The making of global safe assets: does the shock matter?

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Abstract

In this paper we focus on what makes a safe asset. Building on a sample of monthly changes in government bond yields in 40 advanced and emerging countries between 1990 and 2008, we analyse the sensitivity of those yields to country specific fundamentals when global risk aversion, measured by the VIX, rises. Importantly, we analyse whether the relevance of these fundamentals changes depending on the underlying drivers of global risk aversion: US monetary policy, financial and geopolitical shocks. We find that fundamental drivers are largely shock-specific and only a handful of variables explain why some government bonds behave like safe assets in periods of higher risk aversion. These fundamentals include an inertial term – whether the bond was seen as safe asset in the past – the political risk rating – a measure of the quality of institutions – and the size of the economy. Results are generally robust to the exclusion of the United States, suggesting that the US Treasuries are not necessarily "special", apart from the size of their market.

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1 Introduction

There is growing academic and policy interest in safe assets, i.e. liquid assets that "pay", at least in nominal terms, even in the worst state of the world, say a crisis (Gorton (2017); Gourinchas and Jeanne (2012)). Importantly for our work, safe assets are considered to be *information insensitive* especially in bad times (Gorton (2017)) and have a negative beta (namely appreciating in market downturns). The role of safe assets as collateral has also been emphasised, notably in repos. The premium for safe assets often referred to as "convenience yield", especially for US Treasuries. In particular, the scarcity of safe assets that has emerged since the global financial crisis has important macroeconomic implications (Caballero, Farhi and Gourinchas, 2017). In the presence of excess demand for safe assets, the "equilibrium" safe real interest rate declines well below zero and below the actual safe rate, as nominal rates hit the zero lower bound and central banks find it difficult to decrease real rates. In this situation, one of the adjustment mechanisms is the appreciation of the currency of issuance of the safe asset – the so-called paradox of the reserve currency.[1] However, Caballero, Farhi and Gourinchas (2016) note that, when prices and exchange rates fail to clear the market for safe assets, a safety trap equilibrium emerges: in the presence of the zero lower bound and excess demand for the safe asset, adjustment takes place through a contraction of (global) demand.

In this context, the main objective of this paper is to deepen our understanding of the *conditional* role of fundamentals in driving sovereign yields on a cross section of advanced and emerging markets. What makes a safe asset? In particular, we want to test the hypothesis that the role of fundamentals is conditional to different types of (negative) shocks. In order to do this, we measure global risk aversion via the VIX and use a structural econometric model to disentangle different shocks driving global risk aversion: namely US monetary policy shocks, financial shocks - that is an exogenous tightening of financial conditions independent of monetary policy - geopolitical risk shocks and, finally, a US demand shock. Once we identified the potential drivers of global risk, we show how these drivers may identify different fundamentals that are deemed important to explain the change in sovereign bond yields during turbulent episodes. In addition, we want to control whether the sensitivity to fundamentals is particularly low for issuers of "safe" assets (notably the US and some other advanced countries), in line with the idea that safe assets are information-insensitive (Gorton (2017)).[2]

There is still relatively little literature on the features and determinants of safe

[1] For an analysis of the driver of safe haven currencies see Habib and Stracca (2012).

[2] However, preferences for absolute safety underpinning demand for safe assets are not easy to derive and such demand does not derive from standard preferences; see Golec and Perotti (2017).

assets. On the theory side, He, Krishnamurthy and Milbradt (2016) highlight coordination among investors as a key driver of safeness. In their model, a large absolute debt size is crucial as safe asset investors have "nowhere else to go" in equilibrium (and the effect becomes stronger in crisis periods). The empirical work is also limited and mostly focused on US liabilities only, in particular the recent literature on the "convenience yield". Krishnamurthy and Vissing-Jorgensen (2012) prove that investors value both the "liquidity" and "safety" attributes of US Treasuries, whose equilibrium price is driven by changes in Treasury supply. One exception to the strict focus on US liabilities is Du, Im and Schreger (2018), who quantify the difference in the convenience yield of US Treasuries and government bonds of other advanced countries and document a secular decline in this premium. They also show that the premium is higher when the supply of Treasuries (excluding central bank holdings) is lower. Finally, these findings are mostly driven by the crisis period; in the post crisis period, only Treasury bills retain a premium, suggesting the safeness also has a conditional and time-varying nature to some extent. Our contribution to this growing literature is twofold. First, our analysis is less "US-centric" than previous studies, and offers a truly global perspective on the determinants of a safe asset. Second, we shed some light on why some assets offer a protection to global investors in bad times, *conditional* on the source of financial turbulence. Indeed, our results highlight that different country fundamentals play a different role, depending on the underlying shocks.

Our empirical analysis reaches three main results. First, a handful of variables explain why some government bonds behave like safe assets in periods of higher risk aversion. Yields on assets to which investors rushed for safety in the past (as captured by an inertial term), and that are issued by relatively larger countries that enjoy a better political risk rating, tend to behave like safe assets. These fundamentals (inertia, size and political risk rating) are not only statistical but also economically significant. In particular, inertia and political risk are remarkably robust and remain significant when excluding the US and the global financial crisis. The fact that results are generally robust to the exclusion of the United States suggests that the US Treasuries are not necessarily "special", apart from the size of their market. Second, the fundamentals that matter when interacted with the shocks underlying the changes in the VIX (US monetary policy, financial, geopolitical) are to a significant extent shock-dependent, although some of them (political risk rating, size) remain significant for more than one shock. This, in turn, suggests that caution should be exercised in pinpointing a given fundamental as a *catch-all* measure of country specific vulnerability to global shocks. Finally, while results are generally robust, they are weaker for emerging markets, suggesting that the willingness of investors to discriminate *among emerging markets* on the basis of fundamentals is somewhat limited, and that bonds issued by these countries are traded by global investors as a relatively homogeneous and separate asset class.

The paper is structured as follows. Section 2 describes our decomposition of global risk in its underlying fundamentals. Section 3 describes the data and Section 4 our empirical model. Results are presented in Section 5, and Section 6 concludes.

2 The structural drivers of global risk

We follow a well established literature and use the VIX, i.e. the expected volatility of the S&P 500 Index as measured from option prices, as a measure of global risk. Increases in the VIX are associated with a rise in global risk aversion and therefore with states of the world in which safe assets become relatively more appealing. In this vein, the VIX is used for instance by Habib and Stracca (2012), Bruno and Shin (2015) and Avdjiev, Gambacorta, Goldberg and Schiaffi (2017). Changes in the VIX, however, can originate from different underlying shocks, each with distinct implication for asset prices. Take for instance a US monetary policy tightening. This will induce a contraction in equity prices, a fall in inflation compensations and an appreciation of the dollar exchange rate. Such a shock also leads to a rise in the VIX, as implied volatility moves counter-cyclically with respect to stock prices. Crucially for our analysis, government bond yields generally *rise* following such a shock, even though their increase is typically milder than that of short-term rates. Such a configuration of asset price movements, for instance, has characterized the response of financial markets to the monetary policy decisions by the Fed towards the end of 2018 when, despite worries of a slowdown in the global business cycle and a protracted tightening of financial conditions, the Fed announced the intention to keep normalizing interest rates and reducing the balance sheet. Other shocks, however, can raise the VIX but have different implications for asset prices. A case in point is a spike in the VIX due to an unexpected fall in the risk appetite of global investors. While such a shock also generates a fall in equity prices, it typically leads to flight to safety dynamics that induce a *fall* in government bonds yields and an appreciation of some currencies that have safe haven properties (Habib and Stracca, 2012). In this case, the *conditional* correlation between the VIX and government bond yields is therefore negative, rather than positive as in the case of a monetary policy shock, a difference that can bear important implications for investors behaviour and therefore for the safety property of some assets.

Since the central goal of our analysis is to assess the role played by different fundamentals, conditional on well identified shocks, we need a way to disentangle the structural shocks that drive the VIX. To this end, we use a parsimonious Vector Autoregressive (VAR) model. The model resembles closely the one used by Habib and Venditti (2019) to analyze the relationship between the structural drivers of the global financial cycle on the one hand, and capital flows on the other hand. There are, however, two differences between their framework and the one hereby used. First, Habib and Venditti (2019) use a Global Stock Market Factor as a measure of global risk aversion, while we use the VIX. The two concepts are related but different, as the former is driven by shocks to the *conditional expectation* of stock returns, while the latter is more closely related to *uncertainty* about stock returns. Empirically, the time varying premium of safe haven assets, the central object of interest of our analysis, appears to be more closely related to sudden increases in the uncertainty of the economic environment than to changes in expected stork returns, which justifies the use of the VIX. Second, we refine the structural identification scheme used by Habib and Venditti (2019) by adding "narrative" restrictions, following Antolin-Diaz and Rubio-Ramirez (2016). These restrictions ensure that the shocks that we identify are consistent with *a priori* beliefs about the structural drivers of global risk in some particular episodes. In the remaining of this section we provide more details on the empirical model as well as on the identification strategy.

The VAR model includes seven variables, namely the interest rate on the one-year Treasury bill, the log of the Consumer Price Index, the log of the S&P500 index, the log of the US dollar index, the yield of an US dollar High-Yield Corporate Bonds index, the log price of oil and the VIX.[3] Collecting these variables in the vector y_t, the structural representation of the model, which allows for contemporaneous interaction of the variables, is the following:

$$A_0 y_t = A_1 y_{t-1} + A_2 y_{t-2} + ... + A_p y_{t-p} + c + e_t \qquad e_t \sim i.i.d.\ N(0, I),$$

where A_0 is an $n \times n$ matrix of contemporaneous interactions, the p matrices A_j, $j = 1, 2, ..., p$ of dimension $n \times n$ collect the autoregressive coefficients, e_t is a n dimensional vector of structural shocks and c is an intercept term. The model can be written in compact form:

$$A_0 y_t = A_+ x_t + e_t \qquad e_t \sim i.i.d.\ N(0, I),$$

[3]One-year T-Bill rates and the US dollar index are from the Board of Governors of the Federal Reserve System. The Consumer Price Index is from the U.S. Bureau of Labor Statistics. The S&P500 index is from Bloomberg. The yield on US dollar High-Yield Corporate Bonds is the ICE Bank of America Merrill Lynch US Corporate & High Yield Index. The oil price is the US dollar Brent benchmark from the U.S. Energy Information Administration. The VIX is from the Chicago Board Options Exchange.

where $A_+ = [A_1, A_2, ..., A_p, c]$ and $x_t = [y'_{t-1}, y'_{t-2}, ..., y'_{t-p}, 1]'$. Pre-multiplying both sides by A_0^{-1} the model can be cast in its reduced form:

$$y_t = \Phi_+ x_t + u_t \qquad u_t \sim i.i.d.\ N(0, \Sigma),$$

where $\Phi_+ = {A_0}^{-1} A_+$ and $\Sigma = (A'_0 A_0)^{-1}$. The relationship between reduced form and structural shocks is given by the set of equations:

$$u_t \;=\; A_0^{-1} e_t = B e_t. \tag{1}$$

where the matrix B, the structural impact matrix, is the key element of interest. Structural identification consists of estimation of the columns of B starting from the reduced form coefficients Φ_+ and Σ. Together with the reduced form parameters Φ_+ and Σ, the matrix B allows us to compute structural shocks via equations (1), as well as other quantities of interest, namely Impulse Response Functions (IRFs) and forecast error variance decomposition (FEVDs).

