inflows or outflows—with various macroeconomic objectives such as stabilizing markets in case of sudden outflows—which can impede cross-border payments. In the IMF's Institutional View on the Liberalization and Management of Capital Flows, these capital controls are a type of capital flow management measures (CFMs) that are considered appropriate only under certain circumstances and only if they do not substitute for warranted macroeconomic adjustment (IMF 2012, 2022). While such measures may be effective in achieving their policy objectives, they may also influence the timeliness of payments.

The speed of cross-border payments has been measured and tracked by the Financial Stability Board (FSB) since 2020, when the G20 endorsed a target to complete 75 percent of cross-border payments within one hour. Five years later, data showed that only 54.6 percent of payments (other than forward-dated) above $100,000 met this target (FSB 2025). Studies underscore that delays occur mainly in the last leg of the process, after payments have reached the beneficiary bank, rather than on the Swift network (CPMI-BIS-Swift 2022, FSB 2023 and 2024, Swift 2024). This distinct last-mile problem varies widely across countries and regions, with the share of cross-border payments settling within one hour at the beneficiary leg ranging from 24.7 percent in Africa to 81.8 percent in North America in 2024. Several challenges have been highlighted as potential drivers of these delays. These include bank and market infrastructure opening hours and time zones, the use of batch processing, anti-money laundering and countering the financing of terrorism (AML/CFT) compliance procedures, as well as capital controls and related compliance processes.

This paper investigates specifically the role of capital controls in cross-border payment speed. While much of the literature on capital controls looks at their macroeconomic implications (e.g., Eichengreen and Leblang 2003), less attention has been paid to their implications on payment systems. At the same time, the efficiency of payments systems has been explored almost exclusively with a focus on real-time gross settlement and instant payments systems in a domestic context (Boel 2019, Frost and others 2024), mostly focused on settlement risk and other specific issues related to financial infrastructure. It has only very recently turned to consider cross-border payments, largely as a result of the G20 efforts to enhance cross-border payments.

Existing evidence on the relation between capital controls and cross-border payment speed is either limited in scope or purely qualitative. CPMI-BIS-Swift (2022) finds that countries with substantial capital controls tend to have higher payment processing times at the beneficiary leg, using a partial least squares regression approach on a dataset covering over 140 countries. In addition, evidence collected by the IMF and the FSB through surveys and interviews suggests that capital control processing, such as purpose verification or lack of complete supporting documentation, can delay crediting of funds to the beneficiary by hours to days (FSB 2025). By estimating the relationship between capital controls and payment speed for a large panel dataset, this paper fills an important gap.

The empirical analysis presented in this paper exploits two novel granular datasets. The first one is derived from Swift's transaction-level data, anonymized and aggregated, which contains information on the time it takes for a payment to reach the end-customer after it has arrived at the beneficiary bank. The second one measures financial restrictions on capital inflows, using detailed information from the IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) data. The findings suggest that countries with higher levels of capital controls experience slower cross-border payments. For a one-standard-deviation increase in the baseline measure of capital controls, cross-border payment speed decreases by four to eight hours on average. The effect is particularly pronounced in Emerging and Developing Economies and is heterogeneous across geographic regions. In addition, Europe and Central Asia experience slower cross-border payments associated with capital controls. Lower digital readiness, however, does not affect the impact of capital controls on speed in a statistically significant manner. This paper aims to establish for the first time a quantitative relation between cross-border payment speed and capital controls. However, further work is warranted to more clearly establish causality.

The rest of the paper proceeds as follows: Section II describes the data, Section III presents the empirical strategy and the results, Section IV discusses how policies could be informed by these results and identifies areas for future work, and Section V concludes.

II. Data description

This section presents our dataset, which covers 176 countries over the period 2020-2022 at the country level and at an annual frequency. The two primary variables of interest—cross-border payment speed and capital controls—are computed from two novel microeconomic datasets. This section describes them, along with the set of control variables.

A. Cross-border Payment Speed

Before describing the data, we briefly describe the anatomy and structure of cross-border payments and how capital controls may be implemented.

Anatomy of Cross-Border Payments

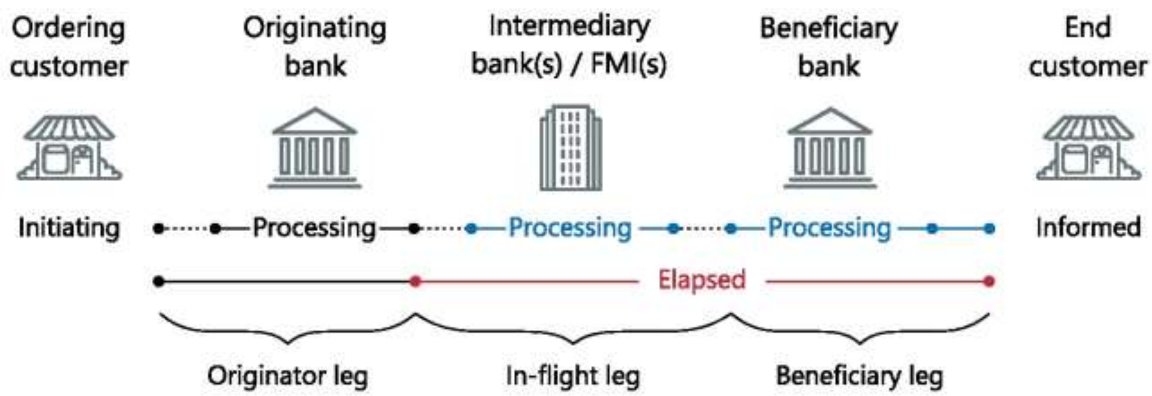
Figure 1 below exemplifies the structure of a typical cross-border payment. At a high level, a cross-border payment conducted through correspondent banks involves three distinct processing phases:

