Global Footprint of US Fiscal Policy*

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ABSTRACT

Like US monetary policy, US fiscal policy has a global footprint: deteriorations in the US fiscal condition i) coincide with depressed global risky asset prices and ii) predict higher future global equity returns moving forward. These results are not spanned by i) the US monetary policy, ii) other fiscal variables or iii) local or global business cycles. To explain these results, I advance a novel fiscal mechanism that emphasises the special US role as the global innovation leader. This empowers the US fiscal policy with a large international transmission across the global innovation network, enabling it to influence i) foreign growth, ii) foreign fiscal conditions, iii) foreign policy uncertainty and consequently iv) global risk-premia. I propose a multi-country general equilibrium model to formalise this argument. The model qualitatively and quantitatively accounts for my empirical findings.

Keywords: International Finance, US Fiscal Policy, Global Financial Cycle
JEL Codes: E0, F3, F4, G1

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1 Introduction

A growing literature in international macro-finance documents the existence of a global financial cycle (GFC): risky asset prices exhibit significant degrees of international comovement (Miranda-Aggropino and Rey, 2015). At the heart of the GFC are common variations in discount rates, not cash flows: equity return premiums move together whereas dividend growths do not (Jordá et al, 2018). Understanding the economic origins behind this global factor structure in risky asset prices is not only an important asset pricing question, but also a first order concern for policy-makers.

Conventional wisdom interprets the GFC as a purely ***monetary*** phenomenon: canonical work by Miranda-Agrippino and Rey (2020) makes the case that the GFC is a global monetary cycle led by the US. US monetary policy shocks drive the global factor structure in international asset prices through her international transmission across the global financial system (Miranda-Agrippino and Rey, 2015; Brusa, Savor and Wilson, 2020). In this paper I show that the GFC is much more than just a monetary phenomenon.

In specific terms, I show that the GFC is as much a ***fiscal*** phenomenon as it is a monetary one. To highlight this important finding, I use the US primary surplus-debt ratio as a proxy for the US fiscal condition. This measure is ideal because it captures the net fraction of debt that the US government retires each quarter and is therefore a good measure of the US debt servicing capacity and consequently the US fiscal condition.

Using annualized (four quarter) changes in this measure, I show that deteriorations in the US fiscal condition i) coincide with depress risky asset valuations worldwide and ii) predict higher future global equity returns at short, medium and long-run horizons. These results are not spanned by i) the global business cycle, ii) the US business cycle or iii) any other countries' business cycle. They are also not driven by other fiscal variables: i) local fiscal conditions and ii) the global fiscal cycle, defined as an equally weighted average of country specific fiscal conditions, do not exert the same influence over global risky asset prices once the US fiscal condition is controlled for.

Importantly, this global footprint of US fiscal policy is distinct from that of US monetary policy: a Campbell-Shiller (1989) decomposition of the US fiscal transmission into global risky asset prices suggests that the risk-free rate component plays a negligible role, contributing close to zero percent of the variance decomposition. Of course the US monetary policy can also influence global risky asset prices through time varying risk premia: it is commonly understood that US monetary policy drives the global financial cycle through its impact on the risk-bearing capacity of global intermediaries (Miranda-Agrippino and Rey, 2020). Thus the fact that changes in intermediary capital ratios are poorly correlated with the US fiscal condition supports my view that the global footprint of US fiscal policy is a related but distinct phenomenon relative to that of US monetary policy uncovered in prior work (Miranda-Agrippino and Rey, 2020).

Given these results, a natural question arises: if not an intermediary mechanism, what is the underlying economic mechanism driving the global footprint of US fiscal policy? To address this question, I advance a novel fiscal mechanism that emphasises *the special US role as the global innovation leader*. When the US innovates, the rest of the world (ROW) follows by adopting her technology as an intermediate input into their own innovation and production. This empowers the US fiscal policy with a large international transmission across the global innovation network, enabling it to shape i) foreign growth, ii) foreign fiscal conditions, iii) foreign policy uncertainty and consequently iii) global risk-premia.