Identification of the structural shocks in VARs is conceptually similar to the estimation of *causal* effects in linear regressions. Indeed, a growing literature suggests the use of instrumental variables techniques to measure the causal effects of shocks on macroeconomic variables; see Stock and Watson (2018) for a survey. In this paper we use an eclectic approach, and combine this method with two other popular identification strategies proposed in the literature. The first is the method of sign restrictions, which imposes inequality constraints on impulse response functions consistently with economic beliefs about the effects of a given shock (Rubio-Ramirez, Waggoner and Arias, 2016). The latter is the "narrative" restrictions approach developed by Antolin-Diaz and Rubio-Ramirez (2016). This consists of retaining, out of a large number of candidate structural shocks, only those that are consistent with a priori beliefs about the structural drivers of macroeconomic variables *in some particular episodes*. For instance, it is natural to think of the onset of the financial crisis in September 2008 as being mainly caused by a financial shock. Such a belief can be used to discipline the estimation of structural shocks, making identification more plausible.[4] We focus on the identification of four structural shocks, namely (i) a US monetary policy shock; (ii) a global financial shock; (iii) a US demand shock; and (iv) a geopolitical shock.

US Monetary policy shocks. US monetary policy shocks are identified using an external instrument, namely the change in interest rate around policy announce-

[4]Technical details on how to combine these approaches are discussed in Cesa Bianchi and Sokol (2017), Braun and Brggemann (2017) and Arias, Rubio-Ramirez and Waggoner (2018). Estimation is performed via the Bayesian framework of Caldara and Herbst (2019).

ments (so called interest rates surprises). The idea of measuring the unexpected component of monetary policy via interest rates surprises has a long tradition in empirical macroeconomics, and dates back to the work of Kuttner (2001) and Cochrane and Piazzesi (2002). Recently, it has been embedded in a VAR framework by Gertler and Karadi (2015). We do not use all the available interest rates surprises but focus only on those that are *negatively* correlated with concurrent changes in stock prices. This allows us to purge monetary policy shocks from so called "information shocks". The latter materialise when the central bank lowers (raises) interest rates while, at the same time, communicating a surprisingly downbeat (upbeat) assessment on the state of the economy. These information shocks have macroeconomic effects that are more similar to aggregate demand than to monetary policy shocks, i.e. they induce a positive correlation between interest rates and equity prices (Jarocinski and Karadi, 2018).[5] Despite the fact that no restrictions are imposed *ex ante*, we find that the effects of a monetary policy shock estimated via external instruments are qualitatively in line with those predicted by the theory. First, following a monetary tightening the VIX, the central variable for our analysis, rises. This shock also induces a higher short term rates, a fall in stock prices and in the prices of consumer goods, a rise in corporate bond yields and an appreciation of the exchange rate.

US Demand Shocks. Negative US demand shocks are identified via sign restrictions, by assuming that they generate a fall in interest rates, a drop in stock prices and a reduction in oil and consumer prices. The VIX rises, as risk aversion increases due to worsened economic conditions. Crucially, we assume that conditional on this shock the yield on High Yields Corporate bonds decreases, corresponding to a *loosening* in financing conditions for risky borrowers. Recessionary headwinds lead to higher risk premia, but these are more than offset by the reduction in the safe leg of the interest rate. Finally, the US dollar depreciates.

Financial shocks. A financial shock is identified using a mixture of sign and narrative restrictions. Sign restrictions are consistent with those employed by Cesa Bianchi and Sokol (2017), who assume that, following a financial shock, the VIX rises and stock prices fall. Central banks respond by loosening their stance, inducing a fall in government bonds yields. However, despite monetary policy accommodation, the financing costs for risky borrowers *rise*, as the increase in compensation required to bear the increased risk of default more than offsets the fall in safe interest rates. Also, the US dollar appreciates due to flight to safety. The different effects on the yields of corporate bonds and on the US dollar distinguish a financial shock from a demand shock. On top of these sign restrictions, we add the following two narrative restrictions:

[5]We thank Marek Jarocinski for making these shocks available to us.

1. The sharp rise in the VIX in September and October 2008, that is the onset of the Global Financial Crisis, was mostly due to the financial shock.
2. The financial shocks in September and October 2008, were *positive* shocks, namely shocks leading to a deterioration of financing conditions.

Geopolitical uncertainty. A geopolitical uncertainty shock has similar macroeconomic consequences as a financial shock. In particular, increased geopolitical uncertainty has recessionary effects, as the VIX rises and equity prices fall. Short term interest rates also fall, as investors rotate from risky to safe assets and shift their portfolio exposure to short term bills, causing their yields to fall. A similar rationale leads to an appreciation of the US dollar. The peculiar features of such a shock is that it raises pressure on the price of oil and as a consequence on the inflation rate. This stagflationary effect distinguishes such a shock from a financial and a demand shock.[6] Identification of the geopolitical shock is further refined by imposing the following narrative restrictions:

1. The rise in the VIX in August 1990 (related to the invasion of Kuwait by Iraq) and in September 2001 (related to the terrorist attacks in New York), was mostly due to a geopolitical shock.
2. The geopolitical shocks in August 1990 and September 2001, were *positive* shocks.

Table 1 summarizes the impact response of the variables included in our VARs to the four identified shocks.[7]

(Table 1 here)

2.1 Structural VAR results

To set the stage for the analysis in section 4, we briefly comment on some of the results obtained with the estimated structural VAR. First, in Figure 1 we show the estimated structural shocks. For those that are identified also through "narrative" restrictions (the financial and geopolitical shock), a red and a green vertical line mark the episodes of interest, namely: (i) the two months at the onset of the

[6]The signs used for this identification are obtained by running an exercise similar to the one used by Piffer and Podstawski (2017). In particular, we instrument the unexpected change in our global risk measure with the change in the price of gold in given dates identified with a narrative approach by Piffer and Podstawski (2017) but restricted to days also related to terrorist attacks and related concerns on the supply of oil (e.g. the invasion of Kuwait in 1990 or the 9/11 terrorist attack). The signs of the resulting IRFs are then used to identify geopolitical risk shocks.

[7]For the monetary policy shock, where no signs are imposed *ex ante*, we report those resulting from the use of the external instrument.

great financial crisis for the financial shock; and (ii) the invasion of Kuwait and the Twin Towers attack for the geopolitical risk shock. The narrative restrictions are effective in ensuring that in these periods these shocks contribute positively to the VIX. While the size of the remaining shocks is typically contained, financial shocks display some abrupt jumps, in particular in 2008, but also in May 2010 (around the downgrade of Greek bonds to the status of junk and the so called "flash crash" in the US stock market) and in late 2011, when the euro area sovereign debt crisis reached its peak.

Next we look at two results strictly related to the VIX, namely its Forecast Error Variance Decomposition (FEVD) and its historical decomposition in the contribution of structural shocks. Although related, the two concepts convey different information. Broadly speaking, the FEVD measures the average share (over the whole sample period) of fluctuations of a given variable that is accounted for by the identified shocks. It therefore gives a broad idea of how much a given shock is relevant for explaining a given variable. The historical decomposition, instead, allows us to gauge whether a given shock was particularly relevant for a given variable *at a given point in time* and can therefore unveil some interesting historical patterns.

Figure 2 shows the Forecast Error Variance Decomposition (FEVD) of the VIX, our measure of global risk. Financial shocks account for the largest share (around 40 percent) of variations in the VIX. US monetary policy and geopolitical shocks have a lower but nonetheless non-negligible impact, estimated at around 20 percent each. Next, in Figure 3, we turn to the historical decomposition of the VIX. The results confirm the dominant role of the financial shocks for explaining changes in global risk appetite. Indeed (i) the increase in the VIX in the second half of the 1990s, when the world economy was hit by the Asian crisis in 1997 and the Russian default in 1998, and (ii) the spike at the onset of the global financial crisis are mainly captured in our model by this shock. US monetary policy, on the other hand, gave a non-negligible support to global risk appetite in the early Nineties (when the Fed Fund rates were progressively cut from 8 to 3 percent) and after the global financial crisis erupted, from 2009 on-wards. Notably, in the run up to the 2008 crisis, the contribution of monetary policy was counter-cyclical with respect to the VIX. Between 2003 and 2008 the VIX fell and remained at historically low levels, while the Federal Reserve raised official interest rates from 1 percent in 2004 to over 5 percent. At the time, a decisive boost to global risk appetite came from a sequence of benign financial shocks, which reflect the relaxation of credit standards that fuelled asset price bubbles, not only in the US, but also in a number of European countries.

Summing up, US monetary policy, financial and geopolitical risk shocks account for around 80 percent of the variance of the VIX. Their relevance is also time varying, with financial shocks having played a prominent role in the late Nineties and in the global financial crisis. US demand shocks, on the other hand, play a marginal role, and will therefore be dropped in the analysis in Section 4.

3 Data

We collect long-term government bond yields in local currency terms for 40 advanced and emerging countries, on a monthly basis, from 1990 to 2018 (see Table 2 for the country sample).[8] The yields come from Global Financial Data, Thomson Reuters and Bloomberg.[9]

(Table 2 here)

The focus of our analysis is on the monthly *change* in government bond yields. The variability of government bond yields may be particularly high in some countries, especially in some emerging markets where yields may be structurally more volatile than in advanced economies.[10] Therefore, to ensure comparability of the results, we standardise the change in bond yields, Δy_{it}, dividing it by each country's standard deviation, σ_i.[11] This will be eventually our dependent variable in the empirical exercise. Formally:

$$\Delta \bar{y}_{it} = \Delta y_{it} / \sigma_i * 100 \tag{2}$$

Moreover, despite this standardisation, a number of outliers are still present in the dataset and may distort the results. This is also reflected in the elevated kurtosis of the change in bond yields. In order to deal with these outliers, we winsorise the standardised change in government bond yields at the 1% level. We use a similar procedure for the level of yields and for inflation, which also has very large outliers in emerging markets.

Control variables. We include the level of government bond yields in the previous month as a proxy of a "carry trade" type of behaviour - high yielding currencies tend to receive capital flows when the volatility is low. Indeed, spikes in

[8]Note that the panel is unbalanced as bond yields are not available for a number of economies, in particular emerging markets, in the 1990s.

[9]For most countries the benchmark maturity is the 10 year rate.

[10]See Table 3 for summary statistics for the whole sample. The standard deviation of the change in bond yields is around 50 basis points. Among advanced economies, this volatility measure drops to 40 basis points, whereas among emerging markets it increases to around 75 basis points.