- **Originator leg:** the time from when a payer (ordering customer) initiates a payment with the originating bank until the originating bank submits the payment to the Swift network.
- **In-flight leg:** the time, over the Swift network, from when the originating bank initiates the payment on the Swift network until the beneficiary bank receives it, either directly from the originating bank or through one or more intermediary banks or a payment market infrastructure. If the originating bank has a relationship with the beneficiary bank, no additional intermediaries may be involved.
- **Beneficiary leg:** the time from when the beneficiary bank receives the payment until the funds are credited to the end-customer’s account.

Capital control policies on inflows require several types of compliance checks, which are conducted by the beneficiary bank once the payment has reached its accounts, but before it gets disbursed to the final beneficiary. For most countries, these checks include verifying the beneficiary information (e.g., type of beneficiary and activity, accuracy of the tax identity number), the purpose of payment (in code or text form), and supporting documentation (e.g., contracts, invoices, export bills). Some jurisdictions may request additional checks, such as limits on payment amounts, restrictions on account types eligible for foreign transfers, and may require beneficiary banks to report all transfers to the local regulator. Some of these processes are not easily automated.

Processing times vary from minutes—when all information is complete and accurate, and the payment is recurring for familiar payment service provider clients—to several days when information is incomplete or lacking.

Figure 1. Stylized Process for a Typical Cross-Border Payment on Swift



Source: CPMI-BIS-Swift (2022)

Data

Our measure of cross-border payment speed is computed from Swift's transaction-level data. Swift is a global financial messaging network used by banks, financial institutions, and corporations to send instructions related to financial transactions. It connects more than 11,500 members across more than 220 countries and territories.

This analysis focuses on cross-border payment speed over the beneficiary leg, which we refer to as the Beneficiary Elapsed Time. The duration of payment at the beneficiary leg can be measured using the Unique End-to-End Transaction Reference (UETR) when the beneficiary bank ultimately accepts the payment. The UETR is a payment identifier introduced by Swift's Global Payments Innovation (GPI) system. The Swift GPI system tracks payment transactions end-to-end, capturing timestamps at each stage of processing. This allows the speed of payments to be measured with precision across countries, corridors, and transaction types.[1]

The universe of Swift transaction-level data over the time period considered consists of approximately 4 billion observations. The maximum retention period is four years in Swift's databases, implying that data was only available from 2020 at the time of drafting. Several filters are applied to the raw data. First, to ensure that the observed relationship is driven by capital controls rather than sanctions, countries that are subject to access restrictions from Swift in the period 2020-2022 are excluded from the dataset.[2] Second, domestic payments are dropped, as capital controls should not directly impact the Beneficiary Elapsed Time. However, foreign-currency transactions between domestic banks are not excluded, since many capital controls involve the holdings and domestic transfers of foreign currency. Third, only Single Customer Credit Transfers (CCT, message type MT103), which represent direct customer-to-customer credit transfers, are kept in the sample. Transfers related to interbank-only settlements, treasury and securities markets, trade finance or cash management are filtered out. Fourth, the sample is restricted to transactions where the beneficiary's account has been confirmed as

[1] For further details on Swift's GPI, see Swift (2020).

[2] These countries are Afghanistan, Belarus, Iran, Myanmar, Russia, Somalia, and Venezuela. This list is based on Swift's rules and sanctions.

credited (payment status code ACCC). This ensures that only completed payments that have reached the end-customer are captured. Among those, transactions credited with a future value date (FVD) are removed. These payments have technically reached the beneficiary bank, but the funds are not available to the customer until the value date. Including them would overstate actual delivery speeds. After filtering, the transaction-level data is anonymized and aggregated to the country-year level for the regression analysis.

B. Financial Account Restriction Index (FARI)

Capital controls are restrictions, taxes, or prohibitions on a country's capital markets when they operate with other countries or in other currencies. The IMF publishes the AREAER, a database that tracks exchange rate and trade regimes of all IMF member countries and contains detailed information on capital controls. From this detailed information, a single binary variable captures the presence of capital controls for each asset category, and for both inflows and outflows. The AREAER is available at an annual frequency and covered data through 2022 at the time of drafting.

Using data from the IMF AREAER, Baba and others (2026) construct a Financial Account Restriction Index (FARI), which takes a subset of the binary variables and averages them for each country and time period. The index ranges from 0 to 1, with a value of 0 indicating minimal capital restrictiveness. The index includes not only controls on the standard portfolio and direct investment categories but also controls on categories that cover nonresidents' foreign currency accounts in the country and domestic residents' accounts abroad as well as repatriation and surrender requirements. The broad coverage of transactions provides a more representative measure of the degree of restrictiveness of a country's financial account. However, it does not capture restrictions on current account transactions such as those related to imports and invisible transactions.