To formalise this argument, I study the international transmission of US fiscal shocks inside a quantitative multi-country general equilibrium model with Epstein and Zin (1991) (EZ) preferences where endogenous growth is driven by two sources. Firstly each country has a local innovation sector that invests resources into R&D and creates intangible capital, or intermediate goods, that is used as an input for final goods production, as in Romer (1990) and Kung and Schmid (2015). Secondly, there is a network structure in global innovation and production: foreign intermediate goods can be made available as an intermediate input for local final goods production through the process of international technology adoption (Comin and Gertler, 2006; Gavazzoni and Santacreu, 2020). Finally fiscal policy is driven by exogenous fiscal rules and the intertemporal government budget constraint (IGBC) and is remitted back to the households.

The key model asymmetry is that the US is the global innovation leader. This is modelled in a simple way: whilst each country is home biased towards their own innovation as production inputs, *they have a greater preference for US innovation relative to other foreign innovation*. This places the US at the center of the global innovation cycle, enabling the US fiscal policy to have a large international transmission through its distortionary impact on US innovation adopted overseas. This generates a mapping between the US fiscal condition, global innovation and growth, global policy uncertainty and global risk premia in my model that quantitatively accounts for my empirical results.

To communicate the economics clearly, I now describe how model dynamics in response to a US government spending shock. The fiscal rules stipulate that the US governments choose to partially finance this fiscal expansion via a larger accumulation of government debt. Thus the US fiscal conditions, proxied by the US surplus-debt ratio, deteriorates in response to the fiscal shock. To finance this fiscal deterioration over the long-run, the intertemporal government budget constraint (IGBC), and the no-ponzi condition that it implies, requires a fiscal adjustment in the US. This occurs via: i) a lower future path of ***discount rates*** on the US government debt portfolio or ii) a higher future path of primary surpluses or ***cash flows*** on the US government debt portfolio.

Discount rates are not the relevant source of adjustment in my model: due to EZ preferences and a high elasticity of substitution (EIS) above unity, the volatility of risk-free rates is low, resulting in low overall discount rate volatility on the government debt portfolio.[1] This leaves the cash flow component as the key source of fiscal adjustment. Since government spending is exogenous in my model, higher future cash flows on the government

[1]It is a well-known result that risk-free rate volatility is an inverse function of the EIS in an asset pricing framework with EZ preferences (Bansal and Yaron, 2004).

debt portfolios require a higher future path of US and ROW taxes. Due to the larger fiscal deterioration in the US, the higher future path of taxes is more pronounced for the US than the ROW.

This relatively higher future path of US taxes has important distortionary impacts on global innovation and growth. Higher expected future taxes levied on the US corporate sector depress i) the market value of US patents, ii) US R&D intensity and consequently iii) US expected growth prospects moving forward. Since the ROW adopts US innovation, this slowdown in US innovation also has ramifications for global growth: the depressed market values for US innovation also lowers market values for foreign adoption of US innovation, depressing innovation and growth prospects outside the US as well.

Confronted by the deteriorating global growth environment, local foreign governments respond by following the US by spending more and accumulating more debt. In other words, *the US leads the global fiscal cycle*, US fiscal deteriorations drive common deteriorations in fiscal conditions worldwide. The rise in global debt levels raise uncertainty over future global tax policy and consequently global long-run growth prospects. Since preferences are recursive, this variation in global growth prospects drives up global risk premia, reproducing my empirical evidence linking US fiscal policy to the global financial cycle.

To conclude the paper, I take the model to the data. The richness of this mechanism gives rise to four testable predictions. Firstly due to her role as the global innovation leader, US R&D drives the global innovation cycle, proxied by global R&D growth. Secondly through its distortionary impact on US R&D expenditure and foreign adoption of US innovation, US fiscal deteriorations depress global innovation and growth. Thirdly the US leads the global fiscal cycle: fluctuations in the US fiscal condition predict future global fiscal conditions. Finally through its influence over foreign fiscal conditions, the US fiscal policy drives global policy uncertainty and consequently global risk premia. Each of these predictions are verified in the data.