[11]We exclude countries where bond yields are unusually flat, which normally denotes highly illiquid or inactive markets.

global financial market volatility are associated with sudden stops in capital flows (Forbes and Warnock, 2012) that penalise currencies and economies that have received large flows when the volatility was low. While this is traditionally associated with currencies, it may likewise matter for the government bond markets, since a lot of the inflows and outflows are concentrated in this asset segment.

Second, we control for the presence of the classical policy trilemma in international macroeconomics and, more specifically, the possibility that countries that are open and adopting a less flexible exchange rate regime may experience capital flows reversals and a stronger transmission of risk shocks. Therefore, similarly to Obstfeld, Ostry and Qureshi (2018), we include the updated *de jure* Chinn and Ito (2006) index of capital account liberalisation and two dummies distinguishing strict pegs from soft pegs and from flexible exchange rate arrangements, using the *de facto* exchange rate arrangement classification by Obstfeld, Shambaugh and Taylor (2010).

Finally, following Habib and Stracca (2012), we consider the possibility that the change in yields, Δy_{it}, is the outcome of a self-fulfilling prophecy or "inertia" in its historical relationship with global risk, which we measure through the change in the VIX, $\mathit{\Delta} v_t$. The idea here is that, in a crisis, investors flock to bonds that have proved themselves in previous crises, over and above the country fundamentals. (Habib and Stracca, 2012) show that this term is highly significant for currencies. Empirically, we recursively compute the following variable between the beginning of the sample t_0 and time $t-1$:

$$z_{it} = Correl_{t_0,t-1}(\Delta y_{it}, \mathit{\Delta} v_t) \tag{3}$$

A *negative* value for this variable identifies safe haven government bonds as it indicates that, in the past, yields decreased when the VIX increased.

Fundamentals. A number of economic fundamentals may influence the response of government bond yields to risk shocks. Uncovering these fundamentals is indeed the main objective of this paper.

First, we include variables capturing *recent macroeconomic developments*, namely real GDP growth and inflation, as these may unearth concerns about the underlying fiscal fundamentals, challenge debt sustainability and drive the reaction of yields to risk shocks.

Second, we control for *fiscal fundamentals*: the level of the government deficit and the size of public debt - including its squared term to control for a possible non-linear impact of this crucial variable - as a ratio to GDP.

Third, we consider indicators of *external sustainability*, including the current account and the stock of net foreign assets over GDP, since investors may rather buy government bonds of countries that have solid positions vis-à-vis non resident when global risk is on the rise.[12] The source of these variables is the IMF, with the exception of net foreign assets that are taken from the updated External Wealth of Nations dataset of Lane and Milesi-Ferretti (2007) and extended with the IMF Balance of Payments of Statistics.

Fourth, *political risk and the quality of institutions* can further exacerbate debt sustainability concerns and affect the reaction of investors when risk aversion changes. To control for this factor, we include the political risk rating index from the International Country Risk Group, a synthetic index measuring variables such as political unrest and the presence of conflicts, government stability, the investment climate, corruption, the rule of law and the quality of bureaucracy.[13]

Finally, the economic *size* of the issuing country (or of the market) may be an important hallmark of a safe asset, as global investors may prefer to invest in large and potentially liquid markets; a consideration that is often made for the safe asset status of US Treasuries in particular. To consider this fundamental, we use countries' share of GDP on global GDP at Purchasing Power Parity, again taken from the IMF.[14]

With the exception of the *de jure* Chinn and Ito (2006) index of capital account liberalisation, all variables are measured in percentage terms.[15] Observe that not all variables are available at monthly frequency. For variables that are available at lower frequency, notably annual, we use a cubic spline interpolation. Table 3 provides summary statistics for our database.

(Table 3 here)

[12] Other popular external sustainability measures, such as the level of foreign currency reserves as a ratio to imports or short-term external debt, are relevant for emerging markets, which are not the main (or at least the only) focus of our paper. Habib and Stracca (2012) find that external sustainability is the most consistent driver of safe haven currency status.

[13] Note that an increase in the index indicates lower political risk.

[14] The inclusion of a specific bond market liquidity measure which is available for our panel of countries since the beginning of the 1990s is challenging. Therefore, we assume that economic size correlates positively with liquidity. We also included the absolute size of government debt, or relative to the global debt market, but this is highly correlated with the relative size of GDP and somewhat less effective in capturing the reaction of risk shocks in our regressions and, eventually, has been excluded.

[15] The political risk rating is an index ranging from 0 (higher risk) to 100 (lower risk).

4 An empirical model of asset safety

We run fixed effects panel regressions on monthly data for a sample of 40 economies since 1990 as follows:

$$\Delta \bar{y}_{it} = \alpha_i + \lambda_t + \beta X_{i,t-1} + \gamma X_{i,t-1} \Delta v_t + \epsilon_{it} \quad (4)$$

where the dependent variable, $\Delta \bar{y}_{it}$ is the standardised monthly change in (local currency) government bond yields, α_i and λ_t are country and time fixed effects, Δv_t is the change in the VIX or, alternatively, the vector of shocks explaining the change in the VIX that have been estimated in Section 2, and X is a vector of "controls" *and* "country fundamentals" in the previous month (for variables with monthly frequency) or in the previous year (for variables at annual frequency that have been interpolated with a cubic spline). As explained in the previous section, controls include the level of yields and variables testing for the potential presence of a policy trilemma and self-fulfilling prophecies. These controls are always present in our regressions. Country fundamentals include real GDP growth, inflation, fiscal fundamentals, the external surplus and the external position, a measure of political risk in the form of rating, and the size of the economy. Fundamentals are included one by one and, eventually, all together.

The main parameter of interest is the coefficient γ that is associated with the interaction term, which indicates whether the control variables or the fundamentals in X may help explaining the response of government bond yields to an increase in global risk or one of its underlying shocks. For example, it is possible that, say, economic conditions, such as GDP growth and inflation, matter for US monetary policy shocks that may alter global credit conditions but not for, say, financial shocks.[16]

5 Results

Before describing the results in detail, it is useful first to provide an overview. The main results are three. First, we find that a handful of variables predict the change in government bond yields when interacted with a rise in the VIX, with the theoretically expected sign: an inertial term (whether the asset behaved like a safe asset in the past), the political risk rating (also a proxy for the quality of institutions of the issuing country) and economic size. These fundamentals are not only statistically, but also economically significant. In particular, inertia and the

[16] Note that the estimated shocks are generated regressors in equation (4). We are working on a robustness check in order to take the generated regressors nature into account.

political risk rating are remarkably robust and remain significant when excluding the US and the global financial crisis. The fact that results are generally robust to the exclusion of the United States indicates that the US Treasuries are not necessarily "special", apart from the size of their market. Second, the fundamentals that matter when interacted with the shocks underlying the changes in the VIX (US monetary policy, financial, geopolitical) are to a significant extent shock-dependent. Only the political risk rating and size remain significant for more than one shock. This, in turn, suggests that caution should be exercised in pinpointing a given fundamental as a *catch-all* measure of vulnerability to all global shocks. Finally, while results are generally robust, they are weaker for emerging markets, suggesting that investors may see emerging markets, to some extent, as a separate asset class, without always discriminating them based on fundamentals.[17]

We now turn to describe the results in detail, first for changes in the VIX and then for the shocks driving it, as identified in Section 2.

5.1 Baseline results for changes in the VIX

In Table 4 we report results for monthly changes in the VIX, without distinguishing by the shocks determining them, which we do later on. The terms that are interesting for our analysis are mostly the interaction terms between the change in the VIX and the predetermined country characteristics. The coefficients associated with the interaction terms are reported in the lower panel of the tables to facilitate the reader in identifying the variables that matter for the response of government bond yields to changes in global risk. The last column presents the results of a *best* most parsimonious benchmark model, where we include only those fundamentals that interacted with the change in the VIX remain statistically significant.

(Table 4 here)

Control variables. Among our control variables, we find that self-fulfilling prophecies, in particular, play a role in identifying safe haven government bonds, replicating an important result of Habib and Stracca (2012). The coefficient associated with the recursive correlation between the change in yields and the change in the VIX is positive and statistically significant at the 1% level. This implies that there is an important element of inertia in the reaction of yields to changes in global risk aversion. Safe asset economies, i.e. those whose government bond prices increased and yields declined when the VIX increased in the past (a negative

[17]Note that this result may be driven by the relatively small number of emerging markets in our sample.

recursive correlation up to time $t-1$), are expected to remain a safe haven when the change in the VIX at time t is positive. In order to judge the economic significance of this result, note that a two standard deviation increase in the VIX, around 8 percentage points, would trigger a marginal decrease in yields by 2 basis points in a typical safe haven economy when the recursive correlation is equal to -10% (the average for the US, Germany or Switzerland) or an increase by 11 basis points in an emerging market, such as Brazil, where the recursive correlation is +30%.[18] Other controls are also significant in some specifications, but not when all fundamentals are jointly included in the model. In particular, higher yield economies experience a sharper increase in sovereign bond yields compared to low yield economies when financial market volatility rises, as expected, whereas the "trilemma" controls are almost always statistically insignificant.

Fundamentals. Turning to the fundamentals, we find that our set of variables delivers conventional messages. Political risk and the size of the economy appear to be the most robust predictors of safe haven government bonds. A higher (better) political risk rating (column 8) and a larger size of the economy (column 9) are associated with a decline in government bond yields after a VIX increase. Their statistical significance is robust to the inclusion of additional fundamentals (column 10). In particular, the economic significance of the coefficient associated with political risk rating is meaningful. An improvement in the risk rating by 10 points, say the difference between the level of this index in US or Japan in 2018 (85) and Italy or Spain (around 75) would imply a decline in yields by 8 basis points vis-á-vis a large shock to the VIX (again 8 percentage points). The differential reaction, i.e. the sharper decline, in yields to a strong global risk shock between a typical safe haven country and an emerging market like Mexico, where the risk rating is equal to 60 in 2018, would be around 20 basis points. For size, note that a 10% increase in size, as measured by GDP at PPP – more or less the difference between a middle sized economy and a large country such as the United States – would trigger a fall by 8 basis points for a two-standard deviation increase in the VIX.[19]

Other fundamentals are also important when included one by one, even though their statistical significance is weakened by the inclusion of other factors. A past robust real GDP growth performance is associated with lower yields when interacted with the change in the VIX (see columns 1 and 11). Unsurprisingly, all fiscal fundamentals do matter in explaining the yield change when volatility rises. A higher fiscal deficit or a higher level of public debt is associated with an increase in

[18]To recover the non-standardised change in yield, one needs to invert the relationship in equation (2).

[19]Note that this result does not depend on the US only, as it will be clarified further below.

government bond yields when Δv_t is positive (columns 2-4). Finally, indicators of external sustainability, the current account deficit and the net foreign asset position enter with the correct (negative) sign, but they are not statistically significant.