The FARI is highly correlated with other popular indices of capital openness, such as Chinn-Ito (2006) and Fernández and others (2016), but it is available for a large set of countries, encompasses a wide array of restrictions, and provides a breakdown by direction of flows. While the FARI captures the presence of capital controls, it does not contain information on their intensity or the degree to which they are enforced—two aspects left for future investigation. Data is available for a large set of countries, allowing us to exploit rich cross-sectional heterogeneity (Table 1).[3]

Three indices are computed: (1) the FARI covering restrictions on capital inflows, (2) the FARI covering restrictions on capital outflows, and (3) an aggregate index covering both. We use the FARI on inflows (henceforth referred to as "the FARI") as it most closely relates to the Beneficiary Elapsed Time described above. It is highly correlated ($\rho = 0.9$) with the aggregated index, suggesting that the choice of index may not significantly change the results. We report the sample summary statistics in Table 1. Most of the variation comes between countries rather than within countries, as capital controls are typically slow-moving processes.

In the universe of cross-border transactions submitted to the Swift messaging system, it is not possible to discriminate between those that are affected by capital controls and those that are not. We expect retail payments and remittances to be less affected by capital controls, yet they are included in our sample. This may contribute to measurement errors, as the relative volume and speed of different payment types are likely different. However, while measurement errors affecting an outcome variable imply larger standard errors, they do not lead to biased results.

[3] When data is not available, missing values are recorded.

C. Other control variables

In addition to the FARI, we include a set of macrofinancial and digital readiness controls (Table 1). This set is parsimonious, as our objective is to measure the relationship between the Beneficiary Elapsed Time and the FARI, rather than build a fully saturated model to predict payment time. Where any of these variables are missing, we use linear interpolation within each country. Imputed data account for less than 20 percent of each variable individually.

Table 1. Summary Statistics and Data Sources

	Mean	Median	Std. Dev.	Min	Max	Country coverage	Data Source
Cross-border payment speed:							
Beneficiary Elapsed Time (hours)	30.72	27.84	19.93	2.50	120.00	176	Swift
Capital controls:							
FARI on inflows	0.29	0.21	0.22	0.00	0.83	176	Baba and others
Macrofinancial conditions:							
Log RGDP per capita	11.29	11.02	3.40	-18.96	19.04	190	IMF WEO
Log population	15.66	16.02	2.21	9.24	21.07	190	IMF WEO
(Exports+Imports)/GDP	0.00	0.00	0.00	0.00	0.00	174	IMF WEP
Foreign Direct Investment/GDP	0.00	0.00	0.00	0.00	0.00	165	IMF BOPS
Remittances/GDP	0.02	0.00	0.11	0.00	2.02	188	IMF BOPS
Current account/GDP	0.00	0.00	0.00	0.00	0.00	174	IMF BOPS
Bid/Ask spread	68.00	-0.04	924.41	-185.84	12,045.00	161	LSEG
FX rate volatility	0.09	0.06	0.14	0.00	1.89	171	LSEG
Financial Access:							
Bank branches per 1,000 adults	16.03	12.45	15.20	0.38	122.77	168	IMF FAS
Deposit accounts per 1,000 adults	1,704	1,329	1,504	53	10,202	125	IMF FAS
Mobile Transactions per capita	46,125	16,640	97,652	3	944,181	64	IMF FAS
Digital readiness							
Cybersecurity	6.31	6.37	4.24	0.00	12.00	187	ITU
Digital readiness	-0.01	-0.06	0.99	-1.89	2.37	144	CISCO
Web servers/population	17,704	614	43,902	1	342,413	191	World Bank

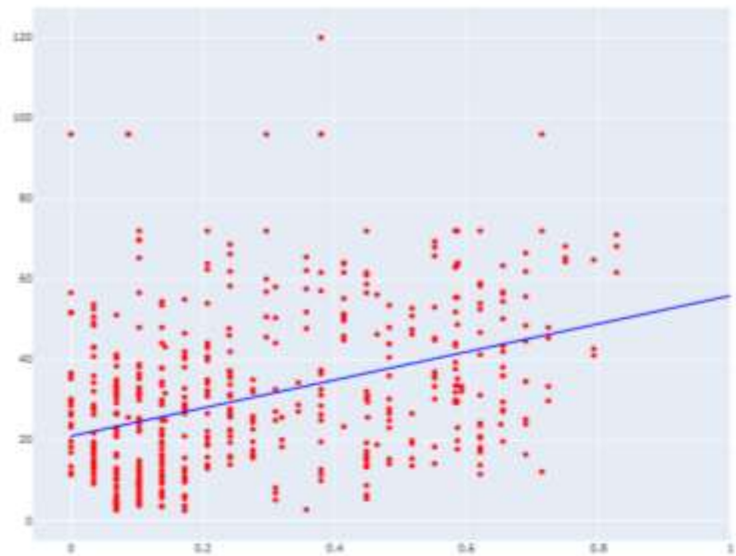
Notes: Statistics for the macrofinancial, financial access and digital readiness variables are reported before interpolation.

III. Methodology and Empirical Results

The empirical analysis aims to assess the relationship between capital controls and payment speed. Figure 2 displays the relationship between the average Beneficiary Elapsed Time (on the y-axis) and the FARI on inflows (on the x-axis). Each dot represents a country-year, and the red line indicates the univariate line of best fit.[4] The plot suggests a positive relationship between the two variables. Notably, there is substantial dispersion at each value of the FARI, suggesting as expected that many other factors influence payment speed.

[4] The FARI is a discrete variable, computed as an average of binary variables.

