LEM
LILLE ÉCONOMIE MANAGEMENT

Document de travail du LEM / Discussion paper LEM
2022-08

International transmission of interest rates: the role of international reserves and sovereign debt

António AFONSO

ISEG – School of Economics and Management, Universidade de Lisboa; REM – Research in Economics and Mathematics, UECE. UECE – Research Unit on Complexity and Economics is supported by Fundação para a Ciência e a Tecnologia. R. Miguel Lupi 20, 1249-078 Lisbon, Portugal | aafonso@iseg.ulisboa.pt

Florence HUART

Univ. Lille, CNRS, IESEG School of Management, UMR 9221 - LEM - Lille Économie Management, F-59000 Lille, France | florence.huart@univ-lille.fr

João Tovar JALLES

ISEG – School of Economics and Management, Universidade de Lisboa; REM – Research in Economics and Mathematics, UECE. UECE – Research Unit on Complexity and Economics is supported by Fundação para a Ciência e a Tecnologia. R. Miguel Lupi 20, 1249-078 Lisbon, Portugal | joaojalles@gmail.com

Piotr STANEK

Cracow University of Economics | piotr.stanek@uek.krakow.pl

https://lem.univ-lille.fr/

International transmission of interest rates: the role of international reserves and sovereign debt*

António Afonso[$.] Florence Huart[+] João Tovar Jalles[#] Piotr Stanek[±]

January 2022

Abstract

We analyse the international transmission of interest rates by focusing on the accumulation of international reserves and the financing of sovereign debt. We develop a model, which describes the money market equilibrium with capital account openness. The model predicts that higher levels of international reserves lead to lower interest rates whereas the effect of higher government debt is ambiguous. We test these predictions on a panel of 130 countries over the period 1985-2019. Our main findings are: i) the transmission of U.S. interest rates to domestic interest rates is stronger in emerging market economies (EMEs) than in advanced economies (AEs) for short-term interest rates, and *vice versa* for long-term interest rates; ii) a strong negative effect of international reserves on interest rates, especially in EMEs; iii) higher debt levels are associated with lower interest rates in EMEs (liquidity effect), but higher interest rates in developing economies (risk premium effect).

Keywords: foreign exchange reserves, government debt, spillover effects, panel data analysis
JEL Codes: C23, E43, E5, F3, F4, H63

* This work was supported by the FCT (*Fundação para a Ciência e a Tecnologia*) [grant number UID/ECO/00436/2019] and co-financed with the subsidy granted to the Cracow University of Economics. The opinions expressed herein are those of the authors and not necessarily those of their employers.

$ ISEG – School of Economics and Management, Universidade de Lisboa; REM – Research in Economics and Mathematics, UECE. UECE – Research Unit on Complexity and Economics is supported by Fundação para a Ciência e a Tecnologia. R. Miguel Lupi 20, 1249-078 Lisbon, Portugal. email: aafonso@iseg.ulisboa.pt.

+ Univ. Lille, CNRS, IESEG School of Management, UMR 9221 - LEM - Lille Économie Management, F59000 Lille, France. email: florence.huart@univ-lille.fr.

ISEG – School of Economics and Management, Universidade de Lisboa; REM – Research in Economics and Mathematics, UECE. UECE – Research Unit on Complexity and Economics is supported by Fundação para a Ciência e a Tecnologia. R. Miguel Lupi 20, 1249-078 Lisbon, Portugal. email: joaojalles@gmail.com.

± Cracow University of Economics. email: piotr.stanek@uek.krakow.pl.

1. Introduction

The prospect of a change in monetary policy in the United States (U.S.) matters for other countries, and this may be true whatever their exchange rate regime, if global financial flows have transformed the open-economy trilemma (fixed exchange rates, free capital flows, and independent monetary policy) into a dilemma (Rey, 2016). Moreover, other factors, which influence interest rates, may attenuate the international transmission of U.S. interest rates. In our paper, we focus on the role of government debt and on the role of international reserves.

The level of government indebtedness has two opposite effects on domestic long-term interest rates. It has a positive effect since it influences risk premia and sovereign bond yields typically upwards, and the latter can influence other interest rates in the economy. However, it can also have a negative impact if there is some indirect monetary financing of budget deficits, notably via quantitative easing (QE) measures, which expands the liquidity in the economy and lowers short-term interest rates. In addition, the accumulation of international reserves may reinforce this liquidity effect by increasing money supply.

Therefore, our contribution is to verify whether the accumulation of reserve assets by central banks enables countries with a high level of government debt to keep interest rates low and to be less exposed to the global transmission of interest rate shocks. Hence, we first explain the theoretical mechanisms in a model, which describes the money market equilibrium in an economy with capital account openness. Then, we test empirically the predictions of the model for a panel of 130 countries (33 advanced economies, 68 emerging market economies, and 29 developing economies) over the period 1985-2019.

The remainder of the paper is organized as follows. Section 2 provides a literature review. Section 3 outlines the theoretical framework. Section 4 details the empirical strategy and discusses our results. Section 5 concludes.

2. Related literature

The strength and determinants of international interest rate spillovers is a central issue in international economics. Notably, the standard textbook approach suggests that in a financially globalized world only floating exchange rates can ensure (some degree of) monetary independence (Mundell, 1963). This view has been recently challenged by Rey (2016). It seems, however, that the debate is far from being settled.

In the literature, the contributions deal with the terms of the trilemma (currency regime and capital mobility), different samples of countries, a distinction between short-term and long-term interest rates, specific base-country rates, the stance of the U.S. monetary policy (contractionary or expansionary), global financial conditions, unconventional monetary policy measures, and the role of foreign exchange reserves.

2.1. Exchange rate regime, capital mobility or capital controls

Floating exchange rate regimes provide room for some *temporary* monetary independence (Frankel, Schmukler and Servén, 2004). However, there are cases where floating exchange rates deliver a low degree of insulation against external shocks. This can be due to deeper international integration of domestic financial markets (Saxena, 2008). Or this can be due to policy choice, in particular *consumer price* inflation targeting (Corsetti et al., 2021).

Capital controls do not affect the international transmission of interest rates, with some exceptions related to fixed exchange rates (Farhi and Werning, 2014) or the degree of capital mobility (Edwards, 2010). Tighter macroprudential policies can help to insulate domestic interest rates from the U.S. interest rates (Aizenman, Chinn and Ito, 2017; Bergant et al., 2020).

2.2. Groups of countries

The impact of U.S. monetary policy shocks differs across AEs and EMEs. It is typically large on interest rates in EMEs, but with nuances. Other kinds of external shocks are more important (Maćkowiak, 2007). The impact is stronger on short-term rates with fixed exchange rates than with flexible exchange rates (Canova, 2005). It is larger on long-term rates when monetary policy shocks are anticipated (Vicondoa, 2019).

Iacoviello and Navarro (2019) compare AEs and EMEs in the responses of short-term interest rates to contractionary U.S. monetary policy shocks. The increase in interest rates is

almost one-for-one in AEs with a peg to the U.S. dollar, while it is smaller but more persistent in EMEs, where the exchange rate regime does not influence the effects.

In Kalemli-Özcan (2019), the response of short-term interest rates to an increase in the U.S. policy rate is less than one for one in AEs while it is more than one for one in EMEs. The difference between both groups of countries can be explained by the influence of risk perceptions on capital flows in EMEs. Cross-country variation can also be explained by the role of trade and financial linkages with the United States (Feldkircher and Huber, 2016) or by the share of trade invoiced in the dominant currency (Gopinath et al., 2020).

2.3. Short-term or long-term interest rates

Interest-rate pass-through has decreased in OECD countries, with a lower impact on long-term interest rates than on short-term interest rates (Kazi, Wagan and Abkar, 2013). By way of contrast, in the case of Poland, an emerging market economy with a floating exchange rate regime, the spillover effects of unconventional monetary policy measures by the European Central Bank (ECB) are modest for short-term rates but can be sizeable for long-term rates, possibly because of the integration of government bond markets (Janus, 2020).

Dedola, Rivola and Stracca (2017) compare the effects of a more restrictive stance of U.S. monetary policy on short-term and long-term interest rates. Bond yields increase relative to the U.S. rate in most countries, but the effects on short-term rates are heterogenous: they decrease in AEs and increase in EMEs. The exchange rate regime and financial openness do not explain cross-country differences. And in contrast to Georgiadis (2016), country characteristics do not explain the extent of spillovers.

2.4. Base-country rates

Shambaugh (2004) defines the base country as the country to which the local country pegs or would most likely peg. Obstfeld, Shambaugh and Taylor (2005) do likewise. They all find evidence in favor of the open-economy trilemma.

Di Giovanni and Shambaugh (2008) work with 10 different base countries. They find that changes in the base interest rate are transmitted to domestic rates in pegged countries but not in non-pegged countries. Obstfeld (2015) also works with a multi-base country framework. The effect of the foreign interest rate on domestic rates is lower in countries that do not peg their

currency. This holds for short-term rates only. The exchange rate regime is not critical for the transmission to long-term rates. Results also differ if the sample of countries is divided: the impact on short-term rates is significant in advanced countries (0.518) but not in emerging/developing countries. The impact on long-term rates is higher in advanced countries (0.484 with the U.S. as the unique base country or 0.753 with a multi-base country framework) than in emerging/developing countries (0.332).

Bekaert and Mehl (2019) propose a measure of financial globalization based on equity market integration and follow the approach of Obstfeld, Shambaugh and Taylor (2005) to gauge the role of capital mobility in the trilemma. Overall, their results suggest that the trilemma holds. The pass-through coefficient is lower for short-term rates (0.16, but not significant) than for long-term rates (0.45). The extent of financial integration has little or no effect on the size of the pass-through coefficients for floaters, but it does for non-floaters.

2.5. Stance of the U.S. monetary policy and global financial conditions

Han and Wei (2018) argue in favour of a 2.5-lemma or an intermediate state between a trilemma and a dilemma. Without capital controls, floating exchange rates provide insulation from U.S. monetary policy shocks, but only when the U.S. tightens the monetary policy stance. A monetary easing in the U.S. makes periphery countries cut interest rates too because of a "fear of appreciation". With capital controls, there is some monetary autonomy whatever the stance of monetary policy in the center country. There is, however, no such asymmetry in policy effects when it comes to international spillovers to sovereign bond yields (Gilchrist, Yue and Zakrajšek, 2019).

Obstfeld, Ostry and Qureshi (2019) find that the trilemma holds in the following sense: fixed and intermediate regimes provide less insulation from *global* financial shocks. The question of transmission to domestic interest rates is not studied directly though. In Bhattarai, Chatterjee and Park (2020), an increase in U.S. *uncertainty* causes an increase in short-term and long-term rates. EMEs seem to suffer from a "flight to safety/quality" phenomenon.

In response to global liquidity shocks, most EMEs do not exercise full monetary autonomy despite a floating exchange rate regime. This finding by Choi et al. (2017) supports the argument of the dilemma by Rey (2016). It may be due to attempts to reduce exchange rate volatility. According to Albagli et al. (2019), an exchange rate channel explains U.S. monetary

policy spillovers to international bond yields: foreign central banks could try to reduce interest rate differentials to avoid currency movements.

Miranda-Agrippino and Rey (2020) show that the U.S. monetary policy has sizable international financial spillovers, even in countries that have a floating exchange rate regime, because of significant fluctuations in the global financial cycle.[1]

2.6. Unconventional monetary policy measures

Bauer and Neely (2014) focus on the Fed's QE policies. The international spillovers on interest rates in AEs can be explained either by a signaling effect or a portfolio balance effect.[2] Hausman and Wongsman (2011) study the spillover effects of U.S. monetary policy surprises on AEs. Responses of short-term rates to path surprises are higher with strong trade linkages with the United States and a less flexible exchange rate regime.

Bowman, Londono and Sapriza (2015) analyse the impact of U.S. unconventional monetary policy announcements on sovereign yields in EMEs. It is stronger in countries with managed floating than in countries with free floating. The debt-to GDP ratio has no influence on this response.

2.7. Foreign reserves

With a higher level of foreign reserves, countries can retain monetary autonomy despite financial openness and exchange rate stability. In this sense, the trilemma holds (Aizenman, Chinn and Ito, 2016). This holds for Asian EMEs but not for Latin American EMEs (Aizenman, Chinn and Ito, 2010; Taguchi, 2011).

Overall, there is some empirical evidence in support of the open-economy trilemma and a high(er) degree of pass-through in the pegged countries. Yet, none of the empirical studies considers explicitly the role of government debt along with international reserves. We aim to fill-in this gap.

[1] Shin (2016) explains that the U.S. monetary policy has a strong influence on global financial conditions because of the role of global banks that lend in dollars. Braüning and Ivashina (2020) also focus on the role of loan supply by global banks. Buch et al. (2019) investigate international spillovers of monetary policy into bank lending. Bruno and Shin (2015) examine the international spillovers on cross-border banking flows.

[2] Lim and Mohaparta (2016) look at the effects of QE policies on financial flows, but not on interest rates.

3. Theoretical framework

We extend the model in Edwards and Khan (1985) in such a way that we are able to distinguish the effects of international reserves and those of government debt on interest rates. They proposed a model of interest rate determination in an economy with capital account openness. Domestic interest rates are influenced by foreign factors (via the interest rate parity) depending on the degree of the capital account openness. They are also dependent on domestic monetary conditions (via the Fisher equation). The model describes the money market equilibrium whereby the real interest rate is influenced by a liquidity effect (it deviates from its long run equilibrium level if there is an excess supply of money). We amend this model by adding the role of international reserves and the presence of government debt. Thus, we modify the specification of the interest rate parity and of the money supply:

- we define the expected rate of change of the exchange rate as a function of international reserves;
- we add a risk premium (sovereign default) in the interest rate parity;
- we define the risk premium as a function of the level of government debt;
- we introduce monetary financing of budget deficits in the model by specifying the counterparts of money supply.

The nominal interest rate at time *t*, i_t, is specified as follows:

$$i_t = \psi(i_t^* + \dot{e}_t + z_t) + (1 - \psi)(r_t + \pi_t^e) \quad (1)$$

where i_t^* is the foreign (U.S.) interest rate, $\dot{e}_t$ the expected rate of depreciation of the domestic currency (the exchange rate is defined as a direct quotation for foreign currency, that is one unit of foreign currency in terms of units of domestic currency), z_t the country risk premium, r_t the real interest rate, π_t^e the expected inflation rate, and ψ a parameter, which measures the degree of the country financial openness (capital account). The first component of Eq. (1) represents the uncovered interest rate parity (UIP) and the second component the Fisher equation.

The domestic interest rate responds with a delay to any changes in the expected return of foreign financial assets. This may be due to transaction costs, information lags or any other kind of frictions. Hence, we have: $\Delta i_t = \theta[(i_t^* + \dot{e}_t + z_t) - i_{t-1}]$, where Δ is the first difference operator, and θ the adjustment parameter ($0 \leq \theta \leq 1$). It follows:

$$i_t = \theta(i_t^* + \dot{e}_t + z_t) + (1 - \theta)i_{t-1}. \quad (2)$$

The real interest rate is influenced by a liquidity effect. It deviates from its (constant) long-term equilibrium level, ρ, if there is any excess money supply ($EMS > 0$) in the money market:

$$r_t = \rho - \lambda EMS_t + \omega_t \tag{3}$$

where λ is a parameter ($\lambda > 0$) and ω_t an error term.

The excess money supply is defined as:

$$EMS_t = m_t - m_t^d \tag{4}$$

where m_t is the actual stock of real money and m_t^d the desired equilibrium stock of real money balances. The equilibrium demand for money is specified in a standard manner (narrow aggregate). The long-run demand for money is assumed to be a function of real income y_t, the long-term equilibrium nominal interest rate ($\rho + \pi_t^e$) rather than the current nominal interest rate, and inflation expectations π_t^e: [3]

$$m_t^d = \alpha_0 + \alpha_1 y_t - \alpha_2(\rho + \pi_t^e) - \alpha_3 \pi_t^e. \tag{5}$$

As for money supply, the stock adjusts according to the following mechanism: $\Delta m_t = \beta(m_t^d - m_{t-1})$, where β is the adjustment coefficient ($0 < \beta < 1$). This process allows the nominal interest rate to return eventually to its long-term equilibrium level. It can also be written as:

$$m_t = \beta m_t^d + (1 - \beta) m_{t-1}. \tag{6}$$

International reserves and government debt are incorporated into the model through monetary conditions and the interest rate parity.