5.2 Does the shock driving the VIX matter?

It is reassuring to find that traditional measures of political and macroeconomic stability do matter for safe haven status. Do they matter for all types of shocks driving global risk? To answer this question, we replace our measure of global risk with the different contributions to its fluctuations derived from US monetary policy shocks (Table 5), financial shocks (Table 6) and geopolitical uncertainty shocks (Table 7).[20]

Interestingly, we find that the relevant fundamentals are to a significant extent *shock-specific*. Consider, for instance, a rise of the VIX due to a US monetary policy shock (Table 5). In this case, we find that investors favour government bonds issued by countries that have higher nominal growth (i.e. higher real growth and higher inflation), lower debt, and a more favourable political risk rating. The most plausible explanation is that the rise of US rates leads to an increase of long-term yields around the world, worsening, everything else equal, the sustainability of public finances. In these circumstances, the attention of global investors turns to the ability of a country to repay its debt, which is indeed positively related to nominal income growth and negatively related to the debt size. An inertial term plays again a significant role. When the VIX responds to a financial shock or to a geopolitical risk shock (see tables 6 and 7), it is more the external balance that matters. In particular, the net foreign asset position, together with the risk rating, size and an inertial term, are significant predictors of bonds safety when a financial shock occurs, while in the face of geopolitical shocks, it is the current account that matters.

(Tables 5 to 7 here)

We distil two main messages from this analysis. First, in periods of elevated uncertainty, investors discriminate across assets, depending on the type of shock that is driving financial turbulence. When monetary policy takes center stage, public debt sustainability is the main concern of global investors. In other cases, it is the external balance of the country issuing debt that plays a decisive role. Second, the only fundamental variable that is consistently predicting a safe asset

[20] As explained in Section 2, we leave out US demand shocks, because they contribute very little to the VIX variability.

behaviour across different shocks is the political risk rating; this implies that good institutions are an important prerequisite for a safe asset, independently of the underlying shocks.

5.3 Robustness analysis

In this section we report some robustness analysis by considering three variants of the baseline analysis, (i) distinguishing between advanced and emerging markets; (ii) excluding the US as a special case (issuer of the dominant currency) and (iii) time variation, with particular focus on excluding the global financial crisis of 2008-09.

In Tables 8 to 11 we report results for a "best" specification for, respectively, changes in the VIX (Table 8), monetary policy shocks (Table 9), financial shocks (Table 10) and geopolitical uncertainty shocks (Table 11).[21]

(Tables 8 to 11 here)

For simple changes in the VIX (Table 8), the inertial term, real GDP growth, public debt, political risk rating and size are significant and with the expected sign in the baseline. We find that rating and size are generally robustly significant, although (perhaps surprisingly) they are not for emerging markets. For political risk rating, it is possible that investors see emerging markets as a broad category and do not discriminate between different emerging markets based on this variable. Also surprisingly, we find the inertial term insignificant for advanced countries. Importantly, however, we find that excluding the US (column 4) and the global financial crisis (column 8) leaves the main results practically unchanged. It is particularly interesting that the relevance of size is maintained, with an even larger coefficient, when excluding the US.

Turning to US monetary policy shocks as a source of changes in the VIX (Table 9), we find broadly robust results, with public debt (linear and squared) the least robust fundamental, e.g. insignificant for advanced and emerging countries separately. Again, political risk rating is insignificant for emerging markets only. Moreover, also in this case excluding the US and the global financial crisis period makes relatively little difference.

For financial shocks (Table 10) results are generally pretty robust and consistent. However, again, we do find that several fundamentals, such as the net foreign asset position, political risk rating as well as economic size, are not robust predictor of safe haven behaviour for emerging markets.

[21] The "best" specification contains only the variables that, when interacted with the change in the VIX, are jointly statistically significant.

Finally, only the current account and size are jointly significant when interacted with geopolitical shocks (Table 11); the current account is only relevant for emerging markets, while the opposite holds true for size. In this case, moreover, size is insignificant when excluding the US.

6 Conclusions

Motivated by the recent academic and policy interest in safe assets, in this paper we have provided novel empirical evidence on the fundamental drivers of safe asset status. Looking at a sample of monthly changes in government bond yields in 40 advanced and emerging countries between 1990 and 2018, we have interacted changes in the VIX (as a measure of global risk) with a wide array of pre-determined country fundamentals and controls, so as to uncover a set of variables that consistently predict safe asset status, in the same spirit of Habib and Stracca (2012) for safe haven currencies. Moreover, and also novel, we have decomposed the VIX in its underlying determinants by identifying a set of relevant structural shocks, notably US monetary policy, financial, and geopolitical uncertainty shocks. We then check if the relevant country fundamentals for safe asset status are shock-dependent or not.

We reach three main conclusions. First, a handful of variables predict the change in government bond yields when interacted with a rise in the VIX, with the theoretically expected sign: an inertial term (whether the asset behaved like a safe asset in the past), the political risk rating and economic size. In particular, inertia and the political risk rating are remarkably robust and remain significant when excluding the US and the global financial crisis. The fact that results are generally robust to the exclusion of the United States suggests that the US Treasuries are not necessarily "special", apart from the size of their market. Second, the fundamentals that matter when interacted with the shocks underlying the changes in the VIX (US monetary policy, financial, geopolitical) are to a significant extent *shock-dependent*. The only fundamental variable that is consistently predicting a safe asset behaviour across most of the different shocks is the political risk rating; this indicates that good institutions are an important prerequisite for a safe asset, independently of the underlying shocks. Nevertheless, our results suggests that caution should be exercised in pinpointing to a given fundamental as a *catch-all* measure of vulnerability to all possible global shocks. Finally, while results are generally robust, they are weaker for emerging markets, suggesting that investors may see emerging markets, to some extent, as a separate asset class, without always discriminating them based on fundamentals.

The policy implications of our work is that country fundamentals do play some role in explaining the safe asset status of government and that some of them (for example, the political risk rating, or public debt) can be influenced by policy makers. Our paper gives, in particular, a quantification of the benefits of changing these policy-amenable variables for the cost of financing the government debt, in particular when financial market volatility is on the rise. Other characteristics, such as economic size, cannot be directly manipulated by policy-makers, but are relevant for the developments of the international monetary system, thinking in particular at the emergence of an international role of the Chinese renmibi or the creation of a euro area safe asset. Finally, it is also important to remain humble in reaching conclusions, as we show that the underlying fundamentals are to a large extent shock-specific and also not robust over time and between country groups (advanced and emerging in particular). We are therefore still far from "cracking the code" of safe assets, and further research is warranted.

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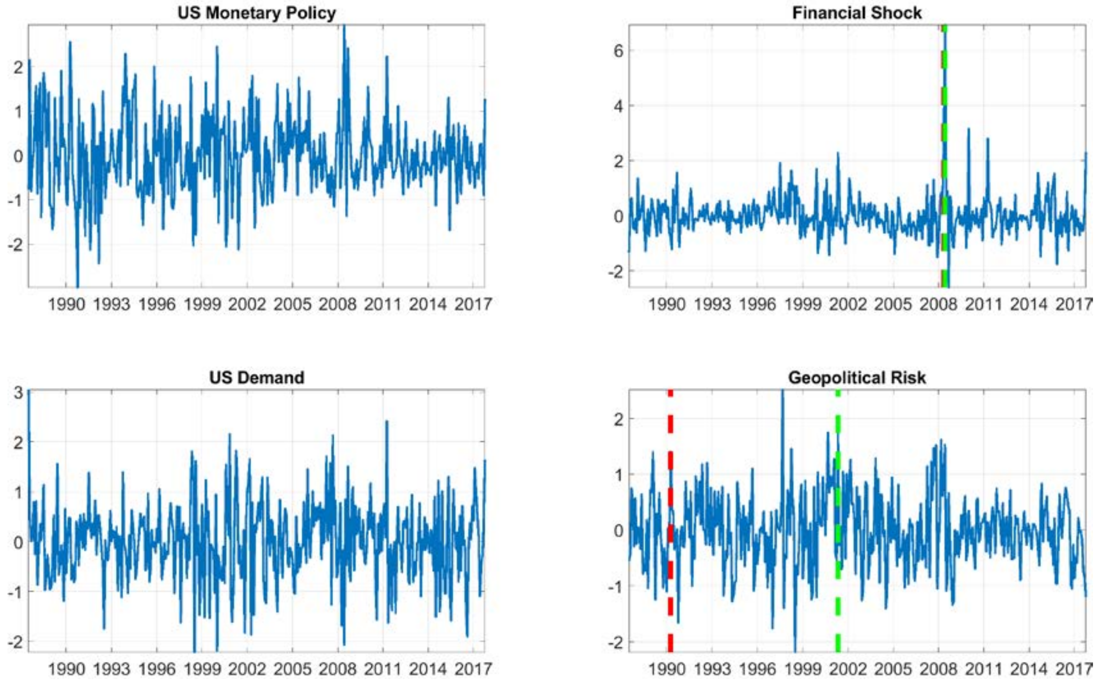
Table 1: Sign Restrictions used to identify shocks in the Structural VAR model

Shock	*Monetary Policy* *(signs implied by external instrument)*	US Demand	Financial	Geopolitical Uncertainty
US Treasury Rate (one-year)	+	-	-	-
SP500 (log)	-	-	-	-
US Consumer Price Index (log)	-	-	-	+
High Yield USD Corporate Bonds (yield)	+	-	+	
Trade Weighted US Dollar index (log)	+	-	+	+
Oil Price (Brent Quality, log)		-	-	+
VIX	+	+	+	+

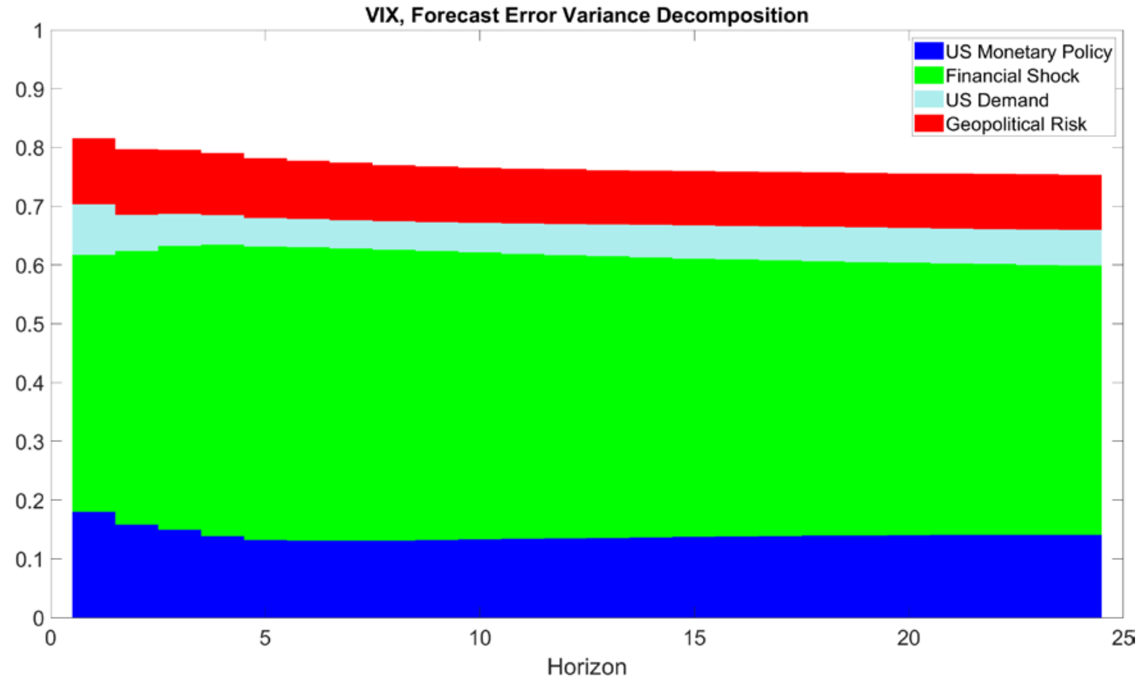
Notes: sign restrictions to identify US demand, Financial and Geopolitical Uncertainty shocks are imposed on impact. The first column reports the signs of the responses generated by the monetary policy shocks estimated via an external instrument.