Related Literature: This paper connects to a large literature documenting the existence of a global financial cycle (GFC) in equity prices. In a seminal contribution Miranda-Agrippino and Rey (2015) showed that the global factor structure driving equity returns is low dimensional: there is a single global factor driving equity prices that is closely related to global market uncertainty and global risk aversion. To explain the GFC, recent literature emphasises the role of the US FED: Brusa, Savor and Wilson (2020) and Agrippino, Nenova and Rey (2020) document a large international transmission of US monetary policy shocks into global risky asset prices, a result that is unique to the US. My paper contributes to this literature by suggesting that the US fiscal policy also plays a role in driving the GFC.

My paper is also intimately connected to a vast asset pricing literature that explores the role of i) EZ preferences and ii) correlated growth prospects in an international context. This literature uses a multi-country framework with i) EZ preferences, ii) correlated growth prospects, or long-run risks, and iii) international trade to resolve many international finance puzzles such as the FX volatility puzzle (Colacito and Croce, 2011; Bansal and Shaliastovich, 2013); Backus-Smith and UIP puzzles (Colacito and Croce, 2013), the carry trade anomaly (Colacito et al, 2018) and the volatility disconnect (Colacito et al, 2021). This literature largely focuses on endowment economy settings: they exogenously impose a correlation structure in long-run risks: my paper unmasks this dark matter. My paper connects these correlated growth prospects to the US fiscal policy, an insight new to the literature.

My work is also connected to a growing literature studying the implications of network structures in global production for international asset pricing. Richmond (2019) links the cross-section of global currency risk to trade network centrality, a measure of a country's position in the global trade network. In more related work, Jiang and Richmond (2019) decompose international co-movements in macro quantities and asset prices into a component capturing primitive TFP correlations and a measure of network closeness. They find that network closeness drives international asset pricing factor structures: in other words, the international transmission of country specific shocks across the global production network drives international co-movements in asset prices. My paper digs deeper into this result, demonstrating both empirically and theoretically that it is the international transmission of US fiscal shocks that ultimately matters.

My work also connects to a growing literature studying the link between fiscal policy and risk premia at the country level. Liu (2019) documents strong predictive power of country level Debt-GDP ratios for future equity returns. This literature has also explored the link between fiscal policy and the cross-section of stock returns (Belo, Gala and Li, 2013), the cost of capital for R&D firms (Croce, Nguyen, Raymond and Schmid, 2019), the term structure of interest rates (Bretscher, Hsu and Tamoni, 2020).

My paper is also related to a literature studying the interaction between fiscal policy, endogenous growth and risk premia. This framework study fiscal policy transmission inside a production economy framework that features Romer (1990) style endogenous growth and EZ preferences such as Kung and Schmid (2015). Croce, Kung, Raymond and Schmid (2019) use a variation of this framework to explain the link between government debt, innovation and the cross-section of equity risk premia whereas Croce, Nguyen and Schmid (2012) use it to explore the welfare implications of certain fiscal policy rules.

My paper differs from these literatures by emphasising the international dimension of US fiscal policy transmission into risk premia across different countries. In this regard my paper is most similar to Jiang (2021): my evidence complements his findings tying the US fiscal condition to the dollar risk premium. However the theoretical mechanism is fundamentally different in my paper: Jiang (2021) explores a traditional intermediary mechanism that emphasises the special role of the dollar as the global reserve currency. I advance a novel mechanism that emphasises the special role of the US as the global innovation leader.

2 Data

Country Coverage: As I describe below, each dataset I use covers a large panel of countries. However my main panel analysis will focus on the developed world. This involves the following 15 countries: Australia, Austria, Belgium, Canada, Denmark, France, Italy, Germany, Japan, Netherlands, New Zealand, Norway, Sweden, Switzerland and the United States. I do this to focus my analysis on fiscal risks, rather than default risks.

Fiscal: I make use of quarterly government surplus and debt data from Oxford Economics (Datastream). The sample period is from 1980Q1-2018Q4 and covers the following countries: Argentina, Australia, Brazil, Canada, China, Czech Republic, Denmark, France, Greece, Israel, Hungary, India, Indonesia, Italy, Japan, Korea, Malaysia, Mexico, New Zealand, Norway, Philippines, South Africa, Sweden, Switzerland, Taiwan, United Kingdom and the United States.