- The effect of money supply m_t on the interest rate can be specified through the counterparts of money supply: domestic assets (a_t) and international reserves (res_t). Domestic assets, in turn, are decomposed into loans to the private sector (l_t) and loans to the general government (b_t). Indeed, a share of domestic loans is used to finance budget deficits. Government debt can be either in local currency (b_t^{LC}) or in foreign currency (b_t^{FC}).[4]
- The expected rate of depreciation of the domestic currency is a negative function of international reserves (stabilizing role) and a positive function of government debt denominated in foreign currency. The country risk premium, z_t, is a positive function

[3] This is a rather orthodox view of money demand and inflation, as mentioned, for instance, by McCallum (1999).
[4] Similarly, loans to the private sector can be denominated in local currency (l_t^{LC}) and in foreign currency (l_t^{FC}).

of overall government debt.[5] Indeed, a higher level of government debt increases the probability of sovereign default (Bi, 2012).[6] Therefore, we can write:

$$\dot{e}_t = \delta_0 - \delta_1 res_{t-1} + \delta_2 b_{t-1}^{FC}, \quad (7)$$

$$z_t = \mu_0 + \mu_1 b_{t-1}. \quad (8)$$

International reserves do not affect the risk premium in the model. Admittedly, emerging countries may seek to accumulate reserves to pay down government debt and reduce sovereign spreads (Bianchi, Hatchondo and Martinez, 2018). But, here, we do not model the optimal level of international reserves.

We can finally derive the reduced-form equation for the nominal interest rate by combining Equations (2)-(8):

$$i_t = \gamma_0 + \gamma_1 i_{t-1} + \gamma_2 i_t^* + \gamma_3 y_t + \gamma_4 \pi_t^e + \gamma_5 l_{t-1} + \gamma_6 b_{t-1}^{LC} + \gamma_7 b_{t-1}^{FC} + \gamma_8 res_{t-1} + \varepsilon_t \quad (9)$$

with

$$\gamma_0 = \psi\theta(\delta_0 + \mu_0) + (1-\psi)[\rho + \lambda(1-\beta)(\alpha_0 - \alpha_2\rho)]$$

$$\gamma_1 = \psi(1-\theta)$$

$$\gamma_2 = \psi\theta$$

$$\gamma_3 = (1-\psi)\lambda(1-\beta)\alpha_1$$

$$\gamma_4 = (1-\psi)[1-\lambda(1-\beta)(\alpha_2+\alpha_3)]$$

$$\gamma_5 = -(1-\psi)\lambda(1-\beta)$$

$$\gamma_6 = \psi\theta\mu_1 - (1-\psi)\lambda(1-\beta)$$

$$\gamma_7 = \psi\theta(\delta_2 + \mu_1) - (1-\psi)\lambda(1-\beta)$$

$$\gamma_8 = -\psi\theta\delta_1 - (1-\psi)\lambda(1-\beta)$$

and $\varepsilon_t = (1-\psi)\omega_t$.

With immediate adjustment to UIP, the lagged value of the nominal interest rate would disappear from Equation (9): $\theta = 1$ and $\gamma_1 = 0$. The international transmission of interest rates

[5] We do not model the foreign risk premium since it is included in the foreign interest rate, which is exogenous.

[6] One can further consider that countries with independent monetary policies, and with a de facto national central bank as lender of last resort, can provide additional guarantee that the sovereign bonds of these countries face limited default risk compared to countries without monetary policy (see Afonso et al., 2018).

is captured by the composite parameter $\gamma_2 > 0$. An increase in real income is expected to cause a rise in domestic interest rates ($\gamma_3 > 0$) whereas credit growth to the private sector expands liquidity in the economy and has a negative effect on interest rates ($\gamma_5 < 0$). The effect of inflation expectations (γ_4) is positive if $\lambda(1-\beta)(\alpha_2 + \alpha_3) < 1$. It depends in particular on how money demand is affected by inflation expectations (α_2 and α_3).

The effect of government debt on domestic interest rates is ambiguous (sign of parameters γ_6 and γ_7) because there are two opposite effects. Indeed, there is a positive effect (first part of the parameters) through the risk premium and the expected rate of depreciation of the domestic currency, and there is a negative effect (second part of the parameters) because domestic banking loans to the public sector increase liquidity in the economy. In short, an increase in sovereign indebtedness can lead to a rise of interest rates in the economy *via* a "premium effect" or a decline of interest rates *via* a "liquidity effect". The premium effect is stronger when government debt is denominated in foreign currency ($\gamma_7 > \gamma_6$). In contrast, an increase in international reserves has an unambiguously negative effect on domestic interest rates (γ_8). This influence is reduced though in situations with sterilized central bank interventions in foreign exchange market.[7]

In summary, the model generates the main following testable predictions:

	Impact on domestic interest rates
Higher level of international reserves	-
Higher level of public debt	- (liquidity effect) + (premium effect)

[7] Depending on the extent of sterilized interventions, $\lambda(1-\beta)$ is close to zero and as a result, the size of the parameter γ_8 is reduced to a value close to $-\psi\theta\delta_1$.

4. Empirical analysis

4.1. Empirical strategy and data

We estimate the reduced-form model described by Equation (9) using panel data. For empirical purposes, we rewrite the model as follows:

$$i_{jt} = \sigma_0 + \sigma_1 i_{jt-1} + \sigma_2 i_t^* + \sigma_3 debt_{jt-1} + \sigma_4 reserves_{jt-1} + \sigma_5' X_{jt} + \nu_{jt} \quad (10)$$

where i_{jt} is the interest rate in country j at time t, i_{jt-1} is its lagged value, i_t^* is the foreign (U.S.) interest rate at time t, $debt_{jt-1}$ is government debt (lagged), $reserves_{jt-1}$ is foreign exchange reserves (lagged), X_{jt} is a vector of control variables, σ_0 is a constant term, and the disturbance term ν_{jt} has the conventional zero mean and constant variance.

In the baseline specification, the dependent variable is expressed in level terms, as derived from the theoretical model. We also test a specification in first differences.[8] Given the predictions of the model in Section 3, we expect the sign of σ_4 to be negative whereas the sign of σ_3 is ambiguous (γ_6 and γ_7 in the theoretical model) and is a matter of empirical issue. For instance, we can assess whether the premium effect could dominate the liquidity effect for long-term interest rates so that σ_3 would be positive for these rates. That is why we test two different versions of the model: the dependent variable is the short-term interest rate in the first version, and it is the long-term interest rate in the second version.

The vector of control variables includes the macroeconomic variables of the model: we expect a negative effect of loans to the private sector (liquidity effect), a positive effect of real GDP rate on the domestic interest rate, and possibly a positive effect of inflation (conditional to the characteristics of money demand). The impact of these two latter macroeconomic variables can also be explained by the Taylor rule (Taylor, 1993). In such a case, we would expect the estimated coefficient on the inflation rate to be positive and higher than that on the real GDP growth rate.

We estimate the model for a panel of 130 countries over the 1985-2019 period. The description of variables and data sources is made in Appendix A. We also compare the results for different groups of countries: advanced economies (AEs), emerging market economies (EMEs), and developing economies (DEVs). As regards the analysis of short-term interest rates, the sample comprises 33 AEs, 68 EMEs and 29 DEVs. For long-term rates, the sample is shorter

[8] Frankel, Schmukler and Servén (2004) use a specification in levels whereas Shambaugh (2004) chooses first differences. Edwards (2010) tests both levels and first differences.

(32 AEs and 23 EMEs) and does not cover DEVs. Appendix B lists the countries in each group.[9] Appendix C gives summary statistics.

The dependent variable is the 3-month market rate for the short-term interest rate or the 10-year sovereign bond yield for the long-term interest rate. As there are issues of data availability, the short-term rate is the Treasury Bill rate, and if not available, the interbank rate or the lending rate.[10] As for long-term rates, the sample includes fewer countries (55 countries in total) and does not comprise developing economies. Interest rates (and macroeconomic variables) are expressed as $\ln(1+x)$.[11] We drop observations where the interest rate is above 50% (and the inflation rate as well).[12]

The foreign interest rate is the U.S. interest rate (the effective federal funds rate or the 10-year sovereign yield). We also check the implications of the period of the zero-lower bound (ZLB) and quantitative easing in the conduct of monetary policy in the United States, by replacing the effective federal funds rate with the Wu-Xia shadow rate for the post-2008 period.[13]

Loans to the private sector are represented by credit to the private sector (as a percentage of GDP) and are lagged one period as in the theoretical model. Inflation expectations are based on forecasts of the annual percentage change in the consumer price index (CPI) from the IMF (WEO Historical). The WEO projections are convenient because they cover a large set of countries. However, the time series starts in 1990. So, we have chosen to use current CPI inflation instead. This does not affect the main results (a comparison is made in Section 4.2).[14] As for real income, it is measured by the real GDP growth rate.[15]

Government debt ($debt$) is measured by general government debt as a percentage of GDP. It is central government debt for some countries. We use the IMF Global Debt Database

[9] The choice of countries is dependent on data availability. For some countries, the series are not considered because of a lack of variation in the interest rates or a lack of data for the macroeconomic variables (government debt or international reserves).

[10] Data on interest rates have different definitions and sources across countries in other papers as well, among others Canova (2005), Obstfeld, Shambaugh and Taylor (2005), Maćkowiak (2007), Iacoviello and Navarro (2019), Kalemli-Özcan (2019), Battharai, Chatterjee and Park (2020).

[11] The same approach to expressing interest rates can be found in Frankel, Schmukler and Servén (2004), Obstfeld, Shambaugh and Taylor (2005), Saxena (208), and Kalemli-Özcan (2019).

[12] Iacoviello and Navarro (2019) also use this threshold to drop extreme cases.

[13] Bergant et al. (2020) use the Wu and Xia (2016) shadow rate for the period of the ZLB too.

[14] This is not surprising because the measure of inflation expectations is based on April forecasts in time t for inflation in t. We could have used forecasts made in $t-1$, but it would not have been very helpful owing to a loss of observations. We did the tests anyway, but the coefficients on expected inflation were not significantly different from zero.

[15] As the unit of some variables is a percentage of GDP – but lagged one period and expressed as $\ln(1+x)$ – the annual percentage change in real income is used instead of its level.

(Mbaye, Moreno-Badia and Chae, 2018) updated in 2019. The theoretical model makes a distinction between government debt denominated in local currency and government debt denominated in foreign currency. We use data from the IMF (WEO): General government gross debt in domestic currency (ggxwdgcd) and in foreign currency (ggxwdgcf). However, due to missing data, the sample is shorter, and as a consequence, we use these variables as robustness checks. In addition, as long as the share of government debt in foreign currency is quite small in most advanced economies, we perform estimates for two groups of countries only: emerging market economies and developing economies. As for international reserves ($reserves$), we use IFS data from the IMF. They are total reserves minus gold in current U.S. dollars. We compute them in domestic currency as a percentage of GDP.

The constant term γ_0 in Eq. (9) includes the constant term of the risk premium μ_0. From an empirical viewpoint, we can account for various time-varying factors of the risk premium, which can be domestic or global risk factors. We look at the role of global uncertainty measured by the change in the value of CBOE volatility (*VIX*). Higher global risk aversion is expected to lead to higher interest rates if it is associated with a tightening of financial conditions (Obstfeld, 2015). Some dummy variables are also included to account for country-specific episodes of sovereign default (*Default*) and for common financial factors such as the global financial crisis (*GFC*) in 2008-2009. The dummy variable *Default* may have various effects on (short-term and long-term) interest rates, as sovereign default may lead to a rise in interest rates if it frightens away investors or a decrease in interest rates if debt restructuring is successful. As for the dummy variable *GFC*, the sign of the estimated coefficient is expected to be negative as long as central banks lowered their policy rates during the crisis.

We also check whether the elements of the trilemma affect the baseline specification of our model. We include the degree of financial openness as measured by the Chinn-Ito index, KAOPEN (Chinn and Ito, 2006). We also define a variable to describe the exchange rate regime. We compare three classifications: ACI classification (ERS), Shambaugh classification (Peg) and IRR classification (Peg IRR). The first is a measure of Exchange Rate Stability (ERS) by Aizenman, Chinn and Ito (2010). The index is a continuous variable, between 0 and 1. The stability of the currency of home country is measured against the currency of the base country. Higher values of ERS means a more stable exchange rate. The second classification is based on a dummy variable which takes the value of one for an exchange rate regime classified as peg by Shambaugh (2004). The classification as peg is derived from situations where the currency stays within a 2% band of fluctuation against the base currency or it has zero volatility in all

months (except for a one off devaluation) during two consecutive years. However, the treatment of euro area (EA) countries is puzzling: the author puts Germany in a floating exchange rate regime (peg=0) while other EA countries are in a fixed exchange rate regime (peg=1). We decided to change the classification and put Germany in a fixed exchange rate regime (peg=1) as well. With the third classification, derived from Ilzetzki, Reinhart and Rogoff (2019), we construct a dummy variable Peg IRR=1 if a country belongs to one of the first two categories of the "coarse" classification (peg, crawling peg). We estimate the coefficient of each of these three variables as well as their interaction with the U.S. interest rate so that we can check the influence of the exchange rate regime on the international transmission of interest rates alongside our two main variables, namely $debt$ and $reserves$. Still, our preferred measure is based on the ERS index, since the other two rely on a dichotomic choice (peg/non peg) and have differences in methodology.

We estimate the model in levels by using three alternative methods: pooled ordinary least squares (OLS) with robust standard errors (SE), with panel-corrected standard errors (PCSE), and with Driscoll-Kraay estimator. Standard OLS estimates can be inaccurate owing to heteroskedasticity, temporal and spatial correlated errors. With the first method, SE estimates are robust to heteroskedasticity. The second method with PCSE controls for heteroskedasticity and first-order autocorrelation of the errors (Beck and Katz, 1995). In the Driscoll and Kraay (1998) approach, SE estimates are robust to heteroskedasticity, temporal dependence (the error structure is assumed to be autocorrelated up to some lag – in this case 2 years), and cross-sectional dependence. The PCSE approach fits panel datasets in which the time dimension T is large, but it is less appropriate if the cross-sectional dimension N gets large compared to T. The Driscoll-Kraay estimator performs well when N gets large, even when it is much larger than T, but N must not be too large if T is small (Hoechle, 2007). Consequently, caution is warranted when it comes to interpret results from the second and third estimation methods for the two sub-periods of our dataset.

For the version of the model in first differences, we perform a dynamic panel data analysis by using the Generalized Method of Moments (GMM) estimator. We use the system GMM estimator rather than the difference GMM estimator, because the time series are persistent, and the cross-sectional dimension is large in comparison with the time dimension. This method estimates the model both in first differences, using as instruments lagged levels of the dependent and independent variables, and in levels, using as instruments the first differences of the regressors (Arellano and Bover, 1995; Blundell and Bond, 1998).

4.2. Empirical results

4.2.1. Short-term interest rates

Table 1 displays the results of the pooled OLS estimation with robust SE in which the ACI classification is used to describe the exchange rate regime (ERS index). Table 2 and Table 3 are dedicated to the Shambaugh classification (Peg) and the IRR classification (Peg IRR) respectively. Each table shows the results for the whole sample and for each sub-group of countries (AEs, EMEs, and DEVs). Each indicates the results for three sample periods: 1985-2019, 1985-2007 (the Great Moderation era) and 2008-2019 (the post-GFC period). In the Online Appendix D, additional results are displayed. Table D1 and Table D2 show the results of alternative estimations methods, PCSE and Driscoll-Kraay robust SE respectively, in particular in regressions with the ACI classification.

The U.S. policy rate has a greater effect on short-term interest rates (STIR) in EMEs than in AEs. This is a finding that is in line with the literature (e.g. Dedola, Rivolta and Stracca, 2017; Iacoviello and Navarro, 2019; Kalemli-Özcan, 2019). In the post-GFC period, however, the estimated coefficient is no longer statistically significant in AEs.[16] During this period, its influence on domestic interest rates is lower in EMEs, but stronger and with a negative sign in DEVs (the estimated coefficients are statistically significant with the Driscoll-Kraay estimator in Table D2, columns 9 and 12 respectively). The dissociation from US interest rates in DEVs is likely to be due to the lower level of financial development and less open financial markets in these economies. As for the decreasing influence of U.S. monetary policy on short-term interest rates in EMEs, it could be due to the role of more stringent macroprudential regulation (Aizenman, Chinn and Ito, 2017; Bergant et al., 2020).