Figure 2. Average Beneficiary Elapsed Time (y-axis) and FARI on Inflows (x-axis)



Notes: The average Beneficiary Elapsed Time is the average by country over all payments within a year, for each recipient country. The FARI is taken from Baba and others (2026). It ranges from 0 to 1, with a value of 0 indicating minimal restrictiveness. Each dot represents a country-year. The line of best fit is estimated via OLS.

A. Baseline regressions

To examine the relationship between the Beneficiary Elapsed Time and the FARI on inflows, we estimate a pooled panel regression via Ordinary Least Squares (OLS) given the short time dimension of the dataset. The baseline regression equation takes the following form:

$$\text{Beneficiary Elapsed Time}_{it} = \beta_0 + \beta_1 \text{ FARI on Inflows}_{it} + \beta_2 \text{ Macrofinancial Conditions}_{it} + \beta_3 \text{ Financial Access}_{it} + \beta_4 \text{ Digital Conditions}_{it} + \varepsilon_{it}$$

where 'Macrofinancial Conditions', 'Financial Access', and 'Digital Conditions' are vectors of country-level controls presented in Table 1. In every regression, we report robust standard errors to account for heteroscedasticity.

First, we present the results from a univariate regression of the average Beneficiary Elapsed Time on the FARI (Table 2, column 1). The results imply that the average Beneficiary Elapsed Time increases by nearly **eight hours** for a one-standard deviation increase in the FARI on inflows (Table 2).[5] The coefficient associated with the FARI is statistically significant at the 1 percent confidence level. The FARI alone can explain around 15 percent of the variation in the Beneficiary Elapsed Time, suggesting that capital controls play an important role in the delays payers and payees face in cross-border transactions.

Other factors could cause both delays in processing payments and capital controls, such as macrofinancial conditions and institutional factors. Omitting them would cause the reported coefficients to be biased upward. We take steps towards rectifying this by including a set of proxies to account for these unobserved factors (Table

[5] The FARI on inflows is calculated over 29 AREAER components. A component takes value 1 if a capital control is in place, and the index is calculated as the sum of components with value 1 divided by 29. A one-standard deviation increase of 0.22 corresponds to approximately 6-7 components having a capital control in place.

2, column 2). The strong positive relationship survives the inclusion of these controls, while the size of the effect is slightly attenuated. Results show that a one-standard deviation increase in the FARI is associated with an increase in average speed of slightly more than **four hours**. This reduction in the magnitude of the relationship is expected and suggests that our other controls are correlated with the FARI and the Beneficiary Elapsed Time. Additionally, the coefficient on the FARI is statistically significantly greater than zero at the 1 percent confidence level. Unsurprisingly, our model now explains more of the variation—up to 38 percent of the variation from the mean.

While the coefficients on the control variables are not the focus of our study, we note that some of the most significant relationships have directions that are plausible. For example, the trade dependence variable is associated with a negative coefficient. This could suggest that countries that are more dependent on trade invest in better infrastructure for cross-border payments. Additionally, both variables related to technology—the cyber security and digital readiness indices—have negative coefficients, suggesting that the less technologically advanced countries face slower cross-border payments.[6]

[6] We also tried an AML/CFT specific variable capturing the presence of a country on the Financial Action Task Force (FATF) grey list. This variable had a statistically insignificant coefficient even as the sole explanatory variable. When included in the regression with the FARI, the FARI coefficient was slightly smaller, while the FATF grey list variable turned slightly negative and insignificant at all standard confidence levels.

Table 2. Baseline Regression Results

	Average Beneficiary Elapsed Time	
	(1)	(2)
FARI on inflows	**34.87***** **(3.62)**	**19.54***** **(4.02)**
Log(Real GDP per capita)		0.33 (0.34)
Log(Population)		-0.70 (0.53)
Trade (X+M)/Y		-6059.45*** (2231.31)
FDI/GDP		-725.10* (402.25)
Current account/GDP		6975.82 (5638.67)
Remittances/GDP		16.53*** (6.15)
FX bid ask spread		0.01 (0.04)
FX volatility		10.47 (7.53)
Bank branches per 1,000 adults		-0.00 (0.04)
Deposit accounts per 1,000 adults		-0.00 (0.00)
Mobile transactions per 1,000 adults		-0.00 (0.00)
Cybersecurity Index		-0.89*** (0.33)
Digtital readiness		-5.68*** (1.48)
Web servers per 1M people		0.00 (0.00)
Constant	21.03*** (1.25)	39.86*** (8.43)
R-Squared	0.15	0.28
F-Stat	92.76	6.76
Observations	528	528

Notes: This table shows how average cross-border payment speed responds to an increase in the FARI, in a univariate (column 1) and multivariate (column 2) specification. The Average Beneficiary Elapsed Time is the average duration of transactions in hours for each country-year. The FARI is taken from Baba and others (2026). It ranges from 0 to 1, with a value of 0 indicating minimal restrictiveness. Robust standard errors are reported in parentheses. *p<0.10, ** p<0.05, ***p<0.01

We test the robustness of our results using the median Beneficiary Elapsed Time instead of the average and find similar results in terms of signs and significance levels (see Annex 1). As expected, the coefficients reflect smaller magnitudes, due to reduced variation. In addition, we test for the presence of nonlinearities in the relationship between the Beneficiary Elapsed Time and the FARI and conclude that the results are not driven by our baseline linearity assumption (Annex 2).

B. Interactions

Next, using models including interactions, we explore if specific groups of countries could drive the relationship between capital controls and payment delays. We classify countries by (1) income groups, (2) digital readiness, and (3) region. We then interact these variables with the FARI. We present regressions that include only the group-level effects, the FARI, and their interactions, as our sample does not have enough variation to identify separately the coefficients of our controls and higher-level interaction terms together.