Figure 1: Estimated structural shocks



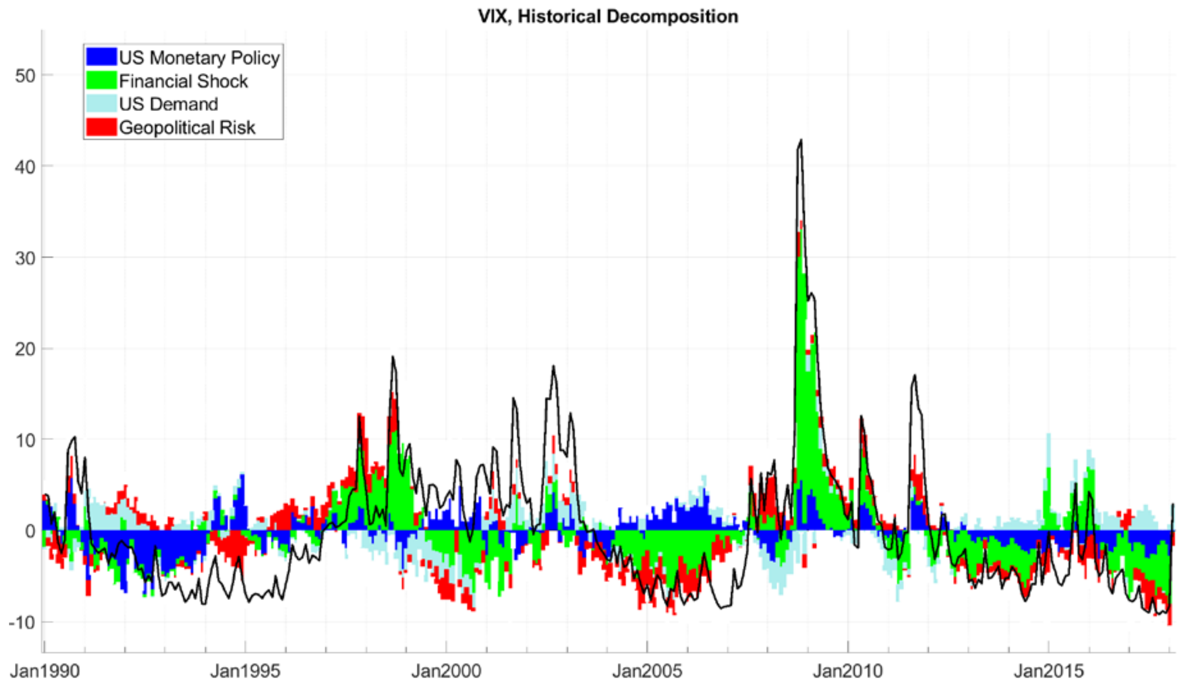
Notes: the red and green dashed lines in the "Financial Shock" panel mark the September and October 2008 observations, the dates on which we impose "narrative restrictions" to identify this shock. The red and green dashed lines in the "Geopolitical Risk" panel mark the August 1990 and September 2001 observations, the dates on which we impose "narrative restrictions" to identify this shock. Median shocks across posterior draws.

Figure 2: Forecast Error Variance Decomposition (FEVD).



Notes: the Figure shows the mean FEVD across posterior draws of the VAR.

Figure 3: Historical Decomposition



Notes: the Figure shows the median contribution of the identified shocks to the history of the VIX across posterior draws of the VAR.

Table 2: Country sample

Advanced economies	United States, United Kingdom, Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Finland, Greece, Ireland, Portugal, Spain, Australia, New Zealand, Hong Kong, Singapore
Emerging economies	Turkey, South Africa, Brazil, Chile, Colombia, Mexico, Peru, Israel, India, Indonesia, Republic of South Korea, Malaysia, Pakistan, Thailand, Russian Federation, China, Czech Republic

Table 3: Summary statistics

	Mean	SD	Min	Max	p1	p99	Skewness	Kurtosis	Obs.
Long-term government bond yield, %	5.88	3.86	-0.57	48.62	0.21	16.63	1.79	11.98	11,802
Yield change, basis points	-2.37	53.93	-1,563	3,211	-112.0	107.0	16.73	1,205	11,339
Yield change/St.Dev, % (DYIELD)	-8.01	100.5	-1,056	1,419	-281.3	267.7	0.16	11.88	11,339
VIX, index	19.31	7.43	9.51	59.89	10.41	44.84	1.72	7.61	13,920
VIX change, index (DVIX)	0.00	4.15	-15.28	20.50	-11.04	16.31	0.84	7.90	13,880
Recursive correl. (DYIELD, DVIX), %	5.72	16.24	-73.9	74.9	-28.43	51.53	0.61	4.45	11,198
Capital account liberalisation, index	0.74	0.34	0.00	1.00	0.00	1.00	-0.83	2.08	13,671
Strict peg, dummy	0.35	0.48	0.00	1.00	0.00	1.00	0.63	1.40	13,848
Soft peg, dummy	0.28	0.45	0.00	1.00	0.00	1.00	0.96	1.92	13,848
Domestic GDP growth, %	3.09	2.98	-14.07	22.32	-5.01	10.37	-0.06	5.59	13,334
Inflation, %	6.04	19.18	-4.58	308.0	-0.99	61.88	10.80	141.6	13,370
General govt. deficit, % of GDP	1.90	4.37	-20.24	32.00	-13.58	11.10	-0.64	7.03	12,976
Public debt, % of GDP	59.95	36.62	0.05	237.1	0.89	183.3	1.47	6.74	12,143
Current account, % of GDP	0.80	5.35	-14.48	26.06	-9.96	17.36	1.05	4.93	13,719
Net foreign assets, % of GDP	-6.49	63.74	-199.3	415.9	-129.7	271.8	2.33	11.53	13,430
Political Risk Rating, index	74.73	12.08	27.00	97.00	43.00	93.50	-0.72	2.95	13,408
Share of world GDP at PPP, %	2.07	3.44	0.15	22.21	0.16	19.93	3.63	17.43	13,814

Table 4: Change in yields, change in VIX and fundamentals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Govt. bond yield, t-1 (YIELD)	-4.79***	-5.04***	-4.79***	-5.14***	-5.30***	-5.17***	-5.15***	-4.91***	-4.91***	-5.67***	-5.15***
	(1.08)	(1.13)	(1.11)	(1.22)	(1.21)	(1.11)	(1.07)	(1.06)	(1.07)	(1.22)	(1.16)
De jure capital account openness, t (KAOPEN)	-0.63	-0.90	-6.65	-8.35	-8.48	-5.79	-6.02	-3.67	-3.55	-7.80	-4.33
	(10.59)	(11.25)	(9.52)	(10.49)	(10.57)	(10.21)	(10.21)	(10.45)	(9.88)	(11.29)	(10.92)
Strict peg, t (STRICT PEG)	-7.05	-7.03	-8.55*	-10.48**	-10.79**	-7.77*	-9.24*	-7.74*	-8.22*	-10.38**	
	(4.24)	(4.34)	(4.32)	(4.42)	(4.45)	(4.43)	(4.86)	(4.44)	(4.36)	(4.92)	
Soft peg, t (SOFT PEG)	-2.95	-2.73	-3.22	-3.32	-3.50	-2.24	-3.45	-3.02	-3.05	-2.44	
	(2.54)	(2.57)	(2.92)	(2.91)	(2.89)	(2.85)	(2.93)	(2.82)	(2.79)	(3.02)	
Correl.[DYIELD, DVIX] t0,t-1 (INERTIA)	-0.20**	-0.18*	-0.18*	-0.21*	-0.22**	-0.24**	-0.26**	-0.23**	-0.22**	-0.24**	-0.24**
	(0.09)	(0.09)	(0.10)	(0.10)	(0.10)	(0.11)	(0.10)	(0.10)	(0.10)	(0.11)	(0.10)
Real GDP growth, t-12 (GROWTH)	0.53									0.36	0.46
	(0.59)									(0.59)	(0.58)
Inflation, t-12 (INFLATION)		0.29								-0.36	-0.35
		(0.30)								(0.63)	(0.57)
Fiscal deficit, % of GDP, t-12 (DEFICIT)			-0.27							-0.39	
			(0.31)							(0.31)	
Public debt, % of GDP, t-12 (DEBT)				0.02						-0.20*	-0.29**
				(0.07)						(0.12)	(0.12)
DEBT squared, t-12 (DEBT SQ)					0.00					0.00***	0.00***
					(0.00)					(0.00)	(0.00)
Current account, % of GDP, t-12 (CA)						-1.06***				-0.97***	
						(0.26)				(0.23)	
Net foreign assets, % of GDP, t-12 (NFA)							-0.07*			-0.04	
							(0.04)			(0.03)	
Political risk rating , t-12 (RATING)								0.09		-0.19	-0.13
								(0.22)		(0.26)	(0.29)
Share of world GDP, %, t-12 (SIZE)									-0.75	0.19	
									(1.04)	(0.73)	
US mon. policy shock * YIELD	1.80**	2.32***	1.59**	1.70**	1.72**	1.58**	1.65**	1.29*	1.71**	1.51	1.64**
	(0.69)	(0.80)	(0.75)	(0.80)	(0.80)	(0.78)	(0.76)	(0.74)	(0.74)	(0.90)	(0.80)
US mon. policy shock * KAOPEN	7.81	12.54*	12.87*	9.91	9.97	11.86*	12.82*	21.39***	12.86*	15.97**	16.88***
	(6.40)	(6.51)	(6.44)	(6.91)	(6.86)	(6.85)	(6.75)	(7.55)	(6.70)	(6.15)	(6.15)
US mon. policy shock * STRICT PEG	-0.39	-0.83	0.00	0.13	0.30	-0.21	-0.24	0.06	-0.48	0.21	
	(2.13)	(2.37)	(2.19)	(2.36)	(2.37)	(2.34)	(2.34)	(2.35)	(2.72)	(2.68)	
US mon. policy shock * SOFT PEG	-0.28	-1.30	-1.71	-2.10	-1.95	-2.97	-3.09	-2.85	-3.45	0.98	
	(2.27)	(2.47)	(2.37)	(2.50)	(2.49)	(2.54)	(2.57)	(2.61)	(2.78)	(2.53)	
US mon. policy shock * INERTIA	0.24**	0.25***	0.31***	0.32***	0.32***	0.26***	0.25***	0.24**	0.25***	0.30***	0.29***
	(0.09)	(0.09)	(0.09)	(0.10)	(0.10)	(0.08)	(0.09)	(0.10)	(0.08)	(0.10)	(0.08)
US mon. policy shock * GROWTH	-1.32***									-1.40**	-1.49***
	(0.41)									(0.52)	(0.47)
US mon. policy shock * INFLATION		-0.40								-1.15**	-1.16***
		(0.25)								(0.44)	(0.40)
US mon. policy shock * DEFICIT			0.59**							0.21	
			(0.24)							(0.33)	
US mon. policy shock * DEBT				0.02						-0.14*	-0.12*
				(0.03)						(0.07)	(0.07)
US mon. policy shock * DEBT SQ					0.00					0.00*	0.00*
					(0.00)					(0.00)	(0.00)
US mon. policy shock * CA						-0.17				-0.06	
						(0.15)				(0.20)	
US mon. policy shock * NFA							-0.01			-0.00	
							(0.01)			(0.01)	
US mon. policy shock * RATING								-0.44***		-0.64***	-0.68***
								(0.16)		(0.21)	(0.19)
US mon. policy shock * SIZE									-0.08	-0.13	
									(0.19)	(0.25)	
Observations	10,266	10,266	10,391	10,058	10,058	10,528	10,528	10,519	10,528	9,892	9,892
Countries	40	40	40	40	40	40	40	40	40	40	40
R-squared	0.37	0.37	0.37	0.38	0.38	0.37	0.36	0.36	0.36	0.38	0.38