Market Returns Data: Equity returns data comes from the country level MSCI total return indices available via Thomson Datastream. Index data is denominated in local currency units and contains the following 41 countries: Australia, Austria, Argentina, Belgium, Brazil, Bulgaria, Canada, Chile, Colombia, Croatia, China, Colombia, Denmark, Egypt, Finland, France, Germany, Greece, Hungary, Indonesia, Ireland, Israel, Italy, Japan, Kuwait, Malaysia, Mexico, Netherlands, Norway, Peru, Philipines, Poland, Portugal, Russia, Singapore, Slovenia, South Africa, South Korea, Sweden, Switzerland, Thailand, United Kingdom.

Dividend Yields: I obtain raw dividend yield series from Thompson Datastream Equity Index which covers the same period from January 1973 to December 2018 and covers the same panel of 41 countries for the market returns data.

Interest Rate Data: To construct credit spread series, I obtain data for 10 year government bond yields from Thomson Datastream as well. The coverage is extensive and involves the following 39 countries: Australia, Austria, Belgium, Brazil, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Egypt, Hong Kong, Hungary, India, Indonesia, Ireland, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Philippines, Poland, Portugal, Slovenia, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, United Kingdom and the United States. The dataset begins in January 1976 and ends in December 2018. Data for investment grade corporate bond yields (BBB) comes from global financial data (GFD) and is less comprehensive: it covers 21 countries but has a longer time series from January 1873-December 2018.

Macroeconomic Data: I obtain country level data for consumption, industrial production and GDP from the OECD at the quarterly frequency. The coverage is comprehensive starting from January 1961 to present. The panel is unbalanced but once a country enters there are no missing observations.

3 Fiscal Variables

3.1 US Fiscal Condition

I use the yearly (four quarter) change in the US surplus-debt ratio:

$$\Delta \text{US Surplus-Debt Ratio}_t = \frac{Surplus_t^{US}}{Debt_{t-1}^{US}} - \frac{Surplus_{t-4}^{US}}{Debt_{t-5}^{US}} \tag{1}$$

ΔUS Surplus-Debt ratio$_t$ has a natural interpretation: it captures the change in the net fraction of debt that the US government repays each year. Thus this variable is an ideal measure of changing US fiscal capacity: a decline (increase) in this value constitutes a deterioration (improvement) in the US fiscal condition respectively.

3.2 Global Fiscal Cycle

As documented by Jiang (2021), there is a global fiscal factor driving common surplus fluctuations. I call this common factor the *Global Fiscal Cycle* and use it as a control in my analyses. It is defined as an equal weighted cross-sectional average of four quarter changes in surplus-debt ratios

$$\text{Global Fiscal Cycle}_t = \frac{1}{N}\sum_{i=1}^{N} \Delta\text{Country i's Surplus-Debt Ratio}_t \tag{2}$$