In this paper, we focus on the role of two factors: government debt and international reserves. According to our theoretical model, the effect of government debt on domestic short-term interest rates is ambiguous. The sign depends on whether the liquidity effect (monetary financing) or the premium effect (sovereign default) dominates. Our empirical results show that government debt has no effect on domestic short-term interest rates in AEs but has a negative effect in EMEs and a positive effect in DEVs. Thus, our findings suggest that the liquidity effect is predominant in

[16] The interaction term between the exchange rate regime and the U.S. policy rate is negative in the specification with the IRR classification (column 6 in Table 3), but it is no longer significantly different from zero if the EA countries are excluded from the sample. This is an exceptional case, because in general, removing EA countries from the sample does not affect the influence of the U.S. policy rate on interest rates in advanced economies. Results, which are not shown in the paper, are available upon request.

EMEs whereas the premium effect is predominant in DEVs. This finding is robust across various classifications of exchange rate regimes and across various estimation methods.

As for the influence of international reserves, it is negative, as expected. It is found to be stronger in EMEs than in AEs, and not statistically significant in DEVs (the number of observations is smaller though).[17] The effect of international reserves has decreased in EMEs. This group is large and heterogenous. During the Great Moderation era, the effect was strong and significant in a sub-group of five Asian EMEs (China, Indonesia, Malaysia, Philippines and Thailand) and not significant in a sub-group of Latin American EMEs (14 countries in our sample). In the post-GFC period, it is the opposite: not significant in the Asian countries and strong and significant in the Latin American countries.[18] As a matter of fact, the Asian financial crisis in 1997 led the affected countries to accumulate foreign exchange reserves to avoid any future currency crisis. Aizenman, Chinn and Ito (2010), and Taguchi (2011) show that the accumulation of international reserves is a way to retain some monetary independence despite financial openness and exchange rate stability. They find that this is true for Asian EMEs, but not for Latin American EMEs. In our analysis, the sample period comprises the last decade. After the global financial crisis, central banks in Latin American countries (in particular, Brazil, Mexico, Peru, Chile, and Uruguay) have in turn been more concerned about disturbances that could stem from financial liberalization, and consequently, they have held larger amounts of foreign exchange reserves. They may have tried to insure against contagion risk (Rosero, 2015).

The effect of domestic credit to the private sector on domestic short-term interest rates is negative (liquidity effect), but there are large differences across groups of countries: the effect is negative in EMEs only; it is positive and small in AEs (second sub-period) and positive and large in DEVs (first sub-period). The positive effect can stem from constraints on credit supply or a rapid expansion of credit demand. During the GFC, given greater uncertainty about credit risk, banks tightened credit conditions. Moreover, loan supply by global banks also affects the international transmission of monetary policy shocks (Bräuning and Ivashina, 2020), and this may explain differences in the effects of credit on short-term interest rates across groups of countries.

Domestic short-term interest rates respond positively to inflation and real GDP growth rates (as in a Taylor rule) in AEs only. The estimated coefficient on real GDP growth rate is statistically significant in the post-GFC period in the pooled OLS regressions with PCSE

[17] This finding holds even if EA countries are excluded from the group of AEs.
[18] These extra results are not shown, but they are available upon requests.

(column 6 in Table D1). In general, interest rates are higher during good times, because there is an increase in investment (in the demand for loanable funds) or because the central bank responds to higher GDP growth by raising its policy rate. Nevertheless, a negative effect of real GDP growth rate on domestic interest rates may well be observed too, as in EMEs, because the increase in income and wealth raises saving (the supply of loanable funds). Admittedly, this mechanism works better with long-term interest rates (see columns 7 to 9 in Table 5). This negative effect of real GDP growth rate on long-term interest rates is, in fact, found by Bowman, Londono and Sapriza (2015) for a panel of 17 EMEs. There are, moreover, other very plausible explanations than the income and wealth effect. Monetary policy can be procyclical in EMEs (Végh and Vuletin, 2012; McGettigan et al., 2013), and capital inflows as well (Kaminsky, Reinhart and Végh, 2004; Araujo et al., 2017; Avdjiev et al., 2018).

As for the influence of global factors on domestic short-term interest rates, an increase in global risk aversion (VIX) leads to higher interest rates.[19] Interest rates were, unsurprisingly, lower during the years of the GFC.

Country-specific factors are represented by episodes of sovereign debt default, financial openness and the exchange rate regime. A default episode is associated with higher interest rates. In open economies, it is likely that such an episode triggers capital outflows and thus a tightening of financial conditions. A high degree of financial openness is associated with lower interest rates in AEs, no significant effect in EMEs, and a positive effect in DEVs (significant in the IRR classification – columns 10 and 11 in Table 3). The depth of financial markets in AEs is likely to enable them to manage capital flows without major perturbations, while illiquid financial markets in DEVs make them vulnerable to capital flows.[20] On the other hand, more liquid financial markets can make countries more vulnerable to sudden changes in risk perceptions by foreign investors because the latter can rebalance more easily their portfolios. This greater exposure may affect more EMEs than AEs. The soundness of financial systems in AEs can, indeed, make a difference. EMEs may, thus, suffer from a flight-to-quality phenomenon (Bhattarai, Chatterjee and Park, 2020).[21]

[19] If a negative effect was to be observed during some time for a particular group of countries (for example, AEs), it could represent a flight-to-quality phenomenon.

[20] We have not included a variable to capture the degree of financial development in the model, because there is the credit/GDP variable.

[21] Eichengreen and Gupta (2015) show that, following the Fed announcement of an imminent and progressive reduction in asset purchases (tapering) in May 2013, the EMEs that were hit harder than others, in terms of exchange rate, foreign reserves or equity prices, were those with larger and more liquid financial markets. Still, Forbes and Warnock (2020) find that the number of EMEs that have experienced extreme capital flow events, such as sudden stops or capital flight, has decreased in the last decade.

Furthermore, countries with a more stable exchange rate (higher ERS) enjoy lower short-term interest rates, except in EMEs. This exception is observed during the period of the Great Moderation only, and it is confirmed with other classifications of exchange rate regime (Peg in Table 2 and Peg IRR in Table 3) and the Driscoll-Kraay estimator (Table D2). This means that EMEs with a fixed exchange rate regime had to maintain domestic interest rates higher than foreign interest rates in order to keep the exchange rate stable. In doing so, the influence of the U.S. interest rate was arguably reduced (the estimated coefficient on the interaction term between the exchange rate regime and the U.S. policy rate is negative). This influence was not qualitatively smaller though, since the peg itself made them have higher interest rates and use the accumulation of international reserves to mitigate this constraint. During the post-GFC period, the exchange rate regime is no longer critical in the determination of short-term interest rates. For AEs, the exchange rate regime does not matter for the impact of the US monetary policy on STIR. This is in contrast to Hausman and Wongsman (2011), who found that the transmission of U.S. interest rates to domestic STIR is stronger with less flexible exchange rate regimes. However, their sample covers years before the GFC (1994-2005).

Overall, the three classifications of exchange rate regimes deliver similar results. More importantly, the results relative to our two main variables – government debt and international reserves – hold in the three classifications and in the three estimation methods.[22] They also hold if we replace the variable "US policy rate" with the US shadow rate ("US policy rate QE" in Online Appendix Table D3) to account for the US unconventional monetary policy from 2009. Likewise, they still hold if we replace current inflation with expected inflation (Online Appendix Table D4).

In Table 4, we check whether the currency composition of sovereign debt matters or not. As explained in Section 4.1., the sample is shorter and covers only EMEs and DEVs. The influence of the U.S. policy rate and that of the exchange rate regime are no longer significant. In EMEs, the liquidity effect is dominant for the sovereign debt denominated in foreign currency (negative sign of the estimated coefficient) during the Great Moderation era. This is probably due to a surge in capital inflows. In DEVs, the liquidity effect is dominant for the sovereign debt denominated in domestic currency (monetary financing by the domestic central bank) whereas the premium effect is dominant for the sovereign debt in foreign currency (as expected).

[22] One notable exception is found in the results with the IRR classification for AEs (column 6 in Table 3): the estimated coefficient on the interaction term is negative and statistically significant at the 5% confidence level. However, if one removes the EA countries from the sample, the estimated coefficient turns positive and is no longer statistically significant. We have mentioned this special case supra (see footnote 17).

A dynamic version of the model has been estimated, too (Online Appendix, Table D5). There are four noticeable differences between the results of the model in first differences with those of the model in levels. First, the estimated coefficient of the debt/GDP variable is negative in AEs during the second sub-period (positive and not significant in the model in levels). This is most likely due to the expansionary stance of monetary policies in AEs (including the euro area) in a context of sharp increases in government indebtedness in the aftermath of the GFC. Second, domestic credit to the private sector has a positive effect on domestic short-term interest rates in EMEs during the second sub-period (also positive, but not significant in the model in levels). This is very likely due to a tightening in credit conditions. Third, a more stable exchange rate is associated with lower interest rates in EMEs during the post-GFC period (also negative but not significant in the model in levels). Fourth, an increase in international reserves in DEVs would lead to an increase in interest rates (negative coefficient but not statistically significant in the model in levels). This result is counterintuitive (it holds only for the whole period). After all, the results of the model in levels are more in line with the predictions of the theoretical model, which is not surprising since the latter is expressed in level terms as well.

All things considered, the main determinants of domestic short-term interest rates are CPI inflation (or expected CPI inflation) in AEs and DEVs, and the U.S. policy rate in EMEs. The influence of the U.S. policy rate has decreased in the post-GFC period (in comparison with the Great Moderation period), except in DEVs where the relationship is negative. The impact of international reserves is greater than that of government debt in AEs and in particular in EMEs, but not in DEVs. Government debt has no effect on STIR in AEs, a negative effect in EMEs (liquidity effect) and a positive effect in DEVs (premium effect). The exchange rate regime was a determinant of the international transmission of US monetary policy to STIR in EMEs before the GFC, but it is no longer a critical determinant. This finding is in accordance with the results of some other recent studies (Dedola, Rivola and Stracca, 2017; Iacoviello and Navarro, 2019).

4.2.2. Long-term interest rates

The panel data analysis of the determinants of long-term interest rates (LTIR) relies on a shorter sample of countries, with only AEs and EMEs. As a consequence, regressions are made for the whole period only. Results are displayed in Table 5 for the 3 classifications of exchange rate regimes. The influence of U.S. LTIR is stronger than that of U.S. STIR in AEs and weaker in EMEs. A higher government debt-to-GDP ratio leads to lower long-term interest rates in EMEs, which indicates a liquidity effect. A higher level of the international reserves-to-GDP

ratio induces lower long-term interest rates, especially in EMEs. It seems that long-term interest rate are lower in countries with a fixed exchange rate regime, but the estimated coefficients are statistically significant only for the whole sample of countries, not for any sub-group. It also seems that the exchange rate regime does not matter for the influence of U.S. LTIR on domestic LTIR. There is one exception though: according to results with the IRR classification, the influence of the U.S. LTIR on domestic LTIR in AEs is stronger if these countries have a peg. This is confirmed by the regressions with PCSE (Online Appendix Table D6) and to a lesser extent with the Driscoll-Kraay estimator (Table D7).

The results remain the same if the variable current "CPI inflation" is replaced with the variable "Expected CPI inflation" (Table D8 in Online Appendix D). Similarly, the dynamic panel data analysis (Table D9) provides the same broad conclusions. Two new results are worth mentioning as long as the estimated coefficients are statistically significant in the system GMM while they are not in the pooled OLS estimations. First, a higher degree of financial openness leads to higher LTIR in EMEs (this is clear with the Shambaugh and IIR classifications). There are more exposed to the implications of international capital mobility whereas AEs enjoy lower LTIR. Second, a more stable exchange rate (higher ERS) or a fixed exchange rate regime (Peg IRR=1) reduces the influence of U.S. LTIR on domestic LTIR in EMEs.

Finally, we have studied the role of currency denomination of sovereign debt for EMEs (unlike STIR, data for LTIR in DEVs are too sparse). Results in Table 6 confirm those that apply to STIR: there is a predominant liquidity effect in the impact of sovereign debt in foreign currency on long-term interest rates.

Altogether, unlike STIR, the main determinant of LTIR is not inflation but the U.S. LTIR, and this, in both AEs and EMEs. The influence of U.S. LTIR is stronger in AEs than in EMEs, as in Obstfeld (2015), but it has decreased in AEs and increased in EMEs. Government debt and international reserves are not important in AEs, but they are in EMEs, with a stronger effect of reserves than that of debt. In general, LTIR are lower in countries with a fixed exchange rate regime (the risk premium can be lower), but the role of the exchange rate regime is not obvious when it comes to analyse it in sub-groups of countries. As in Obstfeld (2015), the exchange rate regime is not critical to the international transmission of changes in long-term interest rates.

5. Conclusion

In this paper, we study the international transmission of U.S. interest rates with a special emphasis on the role of international reserves and government debt as determinants of domestic interest rates.

Our theoretical model predicts that a higher level of international reserves can help to reduce domestic interest rates. Government debt itself has an ambiguous effect: a higher level of government debt can lead either to higher interest rates *via* a risk premium effect (sovereign default) or lower interest rates *via* a liquidity effect (monetary financing of budget deficits). It is supposed that the premium effect is dominant for government debt denominated in foreign currency.

We have tested the predictions of the model by using a panel data analysis, with different groups of countries, three alternative classifications of the exchange rate regime and various estimation methods. The main empirical results are the following:

i) the main determinant of domestic short-term interest rates (STIR) is inflation in advanced economies (AEs) and developing economies (DEVs), but it is the U.S. policy rate in emerging market economies (EMEs); by comparison, the main determinant of domestic long-term interest rates (LTIR) is the U.S. LTIR in both AEs and EMEs;

ii) the U.S. policy rate is found to have a greater positive effect on STIR in EMEs than in AEs, and a negative effect in DEVs; on the contrary, U.S. long-term interest rate have a greater positive influence on LTIR in AEs than in EMEs; the international transmission of U.S. interest rates has declined for STIR in AEs and EMEs, it has decreased for LTIR in AEs, but it has increased for LTIR in EMEs in the post-GFC period (2008-2019);

iii) a higher government debt-to-GDP ratio has no effect on interest rates in AEs, but a negative effect in EMEs (liquidity effect) and a positive effect in DEVs (premium effect); in the latter, the premium effect affects government debt in foreign currency and dominates the liquidity effect which is found on government debt in domestic currency; in contrast, the liquidity effect applies to government debt in foreign currency in EMEs during the Great Moderation era (1985-2007), which is surprising but can be related to the dynamics of capital flows towards these countries during this period;

iv) as expected, there is a negative effect of international reserves on interest rates, and this is especially the case in EMEs, with a stronger impact on LTIR than on STIR, and a stronger

influence on interest rates than that of government debt; international reserves do not have an impact on STIR in DEVs;

v) in general, interest rates tend to be lower in countries with a more stable exchange rate or a fixed exchange rate regime; the exchange rate regime is not a critical factor in the transmission of U.S. interest rates to interest rates in AEs, and similarly, it no longer matters for EMEs in the post-GFC period.

Thus, we do not find compelling evidence that the trilemma still holds. What seems to matter most is the behavior of national monetary authorities in managing international reserves. In EMEs, central banks have relied increasingly on the accumulation of larger amounts of foreign exchange reserves. It was particularly the case in some Asian countries before the GFC, and it has been prevalent recently in several Latin American countries. In this respect, our work supports the view that the accumulation of international reserves may shelter countries from the international transmission of financial shocks (Aizenman, Chinn and Ito, 2010; Taguchi, 2011) In terms of policy implications, monetary authorities in developing countries would be well-advised to save foreign exchange reserves during periods of commodity boom. The liquidity effect of an accumulation of international reserves would help to mitigate the premium effect of higher government debt.