Notes: the dependent variable is the standardised change in government bond yields (DYIELD). The model includes country-specific fixed effects and time fixed effects. Robust standard errors are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 5: Change in yields, US monetary policy shocks and fundamentals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Govt. bond yield, t-1 (YIELD)	-4.79***	-5.04***	-4.79***	-5.14***	-5.30***	-5.17***	-5.15***	-4.91***	-4.91***	-5.67***	-5.15***
	(1.08)	(1.13)	(1.11)	(1.22)	(1.21)	(1.11)	(1.07)	(1.06)	(1.07)	(1.22)	(1.16)
De jure capital account openness, t (KAOPEN)	-0.63	-0.90	-6.65	-8.35	-8.48	-5.79	-6.02	-3.67	-3.55	-7.80	-4.33
	(10.59)	(11.25)	(9.52)	(10.49)	(10.57)	(10.21)	(10.21)	(10.45)	(9.88)	(11.29)	(10.92)
Strict peg, t (STRICT PEG)	-7.05	-7.03	-8.55*	-10.48**	-10.79**	-7.77*	-9.24*	-7.74*	-8.22*	-10.38**	
	(4.24)	(4.34)	(4.32)	(4.42)	(4.45)	(4.43)	(4.86)	(4.44)	(4.36)	(4.92)	
Soft peg, t (SOFT PEG)	-2.95	-2.73	-3.22	-3.32	-3.50	-2.24	-3.45	-3.02	-3.05	-2.44	
	(2.54)	(2.57)	(2.92)	(2.91)	(2.89)	(2.85)	(2.93)	(2.82)	(2.79)	(3.02)	
Correl.[DYIELD, DVIX] t0,t-1 (INERTIA)	-0.20**	-0.18*	-0.18*	-0.21*	-0.22**	-0.24**	-0.26**	-0.23**	-0.22**	-0.24**	-0.24**
	(0.09)	(0.09)	(0.10)	(0.10)	(0.10)	(0.11)	(0.10)	(0.10)	(0.10)	(0.11)	(0.10)
Real GDP growth, t-12 (GROWTH)	0.53									0.36	0.46
	(0.59)									(0.59)	(0.58)
Inflation, t-12 (INFLATION)		0.29								-0.36	-0.35
		(0.30)								(0.63)	(0.57)
Fiscal deficit, % of GDP, t-12 (DEFICIT)			-0.27							-0.39	
			(0.31)							(0.31)	
Public debt, % of GDP, t-12 (DEBT)				0.02						-0.20*	-0.29**
				(0.07)						(0.12)	(0.12)
DEBT squared, t-12 (DEBT SQ)					0.00					0.00***	0.00***
					(0.00)					(0.00)	(0.00)
Current account, % of GDP, t-12 (CA)						-1.06***				-0.97***	
						(0.26)				(0.23)	
Net foreign assets, % of GDP, t-12 (NFA)							-0.07*			-0.04	
							(0.04)			(0.03)	
Political risk rating , t-12 (RATING)								0.09		-0.19	-0.13
								(0.22)		(0.26)	(0.29)
Share of world GDP, %, t-12 (SIZE)									-0.75	0.19	
									(1.04)	(0.73)	
US mon. policy shock * YIELD	1.80**	2.32***	1.59**	1.70**	1.72**	1.58**	1.65**	1.29*	1.71**	1.51	1.64**
	(0.69)	(0.80)	(0.75)	(0.80)	(0.80)	(0.78)	(0.76)	(0.74)	(0.74)	(0.90)	(0.80)
US mon. policy shock * KAOPEN	7.81	12.54*	12.87*	9.91	9.97	11.86*	12.82*	21.39***	12.86*	15.97**	16.88***
	(6.40)	(6.51)	(6.44)	(6.91)	(6.86)	(6.85)	(6.75)	(7.55)	(6.70)	(6.15)	(6.15)
US mon. policy shock * STRICT PEG	-0.39	-0.83	0.00	0.13	0.30	-0.21	-0.24	0.06	-0.48	0.21	
	(2.13)	(2.37)	(2.19)	(2.36)	(2.37)	(2.34)	(2.34)	(2.35)	(2.72)	(2.68)	
US mon. policy shock * SOFT PEG	-0.28	-1.30	-1.71	-2.10	-1.95	-2.97	-3.09	-2.85	-3.45	0.98	
	(2.27)	(2.47)	(2.37)	(2.50)	(2.49)	(2.54)	(2.57)	(2.61)	(2.78)	(2.53)	
US mon. policy shock * INERTIA	0.24**	0.25***	0.31***	0.32***	0.32***	0.26***	0.25***	0.24**	0.25***	0.30***	0.29***
	(0.09)	(0.09)	(0.09)	(0.10)	(0.10)	(0.08)	(0.09)	(0.10)	(0.08)	(0.10)	(0.08)
US mon. policy shock * GROWTH	-1.32***									-1.40**	-1.49***
	(0.41)									(0.52)	(0.47)
US mon. policy shock * INFLATION		-0.40								-1.15**	-1.16***
		(0.25)								(0.44)	(0.40)
US mon. policy shock * DEFICIT			0.59**							0.21	
			(0.24)							(0.33)	
US mon. policy shock * DEBT				0.02						-0.14*	-0.12*
				(0.03)						(0.07)	(0.07)
US mon. policy shock * DEBT SQ					0.00					0.00*	0.00*
					(0.00)					(0.00)	(0.00)
US mon. policy shock * CA						-0.17				-0.06	
						(0.15)				(0.20)	
US mon. policy shock * NFA							-0.01			-0.00	
							(0.01)			(0.01)	
US mon. policy shock * RATING								-0.44***		-0.64***	-0.68***
								(0.16)		(0.21)	(0.19)
US mon. policy shock * SIZE									-0.08	-0.13	
									(0.19)	(0.25)	
Observations	10,266	10,266	10,391	10,058	10,058	10,528	10,528	10,519	10,528	9,892	9,892
Countries	40	40	40	40	40	40	40	40	40	40	40
R-squared	0.37	0.37	0.37	0.38	0.38	0.37	0.36	0.36	0.36	0.38	0.38

Notes: the dependent variable is the standardised change in government bond yields (DYIELD). The model includes country-specific fixed effects and time fixed effects. Robust standard errors are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 6: Change in yields, financial shocks and fundamentals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Govt. bond yield, t-1 (YIELD)	-4.88***	-5.12***	-4.89***	-5.23***	-5.39***	-5.33***	-5.31***	-5.00***	-5.08***	-5.59***	-4.89***
	(1.08)	(1.14)	(1.13)	(1.22)	(1.21)	(1.14)	(1.09)	(1.07)	(1.10)	(1.19)	(0.88)
De jure capital account openness, t (KAOPEN)	-1.45	-0.73	-7.44	-8.26	-8.47	-6.72	-7.14	-4.99	-4.61	-6.02	
	(10.14)	(10.70)	(9.20)	(10.27)	(10.35)	(9.91)	(9.80)	(9.84)	(9.50)	(11.22)	
Strict peg, t (STRICT PEG)	-7.21	-7.25	-8.75*	-10.50**	-10.83**	-7.94*	-9.46*	-8.05*	-8.22*	-10.85**	
	(4.29)	(4.42)	(4.37)	(4.41)	(4.44)	(4.49)	(4.97)	(4.48)	(4.47)	(4.77)	
Soft peg, t (SOFT PEG)	-2.60	-2.45	-3.33	-3.17	-3.37	-2.20	-3.40	-3.01	-2.98	-2.16	
	(2.56)	(2.57)	(3.00)	(2.87)	(2.86)	(2.97)	(3.02)	(2.85)	(2.88)	(2.92)	
Correl.[DYIELD, DVIX] t0,t-1 (INERTIA)	-0.20**	-0.18**	-0.21**	-0.22**	-0.23**	-0.27**	-0.29***	-0.27***	-0.26**	-0.26**	-0.29***
	(0.09)	(0.09)	(0.10)	(0.09)	(0.09)	(0.11)	(0.10)	(0.10)	(0.10)	(0.11)	(0.10)
Real GDP growth, t-12 (GROWTH)	0.48									0.45	
	(0.57)									(0.55)	
Inflation, t-12 (INFLATION)		0.27								-0.19	
		(0.30)								(0.58)	
Fiscal deficit, % of GDP, t-12 (DEFICIT)			-0.29							-0.40	
			(0.31)							(0.31)	
Public debt, % of GDP, t-12 (DEBT)				0.01						-0.18	
				(0.07)						(0.11)	
DEBT squared, t-12 (DEBT SQ)					0.00					0.00***	
					(0.00)					(0.00)	
Current account, % of GDP, t-12 (CA)						-1.07***				-0.97***	
						(0.25)				(0.23)	
Net foreign assets, % of GDP, t-12 (NFA)							-0.07**			-0.04	-0.05*
							(0.04)			(0.03)	(0.03)
Political risk rating , t-12 (RATING)								0.05		-0.21	0.05
								(0.21)		(0.25)	(0.20)
Share of world GDP, %, t-12 (SIZE)									-0.53	0.39	-0.15
									(1.13)	(0.72)	(1.21)
Financial shock * YIELD	2.27***	2.23***	2.26***	2.17***	2.20***	2.12***	2.20***	1.85***	2.33***	1.05	
	(0.58)	(0.56)	(0.62)	(0.57)	(0.56)	(0.63)	(0.59)	(0.66)	(0.57)	(0.82)	
Financial shock * KAOPEN	8.81	5.71	5.56	5.51	5.44	4.34	5.29	15.00*	4.71	22.50**	
	(5.54)	(5.43)	(5.37)	(5.62)	(5.48)	(5.25)	(5.17)	(8.02)	(5.20)	(8.43)	
Financial shock * STRICT PEG	-0.78	-0.67	-1.30	-0.37	-0.19	-1.04	-1.08	-1.54	-1.34	-1.96	
	(3.34)	(3.33)	(3.51)	(3.30)	(3.21)	(3.29)	(3.32)	(3.20)	(3.39)	(3.34)	
Financial shock * SOFT PEG	-2.45	-1.49	-1.46	-0.33	-0.09	-0.58	-0.79	-1.85	-1.82	-1.50	
	(3.04)	(2.78)	(2.76)	(2.90)	(2.86)	(2.89)	(2.97)	(2.81)	(2.73)	(2.96)	
Financial shock * INERTIA	0.27**	0.27**	0.22*	0.26**	0.25**	0.22**	0.21*	0.18*	0.20*	0.21**	0.21***
	(0.10)	(0.11)	(0.11)	(0.11)	(0.11)	(0.10)	(0.10)	(0.10)	(0.11)	(0.11)	(0.07)
Financial shock * GROWTH	0.59									1.14	
	(0.63)									(0.69)	
Financial shock * INFLATION		-0.10								0.05	
		(0.26)								(0.39)	
Financial shock * DEFICIT			0.21							-0.15	
			(0.26)							(0.27)	
Financial shock * DEBT				0.03						-0.03	
				(0.03)						(0.08)	
Financial shock * DEBT SQ					0.00					0.00	
					(0.00)					(0.00)	
Financial shock * CA						-0.25				-0.13	
						(0.17)				(0.20)	
Financial shock * NFA							-0.03**			-0.03**	-0.03***
							(0.01)			(0.01)	(0.01)
Financial shock * RATING								-0.47*		-0.60**	-0.36***
								(0.24)		(0.27)	(0.11)
Financial shock * SIZE									-0.28	-0.48*	-0.43***
									(0.27)	(0.26)	(0.15)
Observations	10,266	10,266	10,391	10,058	10,058	10,528	10,528	10,519	10,528	9,892	10,590
Countries	40	40	40	40	40	40	40	40	40	40	40
R-squared	0.37	0.37	0.37	0.38	0.38	0.37	0.37	0.37	0.37	0.38	0.36