3.3 US Surplus-Debt Ratio in the Data

Table 1: US Surplus-Debt Ratio Summary Statistics

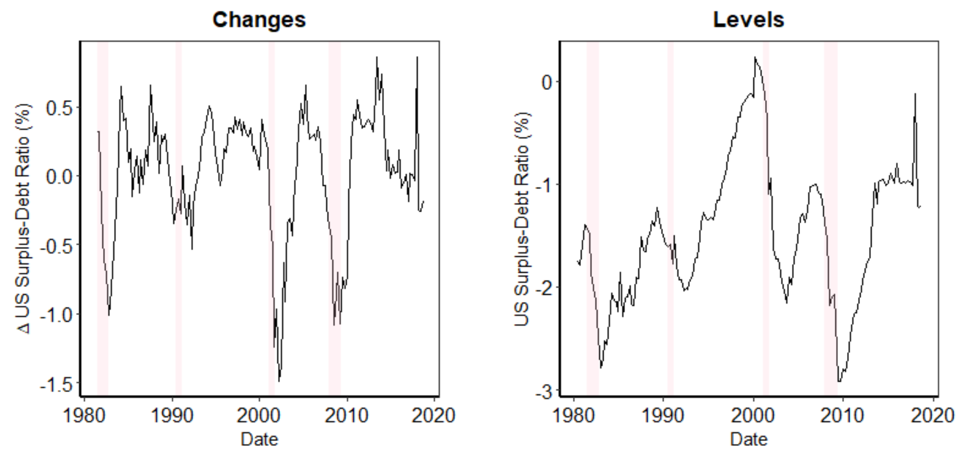
Statistic	US Surplus-Debt Ratio	Δ US Surplus-Debt Ratio
Mean Value (%)	-1.8%	0.18%
Stand Dev (%)	1.3%	0.45%
Skewness Value	0.17	-1.03
Autocorr (1 lag)	0.96	0.73
Autocorr (4 lag)	0.78	0.20
Autocorr (8 lag)	0.37	0.00

Note: Variables are quarterly from 1980Q1-2018Q4

Persistence: Notice from table 1 that the level of the US surplus-debt ratio is incredibly persistent, with significant autocorrelation even at the fourth lag (0.78). Conversely, the change in the US surplus-debt ratio has much weaker persistence: this point is communicated visually via figure 1. It is for this reason that my empirical analysis will work with the changes as opposed to the levels.

Figure 1: *US Surplus-Debt Ratio (Levels and Changes)* (Full Sample)

Description: This figure plots the US Surplus-Debt Ratio in levels and changes in the left and right panels respectively. Sample period is 1980Q1-2018Q4.



4 Stylised Facts

Specification: Here I establish my novel evidence regarding the global footprint of US fiscal policy. To establish the link between global risky asset prices and the US fiscal condition, I follow Muir (2017) and employ the following two proxies to track equity valuations: i) 1 year (four quarter) change in log dividend yields and ii) 1 year (four quarter) change in cum-dividend market excess returns. The baseline specification is the following panel horserace regression that compares the relative explanatory power of the US fiscal condition for local equity prices against i) the local fiscal condition and ii) the global fiscal cycle:

$$
\begin{aligned}
X_{i,t} =& \alpha + \beta_1 \Delta \text{US Surplus-Debt Ratio}_t + \beta_2 \Delta \text{Country i's Surplus-Debt Ratio}_t^{US} \\
& + \beta_3 \Delta \text{Global Fiscal Cycle}_{i,t}^{US} + \beta_4 \Delta r_{F,t}^{US} + \beta_4 \Delta r_{F,t}^{i} + \delta' Macro_t^{US} + \epsilon_{i,t} \\
X_{i,t} \in& \{\Delta DY_{i,t}, r_{i,t}\} \qquad (3)
\end{aligned}
$$

To properly compare the explanatory power of the US fiscal condition against these two alternative fiscal variables, I orthogonalise i) $\Delta \text{Country i's Surplus-Debt Ratio}_t$: four quarter changes in country i's surplus-debt ratio w.r.t four quarter changes in the US surplus-debt ratio ($\Delta \text{US Surplus-Debt Ratio}_t$)and ii) $\text{Global Fiscal Cycle}_{i,t}^{US}$ w.r.t

ΔCountry i's Surplus-Debt Ratio$_t$ and ΔUS Surplus-Debt Ratio$_t$. The reason for adopting this orthogonalisation procedure is straight forward: (3) is intended to represent a panel horserace regression between three *distinct* fiscal shocks: i) US (ΔUS Surplus-Debt Ratio$_t$), ii) local (ΔCountry i's Surplus-Debt Ratio$_t^{US}$) and iii) global (Global Fiscal Cycle$_{i,t}^{US}$). Since fiscal fluctuations follow a global factor structure (Jiang, 2021), one must adopt some version of this orthogonalisation procedure to properly control for this global factor structure.Under the current orthogonalisation procedure, I leave the US fiscal condition untouched and orthogonalise the local and global fiscal cycles w.r.t to it. Appendix A.2.3 demonstrates that reversing the order of orthogonalisation does not impact the baseline results.