As main directions for further research we may point out a more in-depth exploration of the risk and liquidity channels of public debt with a possible estimation of the threshold of government debt-to-GDP ratio above which the sign of the effect of the government debt variable on interest rates changes. Future work could also use error-correction models to uncover the underlying dynamics of interest rates adjustment. Additionally, follow up work could consider the potential spillovers of interest rates of other major central banks like the ECB, Bank of England or Bank of Japan (see Kearns et al., 2020).

References

Afonso, A., Arghyrou, M. G., Gadea, M. D., and Kontonikas, A. (2018). "Whatever it takes" to resolve the European sovereign debt crisis? Bond pricing regime switches and monetary policy effects. *Journal of International Money and Finance*, 86, 1–30.

Aizenman, J., Chinn, M. D. and Ito, H. (2010). The emerging global financial architecture: Tracing and evaluating new patterns of the trilemma configuration. *Journal of International Money and Finance* 29, 615-641.

Aizenman, J., Chinn, M. D. and Ito, H. (2016). Monetary policy spillovers and the trilemma in the new normal: Periphery country sensitivity to core country conditions. *Journal of International Money and Finance* 68, 298-330.

Aizenman, J., Chinn, M. D. and Ito, H. (2017). Financial Spillovers and Macroprudential Policies. *NBER Working Paper* 24105.

Albagli, E., Ceballos, L., Claro, S., and Romero, D. (2019). Channels of US monetary policy spillovers to international bond markets. *Journal of Financial Economics*, *134*(2), 447–473.

Avdjiev, S., Hardy B., Kalemli-Özcan S. and L. Servén (2018). Gross Capital Flows by Banks, Corporates and Sovereigns. *World Bank Policy Research Working Paper* 8514.

Araujo, J. D., David A. C., von Hombeeck C. and Papageorgiou C. (2017). Joining the Club? Procyclicality of Private Capital Inflows in Low Income Developing Countries. *Journal of International Money and Finance* 70, 157-182.

Arellano, M., and Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29–51

Bauer, M. D. and Neely, C. J. (2014). International channels of the Fed's unconventional monetary policy. *Journal of International Money and Finance* 44, 24–46.

Beck, N., and Katz J. N. (1995). What to do (and not to do) with time-series cross-section data. *American Political Science Review* 89, 634–647.

Beers, D., Jones E. and Walsh J. (2020). BoC-BoE Sovereign Default Database: Methodology, Assumptions and Sources. *Bank of Canada Technical Report* 117.

Bekaert, G., and Mehl, A. (2019). On the global financial market integration "swoosh" and the trilemma. *Journal of International Money and Finance*, 94, 227–245.

Bergant, K., Grigoli, F., Hansen, N-J. and Sandri, D. (2020). Dampening Global Financial Shocks: Can Macroprudential Regulation Help (More than Capital Controls)? *IMF Working Paper* 20/106.

Bhattarai, S., Chatterjee, A. and Park, W. Y. (2020). Global Spillover Effects of US Uncertainty. *Journal of Monetary Economics* 114, 71-89.

Bi, H. (2012). Sovereign default risk premia, fiscal limits, and fiscal policy. *European Economic Review*, 56(3), 389–410.

Bianchi, J., Hatchondo, J. C., and Martinez L. (2018). International Reserves and Rollover Risk. *The American Economic Review*, 108(9), 2629-2670.

Blundell, R., and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143.

Bowman, D., Londono, J. M., and Sapriza, H. (2015). U.S. unconventional monetary policy and transmission to emerging market economies. *Journal of International Money and Finance* 55, 27-59.

Bräuning, F. and Ivashina, V. (2020). "Monetary Policy and Global Banking". *Journal of Finance* 75(6), 3055-3095.

Bruno, V. and Shin, H.S. (2015). Capital flows and the risk-taking channel of monetary policy. *Journal of Monetary Economics* 71, 119-132.

Buch, C. M., Bussière, M., Goldberg, L., and Hills, R. (2019). The international transmission of monetary policy. *Journal of International Money and Finance*, 91, 29–48.

Canova, F. (2005). "The Transmission of US Shocks to Latin America". *Journal of Applied Econometrics* 20, 229-251.

Chinn, M. D., and Ito, H. (2006). What matters for financial development? Capital controls, institutions, and interactions. *Journal of Development Economics*, 81(1), 163–192.

Choi, W. G., Kang, T., Kim, G-Y. and Lee, B. (2017). Divergent emerging market economy responses to global and domestic monetary policy shocks. *IMF Working Paper* 17/222.

Corsetti, G., Kuester, K., Müller, G. and Schmidt, S. (2021). The Exchange Rate Insulation Puzzle. *CEPR Discussion Paper* 15689.

Dedola, L., Rivolta, G. and Stracca, L. (2017). If the Fed sneezes, who catches a cold? *Journal of International Economics* 108, 23-41.

di Giovanni, J., and Shambaugh, J. C. (2008). The impact of foreign interest rates on the economy: The role of the exchange rate regime. *Journal of International Economics*, *74*(2), 341–361.

Driscoll, J. C., and Kraay, A. C. (1998). Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data. *Review of Economics and Statistics*, 80(4), 549–560.

Edwards, S. (2010). The International Transmission of Interest Rate Shocks: The Federal Reserve and Emerging Markets in Latin America and Asia. *Journal of International Money and Finance*, 29 (4), 685–703.

Edwards, S. and Khan, M. S. (1985), Interest Rate Determination in Developing Countries: A Conceptual Framework. *IMF Staff Papers*, 32(3), 377-403.

Eichengreen, B. and Gupta, P. (2015), Tapering talk: The impact of expectations of reduced Federal Reserve security purchases on emerging markets. *Emerging Markets Review* 25, 1-15.

Farhi, E., and Werning, I. (2014). Dilemma Not Trilemma? Capital Controls and Exchange Rates with Volatile Capital Flows. *IMF Economic Review*, *62*(4), 569–605.

Feldkircher, M. and Huber, F. (2016). The international transmission of US shocks – Evidence from Bayesian global vector autoregressions. *European Economic Review* 81, 167-188.

Forbes, K. J. and Warnock F. E. (2020). Capital flow waves – or ripples? Extreme capital flow movements since the crisis. *NBER Working Paper* 26851.

Frankel, J., Schmukler, S. L., and Servén, L. (2004). Global transmission of interest rates: Monetary independence and currency regime. *Journal of International Money and Finance*, 23(5), 701–733.

Gilchrist, S., Yue, V., and Zakrajšek, E. (2019). U.S. Monetary Policy and International Bond Markets. *Journal of Money, Credit and Banking*, *51*(S1), 127–161.

Georgiadis, G. (2016). Determinants of global spillovers from US monetary policy. *Journal of International Money and Finance* 67, 41-61.

Gopinath, G., Boz, E., Casas, C., Díez, F. J., Gourinchas, P.-O., and Plagborg-Møller, M. (2020). Dominant Currency Paradigm. *American Economic Review*, 110(3), 677–719.

Han, X., and Wei, S.-J. (2018). International transmissions of monetary shocks: Between a trilemma and a dilemma. *Journal of International Economics*, 110, 205–219.

Hausman, J. and Wongswan, J. (2011). Global asset prices and FOMC announcements. *Journal of International Money and Finance* 30, 547-571.

Hoechle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. *The Stata Journal* 7, 281-312.

Iacoviello, M. and Navarro, G. (2019). Foreign effects of higher US interest rates. *Journal of International Money and Finance* 95, 232-250.

Ilzetzki, E., Reinhart, C. M., and Rogoff, K. S. (2019). Exchange Arrangements Entering the Twenty-First Century: Which Anchor will Hold?. *Quarterly Journal of Economics*, *134*(2), 599–646.

Janus, J. (2020). Is ECB Rocking the Boat? Unconventional Monetary Policy in the EMU and Volatility Spillovers to Poland. *Eastern European Economics*, 58(1), 50–67.

Jordà, O., Schularick M. and Taylor A.M. (2017). "Macrofinancial History and the New Business Cycle Facts." In *NBER Macroeconomic Annual 2016*, volume 31, edited by M. Eichenbaum and J. A. Parker, University of Chicago Press.

Kalemli-Özcan, S. (2019). US monetary policy and international risk spillovers. *NBER Working Paper* 26297.

Kaminsky, G. L., Reinhart C. M. and Végh C. A. (2004). When It Rains, It Pours: Procyclical Capital Flows and Macroeconomic Policies. *NBER Macroeconomics Annual* 19, 11-53.

Kazi, I. A., Wagan, H. and Akbar, F. (2013). The changing international transmission of U.S. monetary policy shocks: Is there evidence of contagion effect on OECD countries. *Economic Modelling* 30, 90-116.

Kearns, J., Schrimpf, A. and Xia, F. (2020). Explaining Monetary Spillovers: The Matrix Reloaded. *CEPR Discussion Paper No. 15006*.

Lane, Ph. R. and Milesi-Ferretti, G. M. (2017), "International Financial Integration in the Aftermath of the Global Financial Crisis". *IMF Working Paper 17/115*

Lim, J. H. and Mohapatra, S. (2016). Quantitative easing and the post-crisis surge in financial flows to developing countries. *Journal of International Money and Finance* 68, 331-357.

Maćkowiak, B. (2007). External shocks, U.S. monetary policy and macroeconomic fluctuations in emerging markets. *Journal of Monetary Economics* 54, 2512-2520.

Mbaye, S., Moreno-Badia, M., Chae, K. (2018). Global Debt Database: Methodology and Sources. *IMF Working Paper* 18/111.

McCallum, B. T. (1999). "Issues in the design of monetary policy rules". In *Handbook of Macroeconomics* (Vol. 1, pp. 1483–1530). Elsevier.

McGettigan, D., Moriyama K., Ntsama J. N.N., Painchaud F., Qu H. and Steinberg C. (2013). Monetary Policy in Emerging Markets: Taming the Cycle. *IMF Working Paper* 13/96.

Miranda-Agrippino, S. and Rey, H. (2020). U.S. Monetary Policy and the Global Financial Cycle. *The Review of Economic Studies* 87 (6), 2754-2776.

Mundell, R. A. (1963). Capital Mobility and Stabilization Policy under Fixed and Flexible Exchange Rates. *Canadian Journal of Economics and Political Science*, *29*(4), 475.

Obstfeld, M. (2015). Trilemmas and trade-offs: living with financial globalisation. *BIS Working Paper* 480.

Obstfeld, M., Ostry, J. D., and Qureshi, M. S. (2019). A Tie That Binds: Revisiting the Trilemma in Emerging Market Economies. *Review of Economics and Statistics*, *101*(2), 279–293.

Obstfeld, M., Shambaugh, J. C., and Taylor, A. M. (2005). The Trilemma in History: Tradeoffs Among Exchange Rates, Monetary Policies, and Capital Mobility. *Review of Economics and Statistics*, *87*(3), 423–438.

Rey, H. (2016). International Channels of Transmission of Monetary Policy and the Mundellian Trilemma. *IMF Economic Review*, *64*(1), 6–35.

Rosero, L. D. (2015). Insuring against Neighboring Crises: International Reserves in Latin America. *Journal of Economic Integration*, 30(3), 467-500.

Saxena, S. C. (2008). Capital flows, exchange rate regime and monetary policy. *BIS Working Paper* 35.

Shambaugh, J. C. (2004). The Effect of Fixed Exchange Rates on Monetary Policy. *Quarterly Journal of Economics*, *119*(1), 301–352.

Shin, H. S. (2016). Global Liquidity and Procyclicality. World Bank Conference, *The State of Economics, the State of the World*, Washington DC, 8 June.

Taguchi, H. (2011). Monetary autonomy in emerging market economies: The role of foreign reserves. *Emerging Markets Review* 12, 371-388.

Taylor R. (1993). Discretion versus policy rules in practice. *Carnegie-Rochester Conference Series on Public Policy* 39, 195-214.

Végh, C. and Vuletin G. (2012). Overcoming the Fear of Free Falling: Monetary Policy Graduation in Emerging Markets. *NBER Working Paper* 18175.

Vicondoa, A. (2019). Monetary news in the United States and business cycles in emerging economies. *Journal of International Economics* 117, 79-90.

Wu, J. C. and Xia F. D. (2016). Measuring the Macroeconomic Impact of Monetary Policy at the Zero Lower Bound. *Journal of Money, Credit and Banking* 48(2-3), 253-291.

Table 1. Determinants of short-term interest rates and ACI classification of exchange rate regimes

	All countries			Advanced economies			Emerging market economies			Developing economies		
VARIABLES	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
STIR (-1)	0.684***	0.627***	0.852***	0.687***	0.670***	0.629***	0.654***	0.603***	0.863***	0.672***	0.597***	0.841***
	(0.028)	(0.035)	(0.017)	(0.026)	(0.037)	(0.071)	(0.044)	(0.054)	(0.021)	(0.039)	(0.048)	(0.033)
US policy rate	0.156***	0.227**	0.021	0.212***	0.170***	0.006	0.355***	0.580***	0.386	-0.119	-0.258	-0.827
	(0.056)	(0.104)	(0.270)	(0.042)	(0.057)	(0.136)	(0.097)	(0.197)	(0.388)	(0.122)	(0.197)	(0.552)
Debt/GDP (-1)	-0.003	-0.001	-0.001	0.001	0.000	0.001	-0.010**	-0.014**	-0.003	0.015***	0.023**	0.003
	(0.003)	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)	(0.005)	(0.006)	(0.005)	(0.006)	(0.009)	(0.011)
Reserves/GDP (-1)	-0.002	-0.010**	-0.001	-0.009***	-0.013***	-0.004	-0.026***	-0.025***	-0.017***	-0.003	-0.020	-0.001
	(0.002)	(0.004)	(0.001)	(0.002)	(0.004)	(0.003)	(0.007)	(0.010)	(0.005)	(0.002)	(0.014)	(0.001)
Credit/GDP (-1)	-0.010***	-0.016***	-0.001	0.004**	0.004	0.005**	-0.010*	-0.019**	0.001	0.020**	0.062***	0.012
	(0.003)	(0.005)	(0.002)	(0.002)	(0.004)	(0.002)	(0.005)	(0.008)	(0.003)	(0.009)	(0.021)	(0.010)
CPI inflation	0.190***	0.211***	0.171***	0.294***	0.311***	0.253***	0.184***	0.210***	0.134***	0.205***	0.231***	0.216***
	(0.020)	(0.027)	(0.024)	(0.033)	(0.049)	(0.033)	(0.030)	(0.043)	(0.025)	(0.030)	(0.036)	(0.056)
Real GDP growth	-0.027*	-0.037*	-0.021	0.052**	0.047	0.042	-0.075***	-0.078***	-0.056**	0.025	0.064	-0.047
	(0.015)	(0.020)	(0.020)	(0.022)	(0.036)	(0.026)	(0.022)	(0.029)	(0.022)	(0.035)	(0.046)	(0.061)
VIX (change)	0.006***	0.004	0.012***	0.003*	-0.002	0.013***	0.009***	0.010**	0.011***	0.003	0.004	0.011*
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)	(0.006)	(0.010)	(0.007)
Default	0.006***	0.003*	0.004***	0.006***	0.013***	0.004**	0.003**	0.001	0.003**	0.009**	0.003	0.007
	(0.001)	(0.002)	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.002)	(0.001)	(0.004)	(0.006)	(0.004)
GFC	-0.005***		-0.010***	-0.005**		-0.007***	-0.004*		-0.006**	-0.007*		-0.013***
	(0.002)		(0.002)	(0.002)		(0.002)	(0.002)		(0.002)	(0.004)		(0.005)
Financial openness	-0.001	0.000	0.000	-0.006**	-0.006	-0.011**	0.002	0.005	0.001	0.008*	0.011	0.005
	(0.001)	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)	(0.002)	(0.004)	(0.002)	(0.004)	(0.007)	(0.005)
ERS	-0.005**	-0.001	-0.002	-0.004***	-0.009**	-0.002	0.002	0.018*	-0.000	-0.014**	-0.036**	-0.009
	(0.002)	(0.006)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.011)	(0.003)	(0.006)	(0.015)	(0.007)
ERS*US policy rate	-0.030	-0.129	-0.130	0.010	0.098	-0.309*	-0.269**	-0.589**	-0.399	0.073	0.331	0.521
	(0.067)	(0.135)	(0.331)	(0.056)	(0.082)	(0.179)	(0.108)	(0.236)	(0.497)	(0.173)	(0.289)	(0.749)
Constant	0.017***	0.022***	0.002	0.002	0.005	0.007*	0.023***	0.020*	0.005	0.007	0.023*	-0.000
	(0.003)	(0.006)	(0.003)	(0.004)	(0.006)	(0.004)	(0.006)	(0.010)	(0.005)	(0.006)	(0.012)	(0.008)
Observations	3,208	1,854	1,354	906	556	350	1,646	942	704	656	356	300
Adjusted R-squared	0.844	0.809	0.898	0.922	0.889	0.859	0.812	0.772	0.881	0.762	0.743	0.787
Number of countries	130	129	129	33	32	33	68	68	67	29	29	29