Notes: the dependent variable is the standardised change in government bond yields (DYIELD). The model includes country-specific fixed effects and time fixed effects. Robust standard errors are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 7: Change in yields, geopolitical uncertainty shocks and fundamentals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Govt. bond yield, t-1 (YIELD)	-4.86***	-5.04***	-4.90***	-5.27***	-5.44***	-5.27***	-5.25***	-4.95***	-5.02***	-5.63***	-5.00***
	(1.01)	(1.06)	(1.06)	(1.17)	(1.16)	(1.08)	(1.03)	(1.01)	(1.04)	(1.15)	(0.97)
De jure capital account openness, t (KAOPEN)	-0.68	-0.39	-6.94	-7.44	-7.80	-6.07	-6.50	-4.73	-3.87	-6.18	
	(10.15)	(10.54)	(9.04)	(10.35)	(10.45)	(9.90)	(9.77)	(9.79)	(9.42)	(10.84)	
Strict peg, t (STRICT PEG)	-7.40	-7.49	-9.02*	-10.81**	-11.11**	-8.10*	-9.65*	-8.34*	-8.42*	-11.35**	
	(4.41)	(4.53)	(4.49)	(4.58)	(4.63)	(4.60)	(5.09)	(4.58)	(4.61)	(5.10)	
Soft peg, t (SOFT PEG)	-2.64	-2.61	-3.33	-3.10	-3.31	-2.11	-3.44	-3.07	-3.01	-2.10	
	(2.56)	(2.59)	(3.01)	(2.91)	(2.90)	(2.87)	(2.98)	(2.85)	(2.85)	(2.95)	
Correl.[DYIELD, DVIX] t0,t-1 (INERTIA)	-0.21**	-0.21**	-0.23**	-0.24**	-0.25**	-0.28**	-0.31***	-0.28***	-0.28***	-0.30***	-0.27**
	(0.09)	(0.09)	(0.10)	(0.09)	(0.09)	(0.11)	(0.10)	(0.10)	(0.10)	(0.11)	(0.10)
Real GDP growth, t-12 (GROWTH)	0.39									0.30	
	(0.54)									(0.55)	
Inflation, t-12 (INFLATION)		0.05								-0.72	
		(0.30)								(0.64)	
Fiscal deficit, % of GDP, t-12 (DEFICIT)			-0.28							-0.41	
			(0.32)							(0.31)	
Public debt, % of GDP, t-12 (DEBT)				0.01						-0.21*	
				(0.08)						(0.11)	
DEBT squared, t-12 (DEBT SQ)					0.00					0.00***	
					(0.00)					(0.00)	
Current account, % of GDP, t-12 (CA)						-1.09***				-0.97***	-1.04***
						(0.25)				(0.23)	(0.23)
Net foreign assets, % of GDP, t-12 (NFA)							-0.07*			-0.04	
							(0.04)			(0.03)	
Political risk rating , t-12 (RATING)								0.15		-0.13	
								(0.21)		(0.28)	
Share of world GDP, %, t-12 (SIZE)									-0.41	0.62	-0.45
									(1.08)	(0.69)	(1.04)
Geopolitical unc. shock * YIELD	2.06***	1.93***	2.22***	2.13***	2.14***	1.93***	2.11***	2.16***	1.98***	1.07	
	(0.64)	(0.67)	(0.63)	(0.65)	(0.65)	(0.67)	(0.62)	(0.60)	(0.61)	(0.77)	
Geopolitical unc. shock * KAOPEN	-2.26	-0.14	-1.83	-3.07	-3.04	-3.07	-1.67	-1.45	-2.14	-3.68	
	(4.01)	(3.35)	(3.49)	(3.45)	(3.43)	(3.65)	(3.38)	(4.90)	(3.22)	(5.67)	
Geopolitical unc. shock * STRICT PEG	2.14	1.91	2.47	0.84	0.98	2.43	2.39	2.39	0.72	-1.32	
	(2.67)	(2.67)	(2.81)	(2.65)	(2.61)	(2.70)	(2.68)	(2.68)	(2.58)	(2.42)	
Geopolitical unc. shock * SOFT PEG	2.87	2.35	2.27	1.68	1.78	3.32	2.73	2.59	1.12	0.75	
	(3.31)	(3.30)	(3.09)	(3.19)	(3.18)	(3.41)	(3.28)	(3.19)	(3.01)	(3.30)	
Geopolitical unc. shock * INERTIA	-0.03	-0.04	-0.09	-0.09	-0.09	-0.04	-0.05	-0.06	-0.06	-0.12	
	(0.08)	(0.08)	(0.08)	(0.09)	(0.09)	(0.07)	(0.07)	(0.07)	(0.08)	(0.10)	
Geopolitical unc. shock * GROWTH	-0.32									-0.21	
	(0.39)									(0.40)	
Geopolitical unc. shock * INFLATION		0.30								0.59	
		(0.29)								(0.47)	
Geopolitical unc. shock * DEFICIT			-0.20							-0.55	
			(0.23)							(0.37)	
Geopolitical unc. shock * DEBT				0.01						0.09	
				(0.03)						(0.09)	
Geopolitical unc. shock * DEBT SQ					0.00					-0.00	
					(0.00)					(0.00)	
Geopolitical unc. shock * CA						-0.22				-0.57***	-0.46**
						(0.18)				(0.20)	(0.19)
Geopolitical unc. shock * NFA							-0.01			0.01	
							(0.01)			(0.01)	
Geopolitical unc. shock * RATING								-0.01		-0.23	
								(0.13)		(0.15)	
Geopolitical unc. shock * SIZE									-0.58***	-0.80***	-0.83***
									(0.19)	(0.19)	(0.24)
Observations	10,266	10,266	10,391	10,058	10,058	10,528	10,528	10,519	10,528	9,892	10,599
Countries	40	40	40	40	40	40	40	40	40	40	0.36
R-squared	0.37	0.37	0.37	0.38	0.38	0.37	0.36	0.36	0.36	0.38	40

Notes: the dependent variable is the standardised change in government bond yields (DYIELD). The model includes country-specific fixed effects and time fixed effects. Robust standard errors are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 8: Change in yields, change in VIX and fundamentals: robustness of benchmark model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Benchmark	Advanced	Emerging	Excl. US	1990-99	2000-09	2010-18	Excl. 2008-09
Govt. bond yield, t-1 (YIELD)	-4.34***	-3.77**	-6.01***	-4.23***	-14.20***	-10.84***	-6.45***	-3.53***
	(0.93)	(1.36)	(1.20)	(0.93)	(2.73)	(3.07)	(0.93)	(0.94)
Correl.[DYIELD, DVIX] t0,t-1 (INERTIA)	-0.18*	-0.18	-0.04	-0.19*	-1.36***	0.16	-0.77***	-0.20*
	(0.10)	(0.12)	(0.14)	(0.10)	(0.42)	(0.24)	(0.24)	(0.11)
Real GDP growth, t-12 (GROWTH)	0.49	-0.29	0.70	0.50	3.12**	0.82	-0.10	0.85
	(0.55)	(0.57)	(0.69)	(0.55)	(1.29)	(0.95)	(0.99)	(0.55)
Public debt, % of GDP, t-12 (DEBT)	-0.01	0.01	0.02	-0.01	-1.35***	0.22*	-1.15***	-0.03
	(0.08)	(0.08)	(0.14)	(0.08)	(0.42)	(0.12)	(0.20)	(0.08)
Political risk rating , t-12 (RATING)	-0.05	-0.30	-0.62	-0.01	-1.36	-0.60**	-0.07	-0.07
	(0.25)	(0.23)	(0.60)	(0.25)	(0.82)	(0.29)	(0.69)	(0.26)
Share of world GDP, %, t-12 (SIZE)	-0.35	-1.21	0.09	-0.29	-12.35	-1.43	-3.67	-0.67
	(0.68)	(1.40)	(1.18)	(0.81)	(14.01)	(2.77)	(4.29)	(0.63)
DVIX * INERTIA	0.06***	0.02	0.07***	0.06***	-0.05	0.06*	0.05**	0.05***
	(0.02)	(0.04)	(0.02)	(0.02)	(0.05)	(0.04)	(0.02)	(0.02)
DVIX * GROWTH	-0.23**	-0.09	-0.37*	-0.21**	-0.50*	-0.56***	0.05	-0.06
	(0.09)	(0.10)	(0.19)	(0.10)	(0.27)	(0.18)	(0.14)	(0.11)
DVIX * DEBT	0.01**	0.01**	0.03	0.01**	-0.02	0.01	0.02***	0.01***
	(0.00)	(0.00)	(0.02)	(0.00)	(0.02)	(0.01)	(0.01)	(0.01)
DVIX * RATING	-0.18***	-0.26***	-0.06	-0.18***	0.19	-0.21***	-0.19***	-0.20***
	(0.04)	(0.05)	(0.07)	(0.04)	(0.13)	(0.07)	(0.04)	(0.03)
DVIX * SIZE	-0.19***	-0.22***	-0.06	-0.25**	-0.13	-0.18***	-0.23***	-0.24***
	(0.04)	(0.05)	(0.12)	(0.12)	(0.15)	(0.06)	(0.08)	(0.05)
Observations	10,351	7,052	3,299	10,027	2,123	3,951	4,277	9,468
Countries	40	23	17	39	26	38	40	40
R-squared	0.38	0.54	0.30	0.38	0.41	0.44	0.33	0.38