By income group

First, we classify the countries in our sample into Advanced Economies (AEs) and Emerging and Developing Economies (EMDEs), using the IMF World Economic Outlook classification. AEs are defined here as the reference group, so that the constant reported in the table is the intercept for the AEs, while the EMDEs coefficient represents the difference between the two groups, and similarly for the slope coefficient.

We find substantially different impacts of capital controls between the two groups (Table 3). For AEs, we cannot reject that the impact of FARI is zero, while for EMDEs, we observe a positive but marginally significant effect. In EMDEs, a one-standard-deviation increase in the FARI is associated with payment delays of approximately **nine hours** compared to AEs. Constants also differ greatly between the two groups. In particular, after accounting for capital controls, payments take 13 hours longer in EMDEs compared to AEs. Additionally, we note that the F-statistic remains large in both regressions, illustrating the overall importance of the explanatory variables. These results highlight the importance of considering the heterogeneous impact of capital controls across different income groups.

By digital readiness

Next, we split the sample between countries of higher and lower digital readiness. As a proxy, we use the 2021 Cisco digital readiness index, which includes seven components related to technology infrastructure and adoption, ease of doing business, human capital development, business and government investment, basic human needs and the start-up environment.[7] A value of -1 (respectively +1) corresponds to a score of one standard deviation below (respectively above) the global average. We use the median value in our sample to split it. Countries with lower digital readiness are defined as the reference group.

We find that the slope does not differ in a statistically significant way between groups, that is, the impact of capital controls does not vary substantially between countries with higher or lower digital readiness (Table 3). In addition, the results indicate that countries with lower digital readiness experience significantly slower payments, approximately 22 hours slower than countries with higher digital readiness, after accounting for capital controls.

[7] For more information, see https://www.cisco.com/c/m/en_us/about/corporate-social-responsibility/research-resources/digital-readiness-index.html#/

Table 3. Interactions: By Country Income Groups and Digital Readiness

	Average Beneficiary Elapsed Time	
	(1)	(2)
FARI on inflows	**-16.16**	**16.63*** **
	(20.82)	**(1.82)**
EMDE * FARI on inflows	**39.09***	
	(21.19)	
HDR * FARI on inflows		**7.01**
		(6.52)
Emerging and Developing Economy (EMDE)	12.86***	
	(3.06)	
Higher digital readiness (HDR)		-22.01***
		(2.10)
Constant	14.98***	34.34***
	(2.65)	(1.82)
R-Squared	0.25	0.37
F-Stat	98.59	129.46
Observations	528	528

Notes: This table shows how country income groups and digital readiness affect the relationship between capital controls and cross-border payment speed. The Average Beneficiary Elapsed Time is the average duration of transactions in hours for each country-year. The FARI is taken from Baba and others (2026). It ranges from 0 to 1, with a value of 0 indicating minimal restrictiveness. Robust standard errors are reported in parentheses. *p<0.10, ** p<0.05, ***p<0.01

By region

Finally, we split countries by regions. We follow the World Bank regional classification, with one difference being that we group North America (Canada and the United States) with Latin America and the Caribbean.[8] We define Europe and Central Asia as the reference group and include a separate constant and slope for the FARI for each region in the same regression. Every other region has a constant that is defined as the sum of their intercept and the intercept of the reference group, and similarly for the slope coefficient.

The slope coefficients differ significantly across regions, indicating heterogeneous effects of capital controls (Table 4). In Europe and Central Asia, the reference region, a one-standard-deviation increase in the FARI delays payments by around **13 hours**. East Asia and Pacific, the Americas and Sub-Saharan Africa have respectively **10 hours**, **9 hours** and **8 hours** faster payments per standard deviation of FARI, compared to Europe and Central Asia. In South Asia, the overall effect of capital controls is not statistically different from zero. In the Middle East and North Africa, the difference relative to the reference group is not significant.

Relative to Europe and Central Asia, the constants indicate that each region has statistically significantly slower payments. South Asia, apart from the effects of capital controls, displays the slowest speed, with payments taking 52 hours more than they would in Europe and Central Asia. Following this, Sub-Saharan Africa, the Middle East and North Africa region, and East Asia and Pacific have respectively 22-hour, 21-hour and 20-hour slower payments. Finally, the Americas (North America, Latin America and the Caribbean) come next with 12-hour slower payments.

[8] This step was taken to remove country-specific information, due to the confidentiality of the Swift data.

Table 4. Interactions: By Region

	Average Beneficiary Elapsed Time
FARI on inflows	**58.88***** **(14.74)**
East Asia and Pacific	20.15*** (3.67)
Middle East and North Africa	21.23*** (5.14)
Americas	12.18*** (4.11)
South Asia	52.29*** (7.23)
Sub-Saharan Africa	21.89*** (3.30)
East Asia and Pacific * FARI on inflows	-45.95*** (16.17)
Middle East and North Africa * FARI on inflows	-8.37 (20.13)
Americas * FARI on inflows	-42.33*** (17.43)
South Asia * FARI on inflows	-74.39*** (19.70)
Sub-Saharan Africa * FARI on inflows	-34.33*** (15.93)
Constant	8.43*** (2.30)
R-Squared	0.34
F-Stat	29.80
Observations	528

Notes: This table shows how geographical regions affect the relationship between capital controls and cross-border payment speed. The Average Beneficiary Elapsed Time is the average duration of transactions in hours for each country-year. The FARI is taken from Baba and others (2026). It ranges from 0 to 1, with a value of 0 indicating minimal restrictiveness. Robust standard errors are reported in parentheses. *p<0.10, ** p<0.05, ***p<0.01

IV. Interpretation of Results and Future Work

Capital controls continue to be an element of countries' policy frameworks to prevent the transmission of international economic and financial shocks. In the IMF's Institutional View, which aims to help countries reap the benefits of capital flows while managing the associated risks, CFMs on inflows should not substitute for warranted macroeconomic adjustment but can be useful in certain circumstances, including in a preemptive manner.