The specification also appropriately controls for global and US macro controls. Since the US surplus-debt ratio is a highly cyclical variable, one may worry that any relationship between the US fiscal condition and global risky asset prices may be mechanically driven by the business cycle: after all, governments around the world institute more expansionary fiscal policies during business cycle troughs when risk premia are high.

Finally I control for the role of US and local risk free rates ($\Delta r_{F,t}^{US}, \Delta r_{F,t}^{i}$). To make the case that the global footprint of US fiscal policy is distinct from that of US monetary policy, it is important to control for risk-free rates in the baseline specification. These risk-free rate controls are in changes rather than levels for two reasons. Firstly risk-free rate levels are highly persistent as an empirical matter. Secondly the fiscal theory of the price level (FTPL) implies a perfectly collinear relationship between surpluses, growth rates and interest rates in levels (Cochrane, 2023).[2] Thus using changes is important for addressing potential endogeneity issues implied by both empirics and theory.

[2]To see this, consider a simple version of FTPL under a perfect foresight equilibrium with no risk. Imposing the intertemporal government budget condition in this economy implies the following relation:

$$\text{Debt}_t = \frac{\text{Surplus}_t}{r_f - g} \tag{4}$$

Thus holding Debt$_t$ fixed, (53) can be interpreted as an accounting identity that generates a perfectly collinear relationship between surplus, risk-free rates and growth rates.

Table 2: *US Fiscal Condition, Risk Free rates and Global Stock Market Valuations*

This table estimates panel specification (3) using data from 1980Q1-2018Q4. Country fixed effects are included and standard errors contained in parentheses are clustered at country and date (quarter) level.

	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	-9.589***	-11.379***	-10.465***	10.091***	14.479***	11.951***
	(1.510)	(1.386)	(1.508)	(1.489)	(1.303)	(1.397)
Δ Country i's Surplus-Debt Ratio$_t^{US}$	1.352	1.311	1.290	0.106	0.103	0.093
	(0.654)	(0.734)	(0.840)	(0.534)	(0.530)	(0.334)
Global Fiscal Cycle$_{i,t}^{US}$	-0.672	-1.236	-0.626	3.339***	4.793***	2.994***
	(0.976)	(0.966)	(0.986)	(0.709)	(0.694)	(0.770)
$\Delta R_{F,t}^{US}$	-0.044***	-0.051***	-0.045***	0.036***	0.052***	0.040***
	(0.007)	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)
$\Delta R_{F,t}^{i}$	2.145***	2.101***	2.175***	-0.466***	-0.464***	-0.499***
	(0.259)	(0.247)	(0.260)	(0.110)	(0.112)	(0.112)
Global Consumption Growth$_t$	−2.306***			5.627***		
	(0.771)			(0.624)		
Global GDP Growth$_t$		0.276			−0.534***	
		(0.178)			(0.112)	
Global IP Growth$_t$			-0.286			-0.575***
			(0.168)			(0.152)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,167	3,167	3,167	3,167	3,167	3,167
Adjusted R^2	0.063	0.060	0.060	0.171	0.142	0.149

	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	−9.426***	−11.233***	−9.509***	10.458***	14.374***	10.064***
	(1.483)	(1.391)	(1.421)	(1.066)	(1.017)	(1.323)
Δ Country i's Surplus-Debt Ratio$_t^{US}$	1.008	0.911	0.880	0.203	0.300	0.133
	(0.854)	(0.834)	(0.840)	(0.834)	(0.430)	(0.334)
Δ Global Fiscal Cycle$_{i,t}^{US}$	-0.333	-1.280	-0.791	2.805***	4.840***	3.612***
	(1.004)	(0.968)	(1.023)	(0.718)	(0.704)	(0.741)
$\Delta R_{F,t}^{US}$	−0.042***	−0.048***	−0.047***	0.035***	0.047***	0.044***
	(0.007)	(0.007)	(0.007)	(0.005)	(0.005)	(0.005)
$\Delta R_{F,t}^{i}$	1.792***	1.806***	1.823***	-0.446***	-0.482***	-0.488***
	(0.247)	(0.247)	(0.248)	(0.110)	(0.112)	(0.112)
US Consumption Growth$_t$	−1.563***			3.437***		
	(0.449)			(0.324)		
US GDP Growth$_t$		0.015			-0.014	
		(0.016)			(0.012)	
US IP Growth$_t$			-0.306			0.775***
			(0.208)			(0.152)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,167	3,167	3,167	3,167	3,167	3,167
Adjusted R^2	0.092	0.129	0.075	0.129	0.142	0.142