Notes: the dependent variable is the standardised change in government bond yields (DYIELD). The model includes country-specific fixed effects and time fixed effects. Robust standard errors are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 9: Change in yields, US monetary policy shocks and fundamentals: robustness of benchmark model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Benchmark	Advanced	Emerging	Excl. US	1990-99	2000-09	2010-18	Excl. 2008-09
Govt. bond yield, t-1 (YIELD)	-5.15***	-4.51***	-7.18***	-5.02***	-17.96***	-12.53***	-8.49***	-4.08***
	(1.16)	(1.57)	(1.65)	(1.15)	(3.04)	(3.84)	(1.02)	(1.22)
De jure capital account openness, t (KAOPEN)	-4.33	2.17	-8.90	-4.68	-76.85**	-70.23***	55.08***	-1.05
	(10.92)	(20.72)	(14.72)	(10.89)	(31.22)	(25.09)	(19.79)	(11.36)
Correl.[DYIELD, DVIX] t0,t-1 (INERTIA)	-0.24**	-0.32**	-0.15	-0.25**	-1.32***	-0.03	-0.93***	-0.27**
	(0.10)	(0.12)	(0.15)	(0.10)	(0.41)	(0.24)	(0.24)	(0.10)
Real GDP growth, t-12 (GROWTH)	0.46	-0.45	0.42	0.47	3.79**	1.35	-0.26	0.84
	(0.58)	(0.57)	(0.85)	(0.58)	(1.37)	(0.94)	(1.17)	(0.60)
Inflation, t-12 (INFLATION)	-0.35	-0.96	0.79	-0.37	-0.12	0.17	0.89	-0.48
	(0.57)	(0.97)	(0.87)	(0.57)	(2.87)	(1.12)	(1.61)	(0.63)
Public debt, % of GDP, t-12 (DEBT)	-0.29**	-0.28**	-0.59	-0.28**	-2.60**	0.19	-1.34***	-0.29**
	(0.12)	(0.13)	(0.67)	(0.12)	(1.01)	(0.30)	(0.46)	(0.12)
DEBT squared, t-12 (DEBT SQ)	0.00***	0.00***	0.01	0.00***	0.01*	0.00	0.00	0.00***
	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Political risk rating , t-12 (RATING)	-0.13	-0.45*	-0.45	-0.08	-1.31	-0.13	-0.13	-0.16
	(0.29)	(0.23)	(0.69)	(0.30)	(0.85)	(0.40)	(0.69)	(0.29)
US mon. policy shock * YIELD	1.64**	3.47***	0.46	1.76**	-0.75	1.08	4.09***	1.69**
	(0.80)	(1.14)	(0.95)	(0.78)	(1.51)	(1.52)	(1.01)	(0.78)
US mon. policy shock * KAOPEN	16.88***	62.56***	16.10*	16.43**	33.48*	13.28	17.49*	15.84**
	(6.15)	(9.31)	(9.14)	(6.16)	(17.52)	(8.51)	(10.28)	(6.10)
US mon. policy shock * INERTIA	0.29***	0.07	0.30***	0.28***	-0.12	0.19	0.16	0.30***
	(0.08)	(0.12)	(0.08)	(0.08)	(0.20)	(0.12)	(0.21)	(0.10)
US mon. policy shock * GROWTH	-1.49***	-0.89	-2.53**	-1.47***	-1.38	-1.95*	-0.45	-0.99**
	(0.47)	(0.65)	(0.93)	(0.47)	(0.96)	(1.02)	(0.85)	(0.45)
US mon. policy shock * INFLATION	-1.16***	-1.18*	-0.77	-1.16***	0.19	-0.87	-1.45*	-1.18***
	(0.40)	(0.62)	(0.47)	(0.40)	(1.68)	(0.55)	(0.83)	(0.38)
US mon. policy shock * DEBT	-0.12*	-0.09	-0.18	-0.13*	-0.73***	-0.03	-0.11	-0.15**
	(0.07)	(0.07)	(0.42)	(0.07)	(0.23)	(0.11)	(0.11)	(0.06)
US mon. policy shock * DEBT SQ	0.00*	0.00**	0.00	0.00*	0.00***	-0.00	0.00	0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
US mon. policy shock * RATING	-0.68***	-0.41*	-0.47	-0.64***	0.03	-0.65**	-0.88***	-0.68***
	(0.19)	(0.23)	(0.31)	(0.19)	(0.48)	(0.28)	(0.29)	(0.18)
Observations	9,892	6,763	3,129	9,578	2,064	3,951	3,877	9,009
Countries	40	23	17	39	26	38	40	40
R-squared	0.38	0.54	0.30	0.38	0.42	0.43	0.34	0.38

Notes: the dependent variable is the standardised change in government bond yields (DYIELD). The model includes country-specific fixed effects and time fixed effects. Robust standard errors are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 10: Change in yields, financial shocks and fundamentals: robustness of benchmark model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Benchmark	Advanced	Emerging	Excl. US	1990-99	2000-09	2010-18	Excl. 2008-09
Govt. bond yield, t-1 (YIELD)	-4.89***	-4.02***	-6.74***	-4.78***	-10.28***	-10.67***	-6.46***	-4.25***
	(0.88)	(1.27)	(1.36)	(0.87)	(2.17)	(3.20)	(0.92)	(0.87)
Correl.[DYIELD, DVIX] t0,t-1 (INERTIA)	-0.29***	-0.18	0.04	-0.30***	-0.53*	0.13	-1.13***	-0.32***
	(0.10)	(0.15)	(0.14)	(0.10)	(0.26)	(0.21)	(0.37)	(0.10)
Net foreign assets, % of GDP, t-12 (NFA)	-0.05*	-0.04	0.11	-0.05*	-0.29	-0.02	0.15	-0.05*
	(0.03)	(0.03)	(0.16)	(0.03)	(0.29)	(0.03)	(0.09)	(0.03)
Political risk rating , t-12 (RATING)	0.05	-0.18	-0.68	0.09	0.22	-0.63	0.67	0.08
	(0.20)	(0.22)	(0.61)	(0.20)	(0.52)	(0.39)	(0.75)	(0.19)
Share of world GDP, %, t-12 (SIZE)	-0.15	-1.25	1.29	-0.12	-1.37	-3.14**	4.41	-0.17
	(1.21)	(1.89)	(1.27)	(1.54)	(10.00)	(1.27)	(4.11)	(1.00)
Financial shock * INERTIA	0.21***	-0.05	0.33***	0.21***	0.24	0.29**	0.24***	0.16**
	(0.07)	(0.13)	(0.09)	(0.07)	(0.18)	(0.11)	(0.09)	(0.06)
Financial shock * NFA	-0.03***	-0.03***	-0.07	-0.03***	-0.12	-0.04***	-0.00	-0.02
	(0.01)	(0.01)	(0.09)	(0.01)	(0.08)	(0.01)	(0.02)	(0.01)
Financial shock * RATING	-0.36***	-0.75***	0.11	-0.36***	-1.01***	-0.28*	-0.30*	-0.43***
	(0.11)	(0.19)	(0.19)	(0.13)	(0.31)	(0.14)	(0.15)	(0.10)
Financial shock * SIZE	-0.43***	-0.56***	-0.01	-0.46	-0.20	-0.28	-0.62**	-0.38**
	(0.15)	(0.14)	(0.42)	(0.44)	(0.37)	(0.20)	(0.24)	(0.14)
Observations	10,590	7,245	3,345	10,264	2,693	4,020	3,877	9,707
Countries	40	23	17	39	29	38	40	40
R-squared	0.36	0.52	0.28	0.36	0.36	0.43	0.32	0.36

Notes: the dependent variable is the standardised change in government bond yields (DYIELD). The model includes country-specific fixed effects and time fixed effects. Robust standard errors are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 11: Change in yields, geopolitical uncertainty shocks and fundamentals: robustness of benchmark model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Benchmark	Advanced	Emerging	Excl. US	1990-99	2000-09	2010-18	Excl. 2008-09
Govt. bond yield, t-1 (YIELD)	-5.00***	-3.85**	-6.30***	-4.89***	-11.72***	-9.71***	-9.36***	-4.43***
	(0.97)	(1.45)	(1.38)	(0.95)	(2.67)	(3.26)	(1.20)	(0.93)
Correl.[DYIELD, DVIX] t0,t-1 (INERTIA)	-0.27**	-0.12	-0.03	-0.28**	-0.53*	0.05	-0.94***	-0.30***
	(0.10)	(0.14)	(0.14)	(0.10)	(0.27)	(0.21)	(0.32)	(0.11)
Current account, % of GDP, t-12 (CA)	-1.04***	-0.85***	-0.25	-1.08***	-3.29*	-0.50	-4.01***	-1.15***
	(0.23)	(0.23)	(0.39)	(0.22)	(1.76)	(0.33)	(0.89)	(0.26)
Share of world GDP, %, t-12 (SIZE)	-0.45	-1.13	1.09	-0.48	4.46	-4.02**	-0.68	-0.39
	(1.04)	(1.74)	(1.02)	(1.37)	(9.78)	(1.79)	(3.00)	(0.87)
Geopolitical unc. shock * CA	-0.46**	-0.33	-0.58*	-0.46**	-0.44	-0.47***	-0.52	-0.29
	(0.19)	(0.21)	(0.30)	(0.18)	(0.83)	(0.13)	(0.48)	(0.23)
Geopolitical unc. shock * SIZE	-0.83***	-0.85***	-0.36	-0.23	-1.57***	-0.29	-0.79***	-0.85***
	(0.24)	(0.17)	(0.59)	(0.41)	(0.32)	(0.24)	(0.22)	(0.29)
Observations	10,599	7,254	3,345	10,273	2,702	4,020	3,877	9,716
Countries	0.36	0.52	0.27	0.36	0.37	0.42	0.32	0.36
R-squared	40	23	17	39	29	38	40	40

Notes: the dependent variable is the standardised change in government bond yields (DYIELD). The model includes country-specific fixed effects and time fixed effects. Robust standard errors are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.