However, capital controls impose administrative costs and other frictions on intermediaries and final payees. The preliminary analysis in this paper shows a robust correlation between capital controls and the speed of payments in the last mile. While the results cannot be interpreted as causal, they do suggest that capital controls may be a possible source of delay in payments, which could be considered in the macroeconomic evaluation of the costs and benefits of capital controls.

Importantly, our measure of capital controls only reflects how many capital controls are in place (the extensive margin), without accounting for the intensity of any specific capital control (the intensive margin). Indeed, the value of the FARI does not change if there has been partial liberalization of a particular index component, or if there is some tightening of existing controls.[9] The FARI does not capture the efficacy of capital control implementation either. Yet, both intensity and implementation efficiency may influence outcomes just as much as the extent of capital controls.

The variation of our results across income groups, digital readiness and geographic regions is suggestive of how these other factors might come into play. This highlights the importance of implementing at the jurisdiction level the international policies that have been agreed under the G20 Roadmap for Cross-Border Payments.

In many countries, ongoing efforts contribute to an improvement in cross-border payment speed (FSB 2025). These efforts involve the widespread migration of the industry to the ISO 20022 standard for cross-border payments and reporting, greater utilization of Swift's friction-reducing services along with innovative solutions that enhance speed and transparency for end users, and the integration of technologies such as artificial intelligence and Application Programming Interfaces (APIs).

Further insights could be gained through more granular and high-frequency analysis. Specifically, analyzing (anonymized) transaction-level data, coupled with the detailed underlying AREAER data, would enable the application of more modern causal inference techniques. This approach would also allow focusing on periods of particularly intensive changes in capital controls, rather than limiting the analysis to the extensive margin captured by the FARI.

In addition, extending the FARI to more years would give deeper insights into future dynamics. Our sample is currently focused on the COVID period, when frequent lockdowns and shifting policy environments may have affected capital flows and payment speed. Nonetheless, the large cross-sectional variation lends confidence that the statistical significance of the results may still hold. Moreover, a longer time period could allow analysis of the interaction between capital controls and the adoption of ISO 20022 — the newest and purportedly transformative payment standards, which practitioners believe should contain sufficiently rich information to speed the implementation of capital controls where required by authorities.

V. Conclusion

Leveraging payment transaction data, aggregated at the country-year level, and a new index of financial account restrictions, this study finds that countries with more extensive capital controls tend to experience longer payment delays. These effects are especially pronounced in Emerging and Developing economies, and in certain geographic regions (Europe and Central Asia). Digital readiness, however, does not affect the relationship in a statistically significant manner. The novel quantitative insights this study provides are an initial step towards uncovering the dynamics around cross-border payment speed. Much remains to be explored to establish a causal relationship, and to better understand the role of the intensity of capital controls and the efficiency of their implementation.

[9] At the time of drafting, two new indices were being developed to quantify the intensity of capital controls in AREAER narratives using manual coding and large language models (Bergant and others, 2026, Li, 2026). These could usefully be explored in future research.

References

Baba, Chikako, Ricardo Cervantes, Salim M. Darbar, Annamaria Kokenyne, and Viktoriya V. Zotova. 2026. "New Measures of Capital Flow Restrictions—AREAER Indices." IMF Working Paper 26/16. International Monetary Fund, Washington DC.

Bergant, Katharina, Andrés Fernández, Ken Teoh, and Martin Uribe. 2026. "Expanding the Landscape of Cross-border Flow Restrictions: Modern Tools and Historical Perspectives." NBER Working Paper No. 34615. National Bureau of Economic Research.

Boel, Paola. 2019. "Payment Systems—History and Challenges." Economic Review 2019:1, Sveriges Riksbanks, Stockholm.

Chinn, Menzie D., and Hiro Ito. 2006. "What Matters for Financial Development? Capital Controls, Institutions, and Interactions." *Journal of Development Economics* 81 (1): 163–92.

Committee on Payments and Market Infrastructures (CPMI) – Bank for International Settlements (BIS) –Swift. 2022. "Swift GPI Data Indicate Drivers of Fast Cross-Border Payments"

Eichengreen, Barry, and David Leblang. 2003. "Capital Account Liberalization and Growth: Was Mr. Mahathir Right?" *International Journal of Finance and Economics* 8(3), pp. 205-224

Frost, Jon, P Koo Wilkens, Anneke Kosse, Shreeti Vatsala, Carolina Velasquez. 2024. "Fast Payments: Design and Adoption" BIS Quarterly Review Volume 31.

Fernández, Andrés, Michael W. Klein, Alessandro Rebucci, Martin Schindler and Martin Uribe. 2016. "Capital Control Measures: A New Dataset." *IMF Economic Review* 64 (3): 548–74.