Note: *p<0.1; **p<0.05; ***p<0.01

Discussion: The results in table 2 are clear: deteriorations in the US fiscal condition coincide with depressed global risky asset prices, as measured by i) increases in dividend yields and ii) lower cum-dividend returns. They suggest that a 1% decline in ΔUS Surplus-Debt Ratio$_t$ is associated with an i) 8-13 basis point increase in dividend yield changes per annum and ii) 10-14 basis point increase in market excess returns on average across the world. These magnitudes are economically significant when one considers the historical volatility of ΔUS Surplus-Debt Ratio$_t$. Consider for example the global financial crisis of 2007-2008 where ΔUS Surplus-Debt Ratio declined from -0.36% to -1.08%, a 300% absolute decline. The coefficients from table 2 thus suggest a 24-39% increase in average dividend yield changes during this period, consistent with Muir (2017) who finds that risk premia are elevated by roughly 25% during financial crises.

Notice that the relevance of the US fiscal condition for global risky asset prices is not driven by other fiscal variables: these results are robust to the inclusion of i) local fiscal conditions and ii) the global fiscal cycle in these specifications. In fact the US fiscal condition drives out the local fiscal condition in both the dividend yield and market return regressions. The global fiscal cycle is also driven out of the dividend yield, though it remains significant in the market excess return regressions (panel B).

Orders of Orthogonalisation: These baseline results are robust across many dimensions. Firstly one may be concerned that the orthogonalisation procedure gives the US fiscal condition an unfair advantage in the horserace since I leave it untouched and orthogonalise the local and global fiscal cycles w.r.t to it. Appendix A.2.3 explores an alternative ordering that leaves the local fiscal condition untouched and hence gives it the best chance to win the horserace. Even under this alternative ordering, the baseline results are unaffected and the US fiscal condition continues to drive global risky asset prices independently of the local or global fiscal cycles.

Business Cycle Risk: In addition to other fiscal variables, one may also worry about the role of macro risk in driving my results. After all, the US federal government enacts countercyclical fiscal policies to insure households during troughs in the global and US business cycles when dividend yields are high and global risky asset prices are low. Thus the powerful link between US fiscal policy and global risky asset prices may simply be an artefact of US or global macro risk. The results show that controlling for either US or global macro control variables does not impact the results, either statistically or economically.

Appendix A.2.1 shows that these baseline results are also unaffected when the local country i's business cycle variables are used as the macro controls instead. Moreover, these business cycle controls are *contemporaneous* business cycle variables: governments also institute expansionary fiscal policies during low expected growth environments (Liu, 2021). Appendix A.2.2 demonstrates that controlling for expected business cycle conditions also leaves the baseline results unaffected.

US FP vs US MP: A second confounding factor is the role of US monetary policy. There is a well documented literature establishing the unique global footprint of US monetary policy (Miranda-Agrippino and Rey, 2020; Brusa, Savor and Wilson, 2020). Is the global footprint of US fiscal policy simply an artefact of the US monetary policy? Here I make the case that it is a related but ultimately distinct phenomenon. Notice from table 2 that even after controlling for risk-free rates, the powerful link between US fiscal policy and global risky asset prices is maintained.