Notes: pooled OLS estimation, robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table 2. Determinants of short-term interest rates and Shambaugh classification of exchange rate regimes

	All countries			Advanced economies			Emerging market economies			Developing economies		
VARIABLES	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
STIR (-1)	0.682***	0.623***	0.853***	0.693***	0.676***	0.640***	0.654***	0.600***	0.863***	0.665***	0.584***	0.841***
	(0.029)	(0.036)	(0.017)	(0.026)	(0.036)	(0.071)	(0.045)	(0.055)	(0.021)	(0.039)	(0.047)	(0.033)
US policy rate	0.150***	0.203***	-0.071	0.211***	0.209***	-0.126	0.232***	0.348***	0.199	-0.041	-0.081	-0.523*
	(0.036)	(0.055)	(0.145)	(0.028)	(0.037)	(0.087)	(0.062)	(0.101)	(0.210)	(0.081)	(0.123)	(0.301)
Debt/GDP (-1)	-0.003	-0.001	-0.001	0.000	-0.000	0.001	-0.009**	-0.013**	-0.003	0.016***	0.024**	0.005
	(0.003)	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)	(0.005)	(0.007)	(0.005)	(0.006)	(0.009)	(0.011)
Reserves/GDP (-1)	-0.002	-0.009**	-0.001	-0.008***	-0.013***	-0.004	-0.024***	-0.023**	-0.017***	-0.003	-0.018	-0.002
	(0.002)	(0.004)	(0.001)	(0.002)	(0.004)	(0.003)	(0.007)	(0.009)	(0.005)	(0.002)	(0.014)	(0.001)
Credit/GDP (-1)	-0.010***	-0.016***	-0.001	0.005**	0.004	0.004*	-0.010*	-0.019**	0.001	0.019**	0.056***	0.014
	(0.003)	(0.005)	(0.002)	(0.002)	(0.004)	(0.002)	(0.005)	(0.008)	(0.003)	(0.009)	(0.019)	(0.010)
CPI inflation	0.190***	0.210***	0.171***	0.287***	0.301***	0.248***	0.187***	0.216***	0.136***	0.205***	0.231***	0.216***
	(0.020)	(0.027)	(0.025)	(0.033)	(0.049)	(0.033)	(0.030)	(0.043)	(0.027)	(0.029)	(0.036)	(0.056)
Real GDP growth	-0.029*	-0.041**	-0.022	0.052**	0.048	0.040	-0.077***	-0.080***	-0.057**	0.025	0.053	-0.047
	(0.015)	(0.020)	(0.020)	(0.022)	(0.036)	(0.027)	(0.022)	(0.029)	(0.022)	(0.035)	(0.047)	(0.060)
VIX (change)	0.006***	0.005	0.012***	0.003*	-0.002	0.013***	0.009***	0.010**	0.011***	0.003	0.004	0.011*
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)	(0.005)	(0.010)	(0.007)
Default	0.006***	0.003*	0.004***	0.005***	0.012***	0.003**	0.003**	0.001	0.003**	0.008**	0.000	0.006
	(0.001)	(0.002)	(0.001)	(0.001)	(0.004)	(0.002)	(0.001)	(0.002)	(0.001)	(0.004)	(0.006)	(0.004)
GFC	-0.005***		-0.010***	-0.005**		-0.007***	-0.004*		-0.006**	-0.007		-0.013***
	(0.002)		(0.002)	(0.002)		(0.002)	(0.003)		(0.002)	(0.004)		(0.005)
Financial openness	-0.001	0.000	0.000	-0.006**	-0.006*	-0.010**	0.002	0.005	0.001	0.007	0.008	0.004
	(0.001)	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)	(0.002)	(0.004)	(0.002)	(0.004)	(0.008)	(0.005)
Peg	-0.003***	0.000	-0.002	-0.002**	-0.004*	-0.002	0.001	0.012**	-0.001	-0.008**	-0.021**	-0.006
	(0.001)	(0.003)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.006)	(0.002)	(0.004)	(0.010)	(0.004)
Peg*US policy rate	-0.031	-0.123*	0.014	0.015	0.042	-0.153	-0.122*	-0.353***	-0.090	-0.089	0.059	-0.076
	(0.039)	(0.071)	(0.155)	(0.032)	(0.048)	(0.110)	(0.067)	(0.127)	(0.221)	(0.106)	(0.186)	(0.392)
Constant	0.016***	0.022***	0.002	0.000	0.002	0.007	0.023***	0.026***	0.005	0.004	0.016	-0.003
	(0.003)	(0.006)	(0.003)	(0.004)	(0.006)	(0.004)	(0.006)	(0.009)	(0.004)	(0.006)	(0.011)	(0.006)
Observations	3,209	1,854	1,355	906	556	350	1,646	942	704	657	356	301
Adjusted R-squared	0.844	0.809	0.898	0.922	0.889	0.858	0.812	0.771	0.881	0.764	0.747	0.789
Number of countries	130	129	129	33	32	33	68	68	67	29	29	29

Notes: pooled OLS estimation, robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table 3. Determinants of short-term interest rates and IRR classification of exchange rate regimes

	All countries			Advanced economies			Emerging market economies			Developing economies		
VARIABLES	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
STIR (-1)	0.687***	0.630***	0.854***	0.700***	0.683***	0.628***	0.658***	0.608***	0.861***	0.671***	0.602***	0.840***
	(0.028)	(0.035)	(0.017)	(0.025)	(0.035)	(0.071)	(0.044)	(0.053)	(0.021)	(0.039)	(0.048)	(0.032)
US policy rate	0.149***	0.202***	-0.061	0.199***	0.213***	-0.081	0.248***	0.446***	0.346	-0.034	-0.020	-1.309**
	(0.044)	(0.076)	(0.194)	(0.028)	(0.040)	(0.085)	(0.087)	(0.167)	(0.293)	(0.100)	(0.149)	(0.519)
Debt/GDP (-1)	-0.003	-0.001	-0.001	0.000	-0.001	0.001	-0.009**	-0.013**	-0.003	0.017***	0.024***	0.006
	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)	(0.005)	(0.006)	(0.005)	(0.006)	(0.009)	(0.011)
Reserves/GDP (-1)	-0.002	-0.009**	-0.001	-0.008***	-0.012**	-0.005*	-0.024***	-0.024***	-0.016***	-0.003	-0.022	-0.001
	(0.002)	(0.004)	(0.001)	(0.002)	(0.005)	(0.003)	(0.006)	(0.009)	(0.005)	(0.002)	(0.014)	(0.002)
Credit/GDP (-1)	-0.010***	-0.016***	-0.001	0.005**	0.005	0.005**	-0.009*	-0.017**	0.002	0.016*	0.051***	0.009
	(0.003)	(0.005)	(0.002)	(0.002)	(0.004)	(0.002)	(0.005)	(0.008)	(0.003)	(0.010)	(0.019)	(0.010)
CPI inflation	0.196***	0.217***	0.176***	0.287***	0.299***	0.255***	0.191***	0.218***	0.139***	0.206***	0.225***	0.226***
	(0.020)	(0.027)	(0.024)	(0.033)	(0.049)	(0.032)	(0.030)	(0.044)	(0.025)	(0.030)	(0.037)	(0.054)
Real GDP growth	-0.027*	-0.040*	-0.020	0.053**	0.046	0.042	-0.075***	-0.080***	-0.056**	0.024	0.057	-0.051
	(0.015)	(0.020)	(0.020)	(0.022)	(0.036)	(0.027)	(0.022)	(0.029)	(0.022)	(0.035)	(0.047)	(0.061)
VIX (change)	0.006***	0.005	0.012***	0.003*	-0.002	0.013***	0.009***	0.010**	0.011***	0.004	0.006	0.011*
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)	(0.006)	(0.010)	(0.007)
Default	0.005***	0.002	0.004***	0.005***	0.013***	0.003**	0.003*	0.000	0.003*	0.008**	0.002	0.007
	(0.001)	(0.002)	(0.001)	(0.002)	(0.004)	(0.002)	(0.001)	(0.002)	(0.001)	(0.004)	(0.006)	(0.004)
GFC	-0.005***		-0.010***	-0.005**		-0.007***	-0.005*		-0.006**	-0.008*		-0.014***
	(0.002)		(0.002)	(0.002)		(0.002)	(0.002)		(0.002)	(0.004)		(0.005)
Financial openness	-0.000	0.001	0.000	-0.006**	-0.006*	-0.011***	0.003	0.006*	0.001	0.010**	0.016**	0.004
	(0.001)	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)	(0.002)	(0.004)	(0.002)	(0.004)	(0.007)	(0.005)
Peg IRR	0.000	0.003	-0.000	-0.002*	-0.002	-0.001	0.004*	0.017**	0.001	-0.001	-0.002	-0.005
	(0.001)	(0.004)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.008)	(0.002)	(0.005)	(0.010)	(0.006)
Peg IRR*US policy rate	-0.024	-0.080	-0.006	0.032	0.023	-0.243**	-0.109	-0.354*	-0.288	-0.126	-0.189	1.030*
	(0.045)	(0.088)	(0.201)	(0.032)	(0.050)	(0.108)	(0.085)	(0.182)	(0.299)	(0.122)	(0.208)	(0.554)
Constant	0.013***	0.018***	0.001	-0.000	0.001	0.007*	0.020***	0.017*	0.004	0.001	0.007	-0.002
	(0.003)	(0.006)	(0.003)	(0.004)	(0.006)	(0.004)	(0.006)	(0.009)	(0.004)	(0.006)	(0.011)	(0.007)
Observations	3,209	1,854	1,355	906	556	350	1,646	942	704	657	356	301
Adjusted R-squared	0.844	0.808	0.898	0.922	0.888	0.859	0.811	0.770	0.881	0.762	0.740	0.790
Number of countries	130	129	129	33	32	33	68	68	67	29	29	29

Notes: pooled OLS estimation, robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table 4. Determinants of short-term interest rates and currency composition of sovereign debt

	Emerging market economies			Developing economies		
VARIABLES	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019
STIR (-1)	0.621***	0.554***	0.812***	0.715***	0.659***	0.797***
	(0.065)	(0.076)	(0.027)	(0.036)	(0.044)	(0.050)
US policy rate	0.106	0.263	0.331	-0.043	-0.182	-1.342*
	(0.102)	(0.239)	(0.431)	(0.195)	(0.342)	(0.735)
Debt DC/GDP (-1)	-0.001	0.007	-0.007	-0.068***	-0.089**	-0.043
	(0.008)	(0.014)	(0.006)	(0.023)	(0.037)	(0.031)
Debt FC/GDP (-1)	-0.022**	-0.037***	-0.002	0.010**	0.021**	0.003
	(0.008)	(0.013)	(0.006)	(0.005)	(0.009)	(0.008)
Reserves/GDP (-1)	-0.035***	-0.028*	-0.023***	-0.001	-0.021*	-0.001
	(0.008)	(0.017)	(0.006)	(0.002)	(0.013)	(0.002)
Credit/GDP (-1)	-0.005	-0.011	0.003	0.018*	0.044*	0.014
	(0.007)	(0.012)	(0.003)	(0.010)	(0.023)	(0.012)
CPI inflation	0.177***	0.167***	0.152***	0.259***	0.309***	0.213***
	(0.031)	(0.052)	(0.029)	(0.040)	(0.049)	(0.062)
Real GDP growth	-0.099***	-0.109**	-0.070***	0.002	0.039	-0.048
	(0.029)	(0.044)	(0.025)	(0.042)	(0.056)	(0.073)
VIX (change)	0.014***	0.020***	0.013***	0.012*	0.015	0.018**
	(0.003)	(0.005)	(0.003)	(0.007)	(0.013)	(0.008)
Default	0.008***	0.008**	0.005***	0.014***	0.013*	0.009
	(0.002)	(0.003)	(0.002)	(0.004)	(0.007)	(0.007)
GFC	-0.006**		-0.007***	-0.012**		-0.015**
	(0.003)		(0.003)	(0.006)		(0.006)
Financial openness	-0.001	0.004	-0.001	0.002	-0.001	0.005
	(0.002)	(0.004)	(0.002)	(0.005)	(0.009)	(0.006)
ERS	-0.004	0.010	-0.005	-0.010	-0.027	-0.012
	(0.003)	(0.012)	(0.003)	(0.007)	(0.020)	(0.009)
ERS*US policy rate	0.059	-0.211	-0.396	-0.011	0.215	1.275
	(0.110)	(0.287)	(0.555)	(0.257)	(0.469)	(0.964)
Constant	0.029***	0.029**	0.012**	0.006	0.016	0.009
	(0.008)	(0.013)	(0.005)	(0.007)	(0.014)	(0.012)
Observations	1,083	516	567	395	182	213
Adjusted R-squared	0.778	0.703	0.868	0.771	0.806	0.647
Number of countries	56	55	55	21	21	21

Notes: pooled OLS estimation, robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table 5. Determinants of long-term interest rates and exchange rate regimes (1985-2019)

	All countries			Advanced economies			Emerging market economies		
VARIABLES	ACI	Peg	IRR	ACI	Peg	IRR	ACI	Peg	IRR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LTIR (-1)	0.657***	0.656***	0.662***	0.725***	0.722***	0.722***	0.595***	0.592***	0.598***
	(0.079)	(0.080)	(0.080)	(0.037)	(0.037)	(0.036)	(0.097)	(0.096)	(0.096)
US LTIR	0.226***	0.251***	0.225***	0.317***	0.312***	0.247***	0.331***	0.196**	0.230**
	(0.074)	(0.067)	(0.071)	(0.055)	(0.045)	(0.041)	(0.122)	(0.084)	(0.107)
Debt/GDP (-1)	-0.005**	-0.006**	-0.006**	-0.002	-0.001	-0.002	-0.014**	-0.015**	-0.017**
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.007)	(0.006)	(0.007)
Reserves/GDP (-1)	-0.009***	-0.009***	-0.007***	-0.001	-0.002	-0.003	-0.039***	-0.044***	-0.047***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.013)	(0.012)	(0.013)
Credit/GDP (-1)	-0.008**	-0.008**	-0.008**	0.001	0.000	0.001	-0.007	-0.005	-0.005
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)
CPI inflation	0.135***	0.131***	0.133***	0.180***	0.180***	0.179***	0.128***	0.121***	0.119***
	(0.027)	(0.027)	(0.027)	(0.023)	(0.023)	(0.023)	(0.037)	(0.035)	(0.035)
Real GDP growth	-0.107***	-0.109***	-0.109***	-0.074***	-0.074***	-0.075***	-0.111**	-0.117**	-0.119**
	(0.031)	(0.032)	(0.032)	(0.028)	(0.028)	(0.028)	(0.050)	(0.053)	(0.054)
VIX (change)	0.003	0.003*	0.003*	-0.000	-0.000	-0.000	0.006*	0.007*	0.007*
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)	(0.004)
Default	0.000	0.000	0.001	0.007	0.007	0.008	-0.001	-0.000	-0.001
	(0.002)	(0.002)	(0.002)	(0.015)	(0.015)	(0.015)	(0.002)	(0.002)	(0.002)
GFC	-0.002	-0.002	-0.002	0.000	0.000	0.000	-0.006	-0.006	-0.006
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)	(0.004)
Financial openness	-0.007***	-0.007***	-0.008***	-0.004*	-0.004*	-0.003	-0.001	0.000	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
ERS	-0.008***			0.003			-0.001		
	(0.003)			(0.002)			(0.008)		
ERS*US policy rate	0.071			-0.030			-0.282		
	(0.061)			(0.053)			(0.240)		
Peg		-0.004**			0.002			-0.004	
		(0.002)			(0.001)			(0.006)	
Peg*US LTIR		0.033			-0.036			-0.035	
		(0.034)			(0.030)			(0.165)	
Peg IRR			-0.004***			-0.002*			0.003
			(0.002)			(0.001)			(0.005)
Peg IRR*US LTIR			0.076**			0.072**			-0.063
			(0.033)			(0.030)			(0.126)
Constant	0.024***	0.022***	0.022***	-0.003	-0.001	0.001	0.035***	0.037***	0.035***
	(0.007)	(0.007)	(0.007)	(0.004)	(0.003)	(0.003)	(0.011)	(0.010)	(0.010)
Observations	1,235	1,235	1,235	843	843	843	392	392	392
Adjusted R-squared	0.883	0.883	0.882	0.919	0.918	0.919	0.835	0.833	0.831
Number of countries	55	55	55	32	32	32	23	23	23