Financial Stability Board (FSB). 2023. "Annual Progress Report on Meeting the Targets for Cross-Border Payments." Financial Stability Board, October. Basel, Switzerland.

Financial Stability Board (FSB). 2024. "Annual Progress Report on Meeting the Targets for Cross-Border Payments." Financial Stability Board, October. Basel, Switzerland.

Financial Stability Board (FSB). 2025. "G20 Roadmap for Cross-border Payments: Consolidated progress report for 2025." Financial Stability Board, October. Basel, Switzerland.

International Monetary Fund (IMF). 2012. "The Liberalization and Management of Capital Flows: An Institutional View." IMF Policy Paper 2012, November 14, Washington, DC.

International Monetary Fund (IMF). 2022. "Review of The Institutional View on the Liberalization and Management of Capital Flows." IMF Policy Paper 2012, March 30, Washington, DC.

Li, Wenjie. 2026. "Beyond Binary: A Policy-Intensity Measure of Capital Flow Management." IMF Working Paper 26/21. International Monetary Fund, Washington, DC.

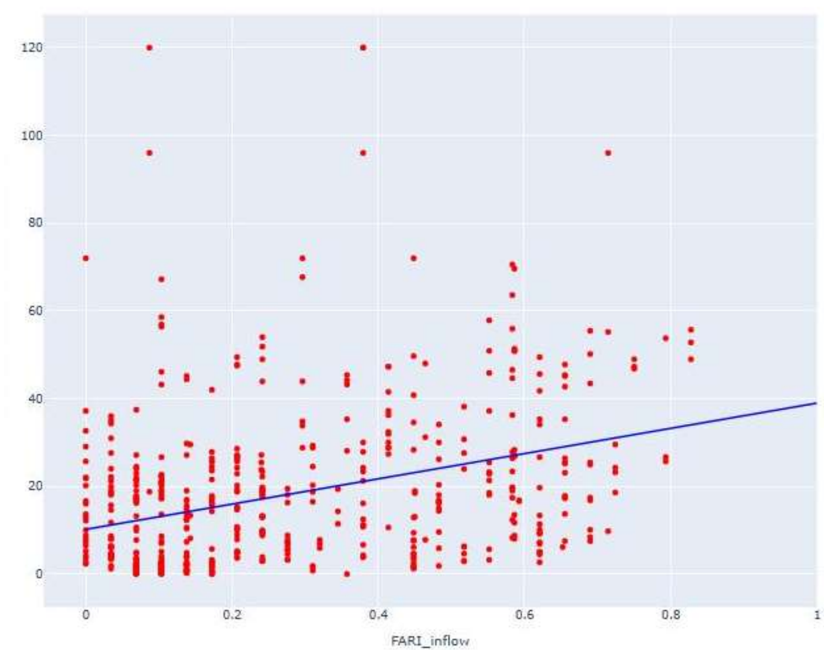
Swift. 2020. "Swift GPI: Driving a Payments Revolution." Swift, October. La Hulpe, Belgium.

Swift. 2024. "Spotlight on Speed: Where to Focus for Faster International Payments." Swift. La Hulpe, Belgium.

Annex 1: Robustness: Median Beneficiary Elapsed Time

Baseline results presented in Section III are based on the average Beneficiary Elapsed Time. This annex shows results obtained using the median Beneficiary Elapsed Time. Results based on averages are more sensitive to outliers. On the other hand, taking the median dampens potentially useful variation. Similar to Section II, Figure A1.1. plots the median Beneficiary Elapsed Time against the FARI on inflows, both aggregated by country-year. The significance and signs are consistent, with some exceptions.

Figure A1.1. FARI on Inflows (x-axis) and Median Beneficiary Elapsed Time (y-axis)



Notes: The median Beneficiary Elapsed Time is the median by country over all payments within a year, for each recipient country. The FARI is taken from Baba and others (2026). It ranges from 0 to 1, with a value of 0 indicating minimal restrictiveness. Each dot represents a country-year. The line of best fit is estimated via OLS.

Tables A1.1-A1.3 present the regression results using the median Beneficiary Elapsed Time. In Table A1.1, we observe a strong positive relationship between the FARI and the median Beneficiary Elapsed Time. A one-standard-deviation increase in the FARI on inflows leads to a **6-hour delay** in payments in the univariate model, while controlling for the previously described set of macro variables lowers the effect to approximately **4 hours**. We find a pattern of significance and signs similar to the baseline results; however, we note that the F-statistic is smaller, suggesting a worse fit. Overall, these results confirm our main findings, with slightly weaker effects for the median regressions that are statistically indistinguishable from the mean regressions.

In Table A1.2, we show the results for the interactions with income groups and the indicator of digital readiness, using the median Beneficiary Elapsed Time. Similar to the results based on the average Beneficiary Elapsed Time, we find that EMDEs have slower payments, and that the FARI has a greater effect than for AEs.

Next, we find that countries with higher digital readiness have much faster payments, while the effect of the FARI does not differ between the two groups. We find that coefficients are similar in magnitude, but the median coefficients are closer to zero. Additionally, the F-statistics are both much smaller than the baseline regressions.

Finally, in Table A1.3, we present the results with interactions between the regional country groups and the FARI, using the median Beneficiary Elapsed Time. We find heterogeneity in the constant and the slope, similarly to the baseline results. Here, as before, the omitted category is Europe and Central Asia. Coefficients are broadly similar to the baseline results, although with smaller magnitudes, mostly within confidence intervals of each other. The F-statistic is also lower, suggesting a worse fit.