Notes: pooled OLS estimation, robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table 6. Determinants of long-term interest rates and currency composition of sovereign debt in EMEs (1985-2019)

VARIABLES	ACI	Peg (Shambaugh)	IRR
	(1)	(2)	(3)
LTIR (-1)	0.579***	0.579***	0.583***
	(0.092)	(0.090)	(0.089)
US LTIR	0.396*	0.197*	0.141
	(0.236)	(0.118)	(0.123)
Debt DC/GDP (-1)	-0.007	-0.005	-0.003
	(0.009)	(0.009)	(0.009)
Debt FC/GDP (-1)	-0.030*	-0.033**	-0.042**
	(0.016)	(0.016)	(0.018)
Reserves/GDP (-1)	-0.039***	-0.045***	-0.051***
	(0.013)	(0.013)	(0.015)
Credit/GDP (-1)	-0.017**	-0.015**	-0.015**
	(0.007)	(0.007)	(0.006)
CPI inflation	0.124***	0.119***	0.118***
	(0.039)	(0.037)	(0.036)
Real GDP growth	-0.132**	-0.136**	-0.140**
	(0.060)	(0.064)	(0.064)
VIX (change)	0.008*	0.008*	0.008*
	(0.004)	(0.004)	(0.004)
Default	0.002	0.002	0.001
	(0.003)	(0.003)	(0.003)
GFC	-0.007	-0.006	-0.006
	(0.006)	(0.005)	(0.005)
Financial openness	-0.002	0.000	0.002
	(0.004)	(0.004)	(0.004)
ERS	0.005		
	(0.014)		
ERS*US policy rate	-0.536		
	(0.491)		
Peg		0.002	
		(0.007)	
Peg*US LTIR		-0.170	
		(0.233)	
Peg IRR			0.001
			(0.006)
Peg IRR*US LTIR			0.055
			(0.162)
Constant	0.041***	0.043***	0.044***
	(0.013)	(0.011)	(0.011)
Observations	308	308	308
Adjusted R-squared	0.816	0.812	0.811
Number of countries	19	19	19

Notes: pooled OLS estimation, robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively

Appendix A. Variables and data sources

Variables	Definitions	Sources
STIR	Short-term interest rate. The measure of the interest rate is one of the following depending on data availability: (1) Treasury Bill rate; (2) Interbank rate; (3) Lending rate.	IMF (IFS); OECD (MEI); European Commission (AMECO); Macrohistory Database by Jordà, Schularick and Taylor (2017); Central banks
LTIR	Long-term interest rate. Government bond yields.	IMF (IFS); OECD (MEI); European Commission (AMECO); Jordà-Schularick-Taylor Macrohistory Database
US policy rate	U.S. Effective Federal Funds Rate (%)	Federal Reserve Bank of St. Louis (FRED)
US policy rate QE (US shadow rate)	Shadow rate during the period of quantitative easing (as of 2009)	Wu and Xia (2016) updated
Debt/GDP	Government debt, % of GDP (either general government debt or central government debt).	IMF Global Debt Database (Mbaye, Moreno-Badia and Chae, 2018) updated in 2019
Debt DC/GDP, Debt FC/GDP	General government gross debt in domestic currency (DC) / foreign currency (FC) as a percentage of GDP	IMF(WEO): general government gross debt in domestic currency (ggxwdgcd) and in foreign currency (ggxwdgcf); Acosta-Ormaechea (2020)
Reserves/GDP	International reserves as a percentage of GDP	WB (WDI) and IMF (IFS): total reserves minus gold in current U.S. dollars
Credit/GDP	Domestic credit to private sector (% of GDP)	WB (WDI), IMF (IFS), Fiscal space database (Kose et al., 2017)
CPI inflation	Change in consumer prices (annual %)	WB (WDI), IMF (IFS, WEO)
Expected CPI inflation	Change in consumer prices (annual %), April forecasts	IMF (WEO Historical)
Real GDP growth	Change in GDP, constant prices (annual %)	WB (WDI)
VIX (change)	Volatility index (in first difference)	Chicago Board of Exchange, Bloomberg.
Default	Dummy: sovereign default (The dummy variable takes the value one for each year when there is a sovereign debt default)	Sovereign defaults database from BoC-BoE (Beers, Jones and Walsh, 2020)
GFC	Dummy: global financial crisis (2008-2009)	
Financial openness	Financial Openness Index (Chinn-Ito index, normalized)	Chinn and Ito (2006) updated
ERS	Exchange Rate Stability Index. It is used as the "ACI classification" of exchange rate regimes	Aizenman, Chinn and Ito (2010) updated
Peg	Dummy: 1=peg. It is used as the "Shambaugh classification" of exchange rate regimes	Shambaugh (2004), 2019 update and own update
Peg IRR	Dummy : 1=peg IRR. It is used as the "IRR classificatio of exchange rate regimes. It is based on the categories 1 and 2 of the coarse classification.	Ilzetzki, Reinhart and Rogoff (2019)

Appendix B. Groups of countries

- Short-term interest rates

Advanced economies (AEs)	United Kingdom, Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Finland, Greece, Iceland, Ireland, Malta, Portugal, Spain, Australia, New Zealand, Cyprus, Israel, Hong Kong SAR, South Korea, Singapore, Czech Republic, Slovak Republic, Estonia, Latvia, Lithuania, Slovenia
Emerging market economies (EMEs)	Turkey, South Africa, Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Guatemala, Mexico, Panama, Paraguay, Peru, Uruguay, Venezuela, Antigua and Barbuda, Bahamas, Barbados, Dominica, Grenada, Guyana, Belize, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Bahrain, Kuwait, Oman, Qatar, Egypt, Sri Lanka, India, Indonesia, Malaysia, Maldives, Pakistan, Philippines, Thailand, Algeria, Angola, Botswana, Cabo Verde, Mauritius, Morocco, Seychelles, Namibia, Swaziland, Tunisia, Fiji, Vanuatu, Micronesia, Armenia, Azerbaijan, Belarus, Albania, Georgia, Bulgaria, Russia, China, Ukraine, Hungary, Mongolia, Croatia, Poland, Romania
Developing economies (DEVs)	Haiti, Honduras, Nicaragua, Bangladesh, Nepal, Vietnam, Burundi, Ethiopia, Gambia, Ghana, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mauritania, Mozambique, Nigeria, Rwanda, Sao Tome and Principe, Sierra Leone, Tanzania, Uganda, Zambia, Solomon Islands, Papua New Guinea, Kyrgyz Republic, Moldova, Tajikistan

- Long-term interest rates

Advanced economies (AEs)	United Kingdom, Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Finland, Greece, Iceland, Ireland, Malta, Portugal, Spain, Australia, New Zealand, Cyprus, Israel, South Korea, Singapore, Czech Republic, Slovak Republic, Estonia, Latvia, Lithuania, Slovenia
Emerging market economies (EMEs)	Turkey, South Africa, Chile, Colombia, Mexico, Venezuela, Sri Lanka, Malaysia, Pakistan, Thailand, Botswana, Mauritius, Morocco, Seychelles, Fiji, Armenia, Bulgaria, Russia, Hungary, Mongolia, Croatia, Poland, Romania

Appendix C. Descriptive statistics

Full sample (130 countries, 1985-2019)

Variable	Obs	Mean	Std.Dev.	Min	Max
Short-term interest rate	3619	.091	.078	-.008	.491
Long-term interest rate	2950	.056	.039	-.005	.385
US policy rate	3619	.029	.026	.001	.088
US policy rate QE	3619	.025	.03	-.027	.088
Debt/GDP	3571	.547	.419	.011	5.937
Debt DC/GDP	1767	.261	.245	0	1.787
Debt FC/GDP	1829	.333	.658	0	11.885
Reserves/GDP	3612	.203	.857	.001	22.948
Credit/GDP	3575	.54	.43	.002	3.09
Inflation CPI	3619	.061	.068	-.098	.487
Expected CPI inflation	3316	.055	.053	-.064	.491
Real GDP growth	3618	.037	.043	-.41	.828
VIX	3566	19.61	5.93	11.09	32.695
Default	3598	.45	.498	0	1
GFC	3503	.074	.261	0	1
Financial openness	3451	.576	.367	0	1
ERS	3618	.608	.312	.004	1
Peg	3619	.437	.496	0	1
Peg (IRR) 12	3619	.693	.461	0	1

ote: cases with the interest rate and the inflation rate above 50% are dropped.

Online Appendix D. Additional results

Table D1. Determinants of short-term interest rates, pooled OLS regressions with panel-corrected standard errors (PCSE)

	All countries			Advanced economies			Emerging market economies			Developing economies		
VARIABLES	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
STIR (-1)	0.559***	0.474***	0.836***	0.639***	0.605***	0.639***	0.499***	0.427***	0.827***	0.552***	0.480***	0.819***
	(0.016)	(0.025)	(0.017)	(0.022)	(0.034)	(0.052)	(0.022)	(0.035)	(0.023)	(0.028)	(0.037)	(0.035)
US policy rate	0.196***	0.092	0.041	0.242***	0.188***	0.009	0.439***	0.389**	0.436*	-0.136	-0.380	-0.815
	(0.059)	(0.106)	(0.205)	(0.044)	(0.073)	(0.187)	(0.089)	(0.175)	(0.262)	(0.147)	(0.246)	(0.611)
Debt/GDP (-1)	-0.001	0.000	-0.001	0.000	0.000	0.001	-0.015***	-0.022***	-0.003	0.029***	0.036***	0.004
	(0.003)	(0.005)	(0.002)	(0.002)	(0.003)	(0.002)	(0.005)	(0.008)	(0.005)	(0.007)	(0.011)	(0.009)
Reserves/GDP (-1)	-0.006**	-0.021***	-0.001	-0.009***	-0.015***	-0.004	-0.050***	-0.052***	-0.021***	-0.005	-0.029*	-0.002
	(0.003)	(0.006)	(0.001)	(0.003)	(0.005)	(0.003)	(0.008)	(0.012)	(0.006)	(0.003)	(0.017)	(0.002)
Credit/GDP (-1)	-0.020***	-0.028***	-0.002	0.003	0.002	0.005**	-0.024***	-0.035***	-0.000	0.020	0.062**	0.013
	(0.003)	(0.005)	(0.002)	(0.003)	(0.004)	(0.002)	(0.006)	(0.009)	(0.004)	(0.013)	(0.030)	(0.010)
CPI inflation	0.236***	0.267***	0.179***	0.327***	0.350***	0.247***	0.249***	0.303***	0.149***	0.223***	0.242***	0.219***
	(0.016)	(0.024)	(0.021)	(0.026)	(0.041)	(0.029)	(0.022)	(0.035)	(0.023)	(0.026)	(0.035)	(0.053)
Real GDP growth	-0.026*	-0.024	-0.024	0.042**	0.027	0.042***	-0.073***	-0.064***	-0.068***	0.043	0.086**	-0.047
	(0.014)	(0.019)	(0.018)	(0.017)	(0.032)	(0.014)	(0.017)	(0.022)	(0.021)	(0.036)	(0.044)	(0.058)
VIX (change)	0.004**	0.003	0.011***	0.003**	-0.002	0.013***	0.006**	0.006	0.010***	0.001	0.001	0.010
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.005)	(0.003)	(0.005)	(0.010)	(0.006)
Default	0.007***	0.004*	0.005***	0.005	0.017	0.004*	0.005***	0.003	0.003**	0.010**	0.004	0.008
	(0.002)	(0.002)	(0.001)	(0.005)	(0.014)	(0.002)	(0.002)	(0.003)	(0.002)	(0.004)	(0.007)	(0.005)
GFC	-0.003		-0.010***	-0.005***		-0.007***	-0.002		-0.005**	-0.006		-0.012**
	(0.002)		(0.002)	(0.002)		(0.002)	(0.003)		(0.002)	(0.006)		(0.005)
Financial openness	-0.002	-0.002	0.000	-0.008***	-0.009**	-0.010**	0.001	0.004	0.001	0.010*	0.012	0.005
	(0.002)	(0.003)	(0.002)	(0.003)	(0.004)	(0.004)	(0.003)	(0.005)	(0.002)	(0.006)	(0.009)	(0.005)
ERS	-0.010***	-0.015**	-0.003	-0.006***	-0.010**	-0.002*	-0.003	-0.001	-0.001	-0.019**	-0.045***	-0.010
	(0.003)	(0.007)	(0.002)	(0.002)	(0.005)	(0.001)	(0.004)	(0.011)	(0.003)	(0.008)	(0.017)	(0.007)
ERS*US policy rate	-0.042	0.013	-0.157	-0.019	0.060	-0.302	-0.327***	-0.380*	-0.453	0.111	0.471	0.524
	(0.077)	(0.144)	(0.250)	(0.058)	(0.104)	(0.217)	(0.111)	(0.217)	(0.342)	(0.212)	(0.356)	(0.814)
Constant	0.031***	0.050***	0.003	0.007	0.014*	0.007	0.046***	0.059***	0.009*	0.015*	0.037**	0.001
	(0.004)	(0.007)	(0.003)	(0.004)	(0.007)	(0.005)	(0.006)	(0.012)	(0.005)	(0.008)	(0.016)	(0.008)
Observations	3,208	1,854	1,354	906	556	350	1,646	942	704	656	356	300
R-squared	0.759	0.713	0.886	0.899	0.859	0.869	0.717	0.681	0.852	0.665	0.661	0.768
Number of countries	130	129	129	33	32	33	68	68	67	29	29	29

Notes: robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table D2. Determinants of short-term interest rates, Driscoll-Kraay estimator

	All countries			Advanced economies			Emerging market economies			Developing economies		
VARIABLES	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
STIR (-1)	0.684***	0.627***	0.852***	0.687***	0.670***	0.629***	0.654***	0.603***	0.863***	0.672***	0.597***	0.841***
	(0.040)	(0.041)	(0.022)	(0.042)	(0.051)	(0.108)	(0.045)	(0.045)	(0.038)	(0.062)	(0.075)	(0.021)
US policy rate	0.156**	0.227**	0.021	0.212***	0.170**	0.006	0.355**	0.580**	0.386**	-0.119	-0.258*	-0.827**
	(0.073)	(0.090)	(0.117)	(0.057)	(0.064)	(0.132)	(0.148)	(0.213)	(0.127)	(0.149)	(0.149)	(0.266)
Debt/GDP (-1)	-0.003	-0.001	-0.001	0.001	0.000	0.001	-0.010*	-0.014*	-0.003	0.015***	0.023***	0.003
	(0.003)	(0.006)	(0.001)	(0.002)	(0.004)	(0.001)	(0.005)	(0.008)	(0.002)	(0.006)	(0.008)	(0.008)
Reserves/GDP (-1)	-0.002	-0.010***	-0.001	-0.009**	-0.013**	-0.004	-0.026***	-0.025***	-0.017***	-0.003*	-0.020	-0.001
	(0.001)	(0.003)	(0.001)	(0.004)	(0.005)	(0.005)	(0.006)	(0.009)	(0.004)	(0.002)	(0.013)	(0.001)
Credit/GDP (-1)	-0.010**	-0.016**	-0.001	0.004	0.004	0.005*	-0.010*	-0.019**	0.001	0.020**	0.062***	0.012
	(0.004)	(0.007)	(0.002)	(0.003)	(0.006)	(0.002)	(0.006)	(0.008)	(0.003)	(0.008)	(0.017)	(0.009)
CPI inflation	0.190***	0.211***	0.171***	0.294***	0.311***	0.253***	0.184***	0.210***	0.134***	0.205***	0.231***	0.216***
	(0.026)	(0.039)	(0.025)	(0.040)	(0.053)	(0.052)	(0.039)	(0.055)	(0.031)	(0.034)	(0.043)	(0.067)
Real GDP growth	-0.027*	-0.037*	-0.021**	0.052***	0.047*	0.042*	-0.075***	-0.078**	-0.056***	0.025	0.064	-0.047
	(0.014)	(0.021)	(0.009)	(0.016)	(0.023)	(0.019)	(0.027)	(0.036)	(0.016)	(0.038)	(0.054)	(0.029)
VIX (change)	0.006*	0.004	0.012***	0.003	-0.002	0.013**	0.009**	0.010	0.011***	0.003	0.004	0.011**
	(0.003)	(0.006)	(0.003)	(0.005)	(0.005)	(0.005)	(0.004)	(0.009)	(0.003)	(0.004)	(0.007)	(0.004)
Default	0.006***	0.003	0.004**	0.006**	0.013***	0.004*	0.003**	0.001	0.003	0.009***	0.003	0.007**
	(0.001)	(0.002)	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.006)	(0.003)
GFC	-0.005***	0.000	-0.010***	-0.005	0.000	-0.007***	-0.004**	0.000	-0.006***	-0.007**	0.000	-0.013**
	(0.002)	(0.000)	(0.001)	(0.004)	(0.000)	(0.001)	(0.002)	(0.000)	(0.001)	(0.003)	(0.000)	(0.004)
Financial openness	-0.001	0.000	0.000	-0.006	-0.006	-0.011***	0.002	0.005	0.001	0.008*	0.011	0.005
	(0.001)	(0.002)	(0.001)	(0.004)	(0.006)	(0.003)	(0.002)	(0.003)	(0.001)	(0.005)	(0.009)	(0.003)
ERS	-0.005***	-0.001	-0.002	-0.004**	-0.009**	-0.002*	0.002	0.018**	-0.000	-0.014**	-0.036***	-0.009
	(0.001)	(0.003)	(0.002)	(0.002)	(0.004)	(0.001)	(0.003)	(0.008)	(0.003)	(0.006)	(0.010)	(0.005)
ERS*US policy rate	-0.030	-0.129	-0.130	0.010	0.098	-0.309*	-0.269*	-0.589**	-0.399*	0.073	0.331	0.521
	(0.060)	(0.078)	(0.187)	(0.081)	(0.105)	(0.167)	(0.155)	(0.226)	(0.227)	(0.178)	(0.210)	(0.317)
Constant	0.017***	0.022**	0.002	0.002	0.005	0.007	0.023***	0.020	0.005	0.007	0.023	-0.000
	(0.005)	(0.008)	(0.002)	(0.005)	(0.008)	(0.005)	(0.006)	(0.013)	(0.004)	(0.007)	(0.013)	(0.006)
Observations	3,208	1,854	1,354	906	556	350	1,646	942	704	656	356	300
R-squared	0.845	0.810	0.899	0.923	0.892	0.864	0.814	0.774	0.884	0.767	0.752	0.797
Number of countries	130	129	129	33	32	33	68	68	67	29	29	29

Notes: robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table D3. Determinants of short-term interest rates and US shadow rate

	All countries			Advanced economies			Emerging market economies			Developing economies		
VARIABLES	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
STIR (-1)	0.684***	0.627***	0.852***	0.688***	0.670***	0.642***	0.654***	0.603***	0.865***	0.672***	0.597***	0.841***
	(0.028)	(0.035)	(0.017)	(0.027)	(0.037)	(0.070)	(0.045)	(0.054)	(0.021)	(0.039)	(0.048)	(0.033)
US policy rate QE	0.118***	0.227**	-0.016	0.186***	0.170***	-0.035	0.265***	0.580***	0.145	-0.097	-0.258	-0.410
	(0.045)	(0.104)	(0.115)	(0.034)	(0.057)	(0.069)	(0.073)	(0.197)	(0.151)	(0.104)	(0.197)	(0.318)
Debt/GDP (-1)	-0.003	-0.001	-0.001	0.001	0.000	0.001	-0.011**	-0.014**	-0.003	0.016***	0.023**	0.002
	(0.003)	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)	(0.005)	(0.006)	(0.005)	(0.006)	(0.009)	(0.011)
Reserves/GDP (-1)	-0.002	-0.010**	-0.001	-0.008***	-0.013***	-0.004	-0.026***	-0.025***	-0.017***	-0.003	-0.020	-0.001
	(0.002)	(0.004)	(0.001)	(0.002)	(0.004)	(0.003)	(0.007)	(0.010)	(0.005)	(0.002)	(0.014)	(0.001)
Credit/GDP (-1)	-0.010***	-0.016***	-0.001	0.004**	0.004	0.005**	-0.010*	-0.019**	0.001	0.019**	0.062***	0.012
	(0.003)	(0.005)	(0.002)	(0.002)	(0.004)	(0.002)	(0.005)	(0.008)	(0.003)	(0.009)	(0.021)	(0.010)
CPI inflation	0.190***	0.211***	0.171***	0.295***	0.311***	0.252***	0.185***	0.210***	0.133***	0.205***	0.231***	0.220***
	(0.020)	(0.027)	(0.024)	(0.033)	(0.049)	(0.033)	(0.030)	(0.043)	(0.025)	(0.030)	(0.036)	(0.055)
Real GDP growth	-0.027*	-0.037*	-0.021	0.053**	0.047	0.042	-0.075***	-0.078***	-0.057**	0.026	0.064	-0.046
	(0.015)	(0.020)	(0.020)	(0.022)	(0.036)	(0.027)	(0.022)	(0.029)	(0.022)	(0.035)	(0.046)	(0.059)
VIX (change)	0.007***	0.004	0.012***	0.004**	-0.002	0.012***	0.009***	0.010**	0.012***	0.003	0.004	0.008
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.001)	(0.003)	(0.004)	(0.003)	(0.006)	(0.010)	(0.006)
Default	0.006***	0.003*	0.004***	0.006***	0.013***	0.004**	0.003**	0.001	0.003**	0.009**	0.003	0.006
	(0.001)	(0.002)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.002)	(0.001)	(0.004)	(0.006)	(0.005)
GFC	-0.006***		-0.010***	-0.007***		-0.006**	-0.006**		-0.007***	-0.007		-0.008**
	(0.002)		(0.002)	(0.002)		(0.003)	(0.002)		(0.003)	(0.004)		(0.004)
Financial openness	-0.001	0.000	0.000	-0.007**	-0.006	-0.010**	0.002	0.005	0.001	0.008*	0.011	0.005
	(0.001)	(0.002)	(0.002)	(0.003)	(0.004)	(0.004)	(0.002)	(0.004)	(0.002)	(0.004)	(0.007)	(0.005)
ERS	-0.005***	-0.001	-0.003*	-0.004***	-0.009**	-0.004***	-0.000	0.018*	-0.003	-0.013**	-0.036**	-0.006
	(0.002)	(0.006)	(0.002)	(0.001)	(0.003)	(0.001)	(0.002)	(0.011)	(0.002)	(0.005)	(0.015)	(0.006)
ERS*US policy rate QE	-0.019	-0.129	-0.033	-0.020	0.098	-0.060	-0.195**	-0.589**	-0.196	0.054	0.331	0.355
	(0.054)	(0.135)	(0.142)	(0.044)	(0.082)	(0.080)	(0.083)	(0.236)	(0.191)	(0.149)	(0.289)	(0.457)
Constant	0.019***	0.022***	0.002	0.003	0.005	0.006	0.026***	0.020*	0.008*	0.006	0.023*	-0.007
	(0.004)	(0.006)	(0.003)	(0.004)	(0.006)	(0.004)	(0.006)	(0.010)	(0.004)	(0.006)	(0.012)	(0.007)
Observations	3,208	1,854	1,354	906	556	350	1,646	942	704	656	356	300
Adjusted R-squared	0.844	0.809	0.898	0.921	0.889	0.856	0.812	0.772	0.881	0.762	0.743	0.787
Number of countries	130	129	129	33	32	33	68	68	67	29	29	29

Notes: pooled OLS estimation, robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table D4. Determinants of short-term interest rates and inflation expectations

	All countries			Advanced economies			Emerging market economies			Developing economies		
VARIABLES	1990-2019	1990-2007	2008-2019	1990-2019	1990-2007	2008-2019	1990-2019	1990-2007	2008-2019	1990-2019	1990-2007	2008-2019
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
STIR (-1)	0.692***	0.638***	0.844***	0.722***	0.707***	0.663***	0.665***	0.619***	0.860***	0.680***	0.612***	0.823***
	(0.028)	(0.036)	(0.017)	(0.026)	(0.039)	(0.081)	(0.044)	(0.054)	(0.022)	(0.038)	(0.048)	(0.032)
US policy rate	0.191***	0.304**	-0.007	0.163***	0.152**	-0.021	0.343***	0.638**	0.397	0.089	-0.054	-0.935*
	(0.071)	(0.142)	(0.286)	(0.050)	(0.076)	(0.127)	(0.119)	(0.258)	(0.417)	(0.149)	(0.262)	(0.547)
Debt/GDP (-1)	-0.001	0.001	0.001	0.001	0.001	0.002	-0.009*	-0.012	-0.003	0.015**	0.021**	0.010
	(0.003)	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)	(0.005)	(0.008)	(0.005)	(0.007)	(0.010)	(0.011)
Reserves/GDP (-1)	-0.003	-0.014***	-0.000	-0.008***	-0.014***	-0.003	-0.028***	-0.022**	-0.019***	-0.002	-0.032*	-0.000
	(0.002)	(0.005)	(0.001)	(0.002)	(0.004)	(0.003)	(0.008)	(0.011)	(0.005)	(0.002)	(0.017)	(0.002)
Credit/GDP (-1)	-0.011***	-0.018***	-0.001	0.007***	0.009**	0.004*	-0.010*	-0.021**	0.001	0.020**	0.068***	0.014
	(0.003)	(0.005)	(0.002)	(0.002)	(0.004)	(0.002)	(0.006)	(0.009)	(0.003)	(0.010)	(0.022)	(0.010)
Expected CPI inflation	0.167***	0.172***	0.177***	0.314***	0.350***	0.265***	0.143***	0.153**	0.123***	0.216***	0.234***	0.274***
	(0.029)	(0.045)	(0.022)	(0.041)	(0.070)	(0.038)	(0.038)	(0.061)	(0.022)	(0.050)	(0.068)	(0.058)
Real GDP growth	-0.038**	-0.062***	-0.012	0.058**	0.065*	0.045*	-0.082***	-0.096***	-0.052**	-0.002	0.001	-0.020
	(0.016)	(0.024)	(0.021)	(0.023)	(0.037)	(0.027)	(0.024)	(0.035)	(0.023)	(0.038)	(0.049)	(0.066)
VIX (change)	0.010***	0.009**	0.015***	0.008***	0.004	0.013***	0.013***	0.016***	0.014***	0.005	0.000	0.018***
	(0.002)	(0.004)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.005)	(0.003)	(0.006)	(0.012)	(0.006)
Default	0.008***	0.006***	0.005***	0.007**	0.020***	0.004*	0.005***	0.002	0.003**	0.012***	0.008	0.008*
	(0.001)	(0.002)	(0.001)	(0.003)	(0.004)	(0.002)	(0.001)	(0.002)	(0.001)	(0.004)	(0.007)	(0.004)
GFC	-0.004**		-0.009***	-0.006***		-0.007***	-0.003		-0.005**	-0.004		-0.012***
	(0.002)		(0.002)	(0.002)		(0.003)	(0.003)		(0.002)	(0.004)		(0.005)
Financial openness	-0.003	-0.003	-0.000	-0.008**	-0.008*	-0.010**	0.001	0.003	0.000	0.004	0.003	0.005
	(0.002)	(0.003)	(0.002)	(0.003)	(0.004)	(0.004)	(0.002)	(0.004)	(0.002)	(0.005)	(0.008)	(0.005)
ERS	-0.007***	-0.002	-0.004*	-0.003**	-0.005	-0.002	-0.002	0.017	-0.002	-0.016***	-0.036**	-0.012*
	(0.002)	(0.007)	(0.002)	(0.002)	(0.004)	(0.002)	(0.003)	(0.013)	(0.003)	(0.006)	(0.017)	(0.007)
ERS*US policy rate	-0.037	-0.182	-0.179	0.029	0.079	-0.262	-0.200	-0.614**	-0.505	-0.104	0.126	0.466
	(0.081)	(0.176)	(0.356)	(0.064)	(0.098)	(0.175)	(0.125)	(0.302)	(0.545)	(0.210)	(0.387)	(0.731)
Constant	0.019***	0.026***	0.002	-0.001	-0.001	0.006	0.026***	0.022*	0.007*	0.007	0.026*	-0.006
	(0.004)	(0.008)	(0.003)	(0.004)	(0.006)	(0.004)	(0.007)	(0.013)	(0.005)	(0.008)	(0.015)	(0.008)
Observations	3,038	1,692	1,346	842	493	349	1,560	863	697	636	336	300
Adjusted R-squared	0.835	0.794	0.894	0.916	0.881	0.851	0.800	0.752	0.874	0.743	0.709	0.784
Number of countries	130	129	129	33	32	33	68	68	67	29	29	29

Notes: pooled OLS estimation, robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table D5. Determinants of short-term interest rates, dynamic panel-data estimation: system GMM

	All countries			Advanced economies			Emerging market economies			Developing economies		
VARIABLES	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019	1985-2019	1985-2007	2008-2019
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
STIR (-1)	0.529***	0.501***	0.636***	0.672***	0.653***	0.620***	0.506***	0.474***	0.585***	0.539***	0.515***	0.600***
	(0.042)	(0.049)	(0.029)	(0.029)	(0.044)	(0.080)	(0.059)	(0.071)	(0.044)	(0.035)	(0.055)	(0.047)
US policy rate	0.475***	0.486***	0.142	0.256***	0.183**	0.133*	0.738***	0.819***	0.252	0.086	-0.160	0.013
	(0.094)	(0.121)	(0.109)	(0.068)	(0.075)	(0.070)	(0.135)	(0.230)	(0.168)	(0.144)	(0.216)	(0.220)
Debt/GDP (-1)	0.007	0.023	-0.006	-0.003	0.001	-0.028***	-0.002	-0.008	-0.003	0.026***	0.025*	0.013
	(0.008)	(0.016)	(0.008)	(0.005)	(0.011)	(0.008)	(0.015)	(0.027)	(0.009)	(0.008)	(0.014)	(0.014)
Reserves/GDP (-1)	-0.008	-0.018	-0.011	-0.006	-0.018	-0.007*	-0.019	0.003	-0.009	0.014**	0.009	-0.001
	(0.010)	(0.027)	(0.012)	(0.007)	(0.020)	(0.004)	(0.027)	(0.062)	(0.018)	(0.006)	(0.016)	(0.017)
Credit/GDP (-1)	0.002	0.012	0.030***	0.008*	0.016***	0.016*	0.015	0.015	0.053***	0.016	0.069*	0.067*
	(0.008)	(0.014)	(0.009)	(0.004)	(0.006)	(0.008)	(0.014)	(0.029)	(0.013)	(0.016)	(0.041)	(0.036)
CPI inflation	0.218***	0.210***	0.220***	0.326***	0.377***	0.246***	0.210***	0.226***	0.163***	0.259***	0.264***	0.310***
	(0.034)	(0.042)	(0.033)	(0.042)	(0.070)	(0.022)	(0.052)	(0.072)	(0.031)	(0.039)	(0.041)	(0.058)
Real GDP growth	-0.047*	-0.077*	-0.013	0.075**	0.094**	0.070**	-0.074*	-0.089	-0.045**	-0.053*	-0.057	-0.035
	(0.027)	(0.042)	(0.018)	(0.031)	(0.045)	(0.035)	(0.044)	(0.061)	(0.022)	(0.031)	(0.060)	(0.040)
VIX (change)	0.003	0.001	0.008***	0.005***	-0.000	0.013***	0.007**	0.009	0.007**	-0.002	-0.002	0.003
	(0.003)	(0.005)	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.006)	(0.003)	(0.006)	(0.010)	(0.007)
Default	0.006*	0.005	0.005**	0.007***	0.017***	0.005***	0.003	0.004	-0.000	0.012***	0.026***	0.004
	(0.003)	(0.006)	(0.002)	(0.002)	(0.005)	(0.001)	(0.003)	(0.006)	(0.002)	(0.004)	(0.009)	(0.006)
GFC	-0.002		-0.005**	-0.002		-0.006*	0.000		0.002	-0.006		-0.008
	(0.002)		(0.002)	(0.002)		(0.003)	(0.003)		(0.003)	(0.004)		(0.006)
Financial openness	0.011*	0.001	0.008	-0.007**	-0.006	0.001	0.003	0.002	0.003	0.013	0.019	0.004
	(0.005)	(0.007)	(0.008)	(0.003)	(0.006)	(0.004)	(0.007)	(0.010)	(0.010)	(0.012)	(0.017)	(0.012)
ERS	-0.008	-0.000	-0.020***	-0.004	-0.015**	0.000	0.014*	0.028*	-0.011**	-0.023***	-0.053***	-0.015*
	(0.006)	(0.010)	(0.006)	(0.004)	(0.006)	(0.003)	(0.008)	(0.016)	(0.005)	(0.008)	(0.017)	(0.008)
ERS*US policy rate	-0.340***	-0.452***	-0.064	-0.088	0.037	-0.056	-0.636***	-0.930***	-0.094	-0.128	0.246	-0.040
	(0.116)	(0.164)	(0.154)	(0.075)	(0.084)	(0.084)	(0.144)	(0.272)	(0.233)	(0.215)	(0.330)	(0.292)
Observations	3,208	1,854	1,354	906	556	350	1,646	942	704	656	356	300
Number of countries	130	129	129	33	32	33	68	68	67	29	29	29