Table A1.1. Regression results: Median Beneficiary Elapsed Time

	Median Beneficiary Elapsed Time	
	(1)	(2)
FARI on inflows	**28.78*** **	**17.65*** **
	(3.49)	**(3.89)**
Log(Real GDP per capita)		0.31
		(0.32)
Log(Population)		-0.03
		(0.57)
Trade (X+M)/Y		-3316.06
		(2326.95)
FDI/GDP		-474.58
		(711.33)
Current account/GDP		6226.45
		(6196.72)
Remittances/GDP		7.37
		(7.39)
FX bid ask spread		0.02
		(0.04)
FX volatility		7.91
		(7.32)
Bank branches per 1,000 adults		0.00
		(0.04)
Deposit accounts per 1,000 adults		-0.00
		(0.00)
Mobile transactions per 1,000 adults		-0.00
		(0.00)
Cybersecurity Index		-1.04***
		(0.33)
Digtital readiness		-2.93**
		(1.42)
Web servers per 1M people		0.00
		(0.00)
Constant	10.18***	19.14
	(1.13)	(9.16)
R-Squared	0.12	0.28
F-Stat	67.83	6.76
Observations	528	528

Notes: This table shows how median cross-border payment speed responds to an increase in the FARI, in a univariate (column 1) and multivariate (column 2) specification. The median Beneficiary Elapsed Time is the median duration of transactions in hours for each country-year. The FARI is taken from Baba and others (2026). It ranges from 0 to 1, with a value of 0 indicating minimal restrictiveness. Robust standard errors are reported in parentheses. *p<0.10, ** p<0.05, ***p<0.01.

Table A1.2. Interactions: By Country Income Groups and Digital Readiness

	Median Beneficiary Elapsed Time	
	(1)	(2)
FARI on inflows	**-10.59**	**16.15*** **
	(16.61)	**(4.50)**
LIC * FARI on inflows	**30.70***	
	(17.07)	
HDR * FARI on inflows		**-3.93**
		(5.68)
Emerging and Developing Economy (EMDE)	9.14***	
	(2.60)	
Higher digital readiness (HDR)		-15.80***
		(2.01)
Constant	6.01***	20.26***
	(2.14)	(1.87)
R-Squared	0.18	0.28
F-Stat	77.10	94.6
Observations	528	528

Notes: This table shows how country income groups and digital readiness affect the relationship between capital controls and median cross-border payment speed. The median Beneficiary Elapsed Time is the median duration of transactions in hours for each country-year. The FARI is taken from Baba and others (2026). It ranges from 0 to 1, with a value of 0 indicating minimal restrictiveness. Robust standard errors are reported in parentheses. *p<0.10, ** p<0.05, ***p<0.01

Table A1.3. Interactions: By Region

	Median Beneficiary Elapsed Time
FARI on inflows	**48.23*** **
	(14.97)
East Asia and Pacific	15.28***
	(3.08)
Middle East and North Africa	20.58***
	(5.11)
Americas	7.68***
	(3.50)
South Asia	45.79***
	(7.92)
Sub-Saharan Africa	15.03***
	(3.49)
East Asia and Pacific * FARI on inflows	-38.16***
	(15.98)
Middle East and North Africa * FARI on inflows	-8.73
	(21.11)
Americas * FARI on inflows	-33.82**
	(17.14)
South Asia * FARI on inflows	-63.41***
	(20.31)
Sub-Saharan Africa * FARI on inflows	-25.46
	(16.42)
Constant	0.71
	(2.20)
R-Squared	0.28
F-Stat	22.1
Observations	528

Notes: This table shows how regions affect the relationship between capital controls and median cross-border payment speed. The median Beneficiary Elapsed Time is the median duration of transactions in hours for each country-year. The FARI is taken from Baba and others (2026). It ranges from 0 to 1, with a value of 0 indicating minimal restrictiveness. Robust standard errors are reported in parentheses. *p<0.10, ** p<0.05, ***p<0.01

Annex 2: Robustness: Non-Linearities

As a robustness exercise, we examine non-linearities in the relationship between the FARI and the Beneficiary Elapsed Time. Specifically, we include a squared term of the FARI as an additional explanatory variable (Table A2.1). We find that the squared term is not statistically different from zero, and the introduction of the nonlinear term reduces the significance of the linear coefficient. However, we note that the F-statistic remains large in both. These results indicate that our baseline results are not driven by the assumption of linearity.

Table A2.1. Baseline Regressions: Including a Non-Linear Term

	Average Beneficiary Elapsed Time	Median Beneficiary Elapsed Time
FARI on inflows	**27.84**	**17.66**
	(15.13)	**(14.17)**
FARI on inflows (squared)	10.06	15.93
	(20.67)	(19.71)
Constant	21.72***	11.28***
	(1.90)	(1.68)
R-Squared	0.15	0.12
F-Stat	47.20	34.52
Observations	528	528

Notes: This table shows how the addition of a nonlinear term changes the relationship between average/median payment speed and capital controls. The average (respectively median) Beneficiary Elapsed Time is the average (respectively median) duration of transactions in hours for each country-year. The FARI is taken from Baba and others (2026). It ranges from 0 to 1, with a value of 0 indicating minimal restrictiveness. Robust standard errors are reported in parentheses. *p<0.10, ** p<0.05, ***p<0.01

PUBLICATIONS

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