Notes: robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table D6. Determinants of long-term interest rates and exchange rate regimes (1985-2019), PCSE

	All countries			Advanced economies			Emerging market economies		
VARIABLES	ACI	Peg	IRR	ACI	Peg	IRR	ACI	Peg	IRR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LTIR (-1)	0.580***	0.580***	0.586***	0.685***	0.681***	0.686***	0.511***	0.511***	0.508***
	(0.030)	(0.030)	(0.030)	(0.031)	(0.031)	(0.030)	(0.036)	(0.036)	(0.036)
US LTIR	0.315***	0.324***	0.295***	0.382***	0.365***	0.288***	0.375***	0.243***	0.273***
	(0.058)	(0.041)	(0.044)	(0.053)	(0.041)	(0.039)	(0.145)	(0.085)	(0.099)
Debt/GDP (-1)	-0.006**	-0.006**	-0.007***	-0.002	-0.001	-0.002	-0.019***	-0.019***	-0.022***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.007)	(0.007)	(0.008)
Reserves/GDP (-1)	-0.013***	-0.013***	-0.011***	-0.001	-0.002	-0.003	-0.051***	-0.057***	-0.063***
	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.012)	(0.011)	(0.012)
Credit/GDP (-1)	-0.010***	-0.010***	-0.010***	0.000	-0.000	0.000	-0.010**	-0.008	-0.008
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)
CPI inflation	0.148***	0.144***	0.146***	0.187***	0.185***	0.185***	0.131***	0.123***	0.123***
	(0.027)	(0.028)	(0.028)	(0.027)	(0.027)	(0.026)	(0.034)	(0.036)	(0.036)
Real GDP growth	-0.100***	-0.102***	-0.103***	-0.081***	-0.082***	-0.082***	-0.080**	-0.085**	-0.087**
	(0.019)	(0.019)	(0.019)	(0.016)	(0.016)	(0.016)	(0.034)	(0.034)	(0.035)
VIX (change)	0.002	0.002	0.002	-0.000	-0.000	-0.000	0.004	0.005*	0.005*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.003)
Default	0.001	0.001	0.002	0.007	0.007	0.007	0.000	0.000	0.000
	(0.002)	(0.002)	(0.002)	(0.008)	(0.008)	(0.008)	(0.002)	(0.002)	(0.002)
GFC	-0.003	-0.002	-0.002	-0.000	-0.000	-0.001	-0.005	-0.004	-0.004
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)
Financial openness	-0.010***	-0.010***	-0.010***	-0.005**	-0.005**	-0.004**	-0.004	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.005)
ERS	-0.008**			0.005*			-0.005		
	(0.004)			(0.003)			(0.014)		
ERS*US policy rate	0.026			-0.066			-0.283		
	(0.082)			(0.062)			(0.343)		
Peg		-0.004*			0.002			-0.001	
		(0.002)			(0.002)			(0.008)	
Peg*US LTIR		0.013			-0.052			-0.150	
		(0.044)			(0.034)			(0.210)	
Peg IRR			-0.004*			-0.002			0.003
			(0.002)			(0.002)			(0.006)
Peg IRR*US LTIR			0.070			0.071**			-0.083
			(0.046)			(0.034)			(0.141)
Constant	0.029***	0.027***	0.027***	-0.001	0.001	0.003	0.046***	0.046***	0.045***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.008)	(0.007)	(0.008)
Observations	1,235	1,235	1,235	843	843	843	392	392	392
R-squared	0.841	0.840	0.839	0.899	0.899	0.901	0.783	0.782	0.772
Number of countries	55	55	55	32	32	32	23	23	23

Notes: pooled OLS regressions with panel-corrected standard errors (PCSE), robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table D7. Determinants of long-term interest rates and exchange rate regimes (1985-2019), Driscoll-Kraay estimator

	All countries			Advanced economies			Emerging market economies		
VARIABLES	ACI	Peg	IRR	ACI	Peg	IRR	ACI	Peg	IRR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LTIR (-1)	0.657***	0.656***	0.662***	0.725***	0.722***	0.722***	0.595***	0.592***	0.598***
	(0.084)	(0.084)	(0.085)	(0.027)	(0.027)	(0.026)	(0.097)	(0.096)	(0.097)
US LTIR	0.226**	0.251***	0.225***	0.317***	0.312***	0.247***	0.331***	0.196**	0.230*
	(0.088)	(0.080)	(0.075)	(0.050)	(0.038)	(0.031)	(0.106)	(0.096)	(0.114)
Debt/GDP (-1)	-0.005	-0.006*	-0.006*	-0.002	-0.001	-0.002	-0.014	-0.015*	-0.017*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.009)	(0.009)	(0.009)
Reserves/GDP (-1)	-0.009***	-0.009***	-0.007***	-0.001	-0.002	-0.003	-0.039**	-0.044**	-0.047**
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)	(0.017)	(0.017)	(0.018)
Credit/GDP (-1)	-0.008**	-0.008**	-0.008**	0.001	0.000	0.001	-0.007	-0.005	-0.005
	(0.004)	(0.004)	(0.004)	(0.002)	(0.002)	(0.002)	(0.006)	(0.006)	(0.006)
CPI inflation	0.135***	0.131***	0.133***	0.180***	0.180***	0.179***	0.128***	0.121***	0.119***
	(0.021)	(0.020)	(0.020)	(0.028)	(0.029)	(0.029)	(0.025)	(0.024)	(0.024)
Real GDP growth	-0.107***	-0.109***	-0.109***	-0.074*	-0.074*	-0.075*	-0.111**	-0.117**	-0.119**
	(0.030)	(0.029)	(0.030)	(0.044)	(0.044)	(0.045)	(0.048)	(0.049)	(0.053)
VIX (change)	0.003	0.003	0.003	-0.000	-0.000	-0.000	0.006*	0.007*	0.007*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
Default	0.000	0.000	0.001	0.007	0.007	0.008	-0.001	-0.000	-0.001
	(0.002)	(0.002)	(0.002)	(0.009)	(0.009)	(0.009)	(0.002)	(0.002)	(0.002)
GFC	-0.002	-0.002	-0.002	0.000	0.000	0.000	-0.006*	-0.006*	-0.006
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
Financial openness	-0.007***	-0.007***	-0.008***	-0.004	-0.004	-0.003	-0.001	0.000	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.004)	(0.004)	(0.004)
ERS	-0.008			0.003			-0.001		
	(0.005)			(0.004)			(0.006)		
ERS*US policy rate	0.071			-0.030			-0.282*		
	(0.096)			(0.078)			(0.166)		
Peg		-0.004*			0.002			-0.004	
		(0.002)			(0.002)			(0.005)	
Peg*US LTIR		0.033			-0.036			-0.035	
		(0.044)			(0.033)			(0.146)	
Peg IRR			-0.004			-0.002			0.003
			(0.003)			(0.002)			(0.006)
Peg IRR*US LTIR			0.076			0.072*			-0.063
			(0.054)			(0.036)			(0.137)
Constant	0.024***	0.022***	0.022***	-0.003	-0.001	0.001	0.035***	0.037***	0.035***
	(0.007)	(0.007)	(0.007)	(0.004)	(0.003)	(0.003)	(0.011)	(0.011)	(0.011)
Observations	1,235	1,235	1,235	843	843	843	392	392	392
R-squared	0.885	0.884	0.883	0.920	0.920	0.920	0.840	0.839	0.837
Number of countries	55	55	55	32	32	32	23	23	23

Notes: robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table D8. Determinants of long-term interest rates and inflation expectations (1990-2019)

	All countries			Advanced economies			Emerging market economies		
VARIABLES	ACI	Shambaug	IRR	ACI	Shambaug	IRR	ACI	Shambaug	IRR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LTIR (-1)	0.658***	0.658***	0.663***	0.729***	0.727***	0.725***	0.589***	0.586***	0.595***
	(0.082)	(0.082)	(0.082)	(0.041)	(0.041)	(0.041)	(0.097)	(0.096)	(0.097)
US LTIR	0.199***	0.218***	0.218***	0.314***	0.301***	0.260***	0.310**	0.192**	0.205*
	(0.076)	(0.070)	(0.074)	(0.065)	(0.053)	(0.047)	(0.141)	(0.087)	(0.111)
Debt/GDP (-1)	-0.005**	-0.006**	-0.007**	-0.002	-0.001	-0.002	-0.015**	-0.015**	-0.018**
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.007)	(0.006)	(0.007)
Reserves/GDP (-1)	-0.009***	-0.009***	-0.007**	0.000	-0.001	-0.002	-0.037***	-0.042***	-0.046***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.013)	(0.012)	(0.013)
Credit/GDP (-1)	-0.008**	-0.008**	-0.008**	0.002	0.001	0.002	-0.008	-0.007	-0.007
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)
Expected CPI inflation	0.123***	0.120***	0.120***	0.168***	0.169***	0.166***	0.130***	0.124***	0.116***
	(0.031)	(0.031)	(0.031)	(0.035)	(0.035)	(0.035)	(0.038)	(0.036)	(0.035)
Real GDP growth	-0.110***	-0.112***	-0.112***	-0.078***	-0.078***	-0.078***	-0.108**	-0.114**	-0.118**
	(0.033)	(0.033)	(0.033)	(0.030)	(0.030)	(0.030)	(0.051)	(0.054)	(0.055)
VIX (change)	0.004**	0.004**	0.004**	0.000	0.000	0.000	0.009**	0.009**	0.009**
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)	(0.004)
Default	0.001	0.001	0.001	0.007	0.007	0.008	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.018)	(0.018)	(0.018)	(0.002)	(0.002)	(0.002)
GFC	-0.002	-0.002	-0.002	0.001	0.001	0.001	-0.006	-0.006	-0.005
	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.005)	(0.005)	(0.004)
Financial openness	-0.007***	-0.007***	-0.007***	-0.003	-0.003	-0.002	-0.002	0.000	0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
ERS	-0.009***			0.003			-0.005		
	(0.003)			(0.003)			(0.008)		
ERS*US policy rate	0.102			-0.018			-0.204		
	(0.076)			(0.066)			(0.259)		
Peg		-0.007***			0.001			-0.006	
		(0.002)			(0.002)			(0.006)	
Peg*US LTIR		0.084**			-0.008			-0.017	
		(0.040)			(0.037)			(0.161)	
Peg IRR			-0.004**			-0.002			0.001
			(0.002)			(0.002)			(0.005)
Peg IRR*US LTIR			0.073*			0.059			-0.015
			(0.041)			(0.038)			(0.128)
Constant	0.025***	0.023***	0.022***	-0.004	-0.002	-0.000	0.037***	0.038***	0.037***
	(0.007)	(0.007)	(0.007)	(0.004)	(0.003)	(0.003)	(0.011)	(0.010)	(0.010)
Observations	1,175	1,175	1,175	786	786	786	389	389	389
Adjusted R-squared	0.872	0.872	0.871	0.899	0.899	0.899	0.831	0.830	0.826
Number of countries	55	55	55	32	32	32	23	23	23

Notes: pooled OLS estimation, robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.

Table D9. Determinants of long-term interest rates and exchange rate regimes (1985-2019), system GMM

	All countries			Advanced economies			Emerging market economies		
VARIABLES	ACI	Peg	IRR	ACI	Peg	IRR	ACI	Peg	IRR
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LTIR (-1)	0.551***	0.552***	0.560***	0.618***	0.606***	0.615***	0.534***	0.535***	0.544***
	(0.077)	(0.077)	(0.078)	(0.035)	(0.033)	(0.033)	(0.079)	(0.084)	(0.078)
US LTIR	0.671***	0.590***	0.530***	0.465***	0.480***	0.392***	0.809***	0.509***	0.594***
	(0.122)	(0.101)	(0.105)	(0.066)	(0.052)	(0.055)	(0.197)	(0.112)	(0.119)
Debt/GDP (-1)	-0.002	0.000	-0.001	0.001	0.003	0.002	-0.018*	-0.014	-0.020*
	(0.008)	(0.008)	(0.008)	(0.004)	(0.005)	(0.005)	(0.010)	(0.010)	(0.011)
Reserves/GDP (-1)	-0.013	-0.012	-0.012	-0.013	-0.013	-0.015	-0.033**	-0.032*	-0.036*
	(0.016)	(0.016)	(0.016)	(0.010)	(0.011)	(0.010)	(0.016)	(0.017)	(0.019)
Credit/GDP (-1)	0.006	0.007*	0.008**	0.002	0.002	0.004	0.018	0.026**	0.021**
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.012)	(0.011)	(0.009)
CPI inflation	0.155***	0.153***	0.155***	0.197***	0.196***	0.194***	0.129*	0.133*	0.127*
	(0.053)	(0.052)	(0.051)	(0.043)	(0.042)	(0.043)	(0.079)	(0.078)	(0.076)
Real GDP growth	-0.144***	-0.144***	-0.146***	-0.133***	-0.134***	-0.135***	-0.133**	-0.128**	-0.131**
	(0.041)	(0.042)	(0.043)	(0.046)	(0.046)	(0.046)	(0.059)	(0.056)	(0.058)
VIX (change)	0.001	0.001	0.001	-0.001	-0.001	-0.001	0.005	0.004	0.005
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.005)	(0.005)	(0.005)
Default	0.002	0.002	0.002	0.007	0.008	0.008	0.005	0.005	0.005
	(0.004)	(0.004)	(0.004)	(0.006)	(0.006)	(0.006)	(0.005)	(0.005)	(0.005)
GFC	-0.002	-0.002	-0.002	-0.002	-0.001	-0.002	-0.005	-0.003	-0.004
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)
Financial openness	-0.008**	-0.008**	-0.008**	-0.007***	-0.006***	-0.005**	0.012	0.015**	0.016**
	(0.003)	(0.003)	(0.004)	(0.002)	(0.002)	(0.002)	(0.008)	(0.008)	(0.007)
ERS	0.007			0.005			0.022		
	(0.006)			(0.004)			(0.015)		
ERS*US policy rate	-0.270**			-0.068			-0.872**		
	(0.130)			(0.092)			(0.379)		
Peg		0.004			0.003			0.002	
		(0.004)			(0.003)			(0.013)	
Peg*US LTIR		-0.144**			-0.103*			-0.191	
		(0.072)			(0.052)			(0.304)	
Peg IRR			0.002			-0.001			0.011
			(0.003)			(0.003)			(0.008)
Peg IRR*US LTIR			0.011			0.077*			-0.317**
			(0.061)			(0.047)			(0.156)
Observations	1,235	1,235	1,235	843	843	843	392	392	392
Number of countries	55	55	55	32	32	32	23	23	23

Notes: Arellano-Bover/Blundell-Bond estimator, robust standard errors in parentheses. *, ** and *** denote statistical significance at the 10, 5 and 1 percent level, respectively.