To make this point more concrete, I follow the methodology from Campbell and Shiller (1988) to decompose the global equity market response to US fiscal policy shocks into a i) risk-free rate, ii) cash flow and iii) risk premium component using the first-order approximation:

$$r_t^W - \mathbb{E}_{t-1} r_t^W \approx (\mathbb{E}_t - \mathbb{E}_{t-1})[\underbrace{\sum_{\tau=0}^{\infty} \rho^\tau r_{F,t+\tau}^W}_{\text{Risk Free Rate}} + \underbrace{\sum_{\tau=0}^{\infty} \rho^\tau \Delta d_{t+\tau}}_{\text{Cash Flow}} + \underbrace{\sum_{\tau=0}^{\infty} \rho^\tau (r_{t+\tau}^W - r_{F,t+\tau}^W)}_{\text{Risk Premium}}]$$

Following the approach of Campbell (1991) and Campbell and Ammer (1993), I use a p lag VAR to model the news terms:

$$z_{t+1} = \Lambda z_t + \phi \Delta \text{US Surplus-Debt Ratio}_t^{Orth} + w_{t+1} \tag{5}$$

ΔUS Surplus-Debt Ratio^{Orth} is the four quarter change in the US surplus-debt ratio orthogonalised w.r.t US and global business cycle and the global fiscal cycle. This implies that the revisions in expectations for each component can be written as:

$$\begin{aligned}
\mathcal{N}_{R_F} &= \sum_{\tau=0}^{\infty} \rho^j r_{F,t+\tau}^W = s_r(1-\rho A)^{-1} w_{t+1} \\
\mathcal{N}_{R_P} &= \sum_{\tau=0}^{\infty} \rho^j (r_{t+\tau}^W - r_{F,t+\tau}^W) = s_y \rho A (1-\rho A)^{-1} w_{t+1} \\
\mathcal{N}_R &= r_t^W - \mathbb{E}_{t-1} r_t^W = s_r w_{t+1} \\
\mathcal{N}_{CF} &= \sum_{\tau=0}^{\infty} \rho^j \Delta d_{t+\tau} = \mathcal{N}_R - \mathcal{N}_{R_P} - \mathcal{N}_{R_F}
\end{aligned} \tag{6}$$

s_y, s_r are appropriate $1 \times np$ selection matrices that isolate the world excess return $r_t^W - r_{F,t}^W$ and the risk free rate $r_{F,t}^W$ from the VAR system. $\rho = 0.995$ is chosen in line with the literature (Campbell, 1991). Thus the transmission of US fiscal shocks into i) risk-free rate component ($\mathcal{F}_{R_F}$), ii) cash flow component ($\mathcal{F}_{CF}$) and iii) risk-premium component ($\mathcal{F}_{R_P}$) is:

$$\begin{aligned}
\mathcal{F}_{R_F} &= s_r(1-\rho\Lambda)^{-1}\phi \\
\mathcal{F}_R &= s_y \phi \\
\mathcal{F}_{R_P} &= s_y \rho \Lambda (1-\rho\Lambda)^{-1}\phi \\
\mathcal{F}_{CF} &= \mathcal{F}_R - \mathcal{F}_{R_P} - \mathcal{F}_{R_F}
\end{aligned} \tag{7}$$

s_y, s_r are appropriate $1 \times np$ selection matrices that isolate the world excess return $r_t^W - r_{F,t}^W$ and the risk free rate $r_{F,t}^W$ from the VAR system. $\rho = 0.995$ is chosen in line with the literature

(Campbell, 1991).

Table 3: US Fiscal Transmission Variance Decomposition

Component	Share	C.I
Risk-Free Rate ($\mathcal{F}_{R_F}$)	7.4%	[-20%, 17%]
Cash Flow ($\mathcal{F}_{CF}$)	35.8%	[17%, 62%]
Risk-Premium ($\mathcal{F}_{R_P}$)	56.8%	[32%, 95%]

Note: CIs constructed using wild bootstrap with 5,000 iterations

The results of this decomposition are presented in table 3. Confidence intervals are constructed using the wild bootstrap methodology advanced by Gertler and Karadi (2015) and Mertens and Ravn (2013). It shows that the risk-free rate component plays a rather muted role in the fiscal transmission (7%) versus the cash flow (35%) and the risk-premium component (58%). These decomposition results reinforces the finding from table 2 that the risk-free rates do not account for the tight connection between the US fiscal condition and global risky asset prices.

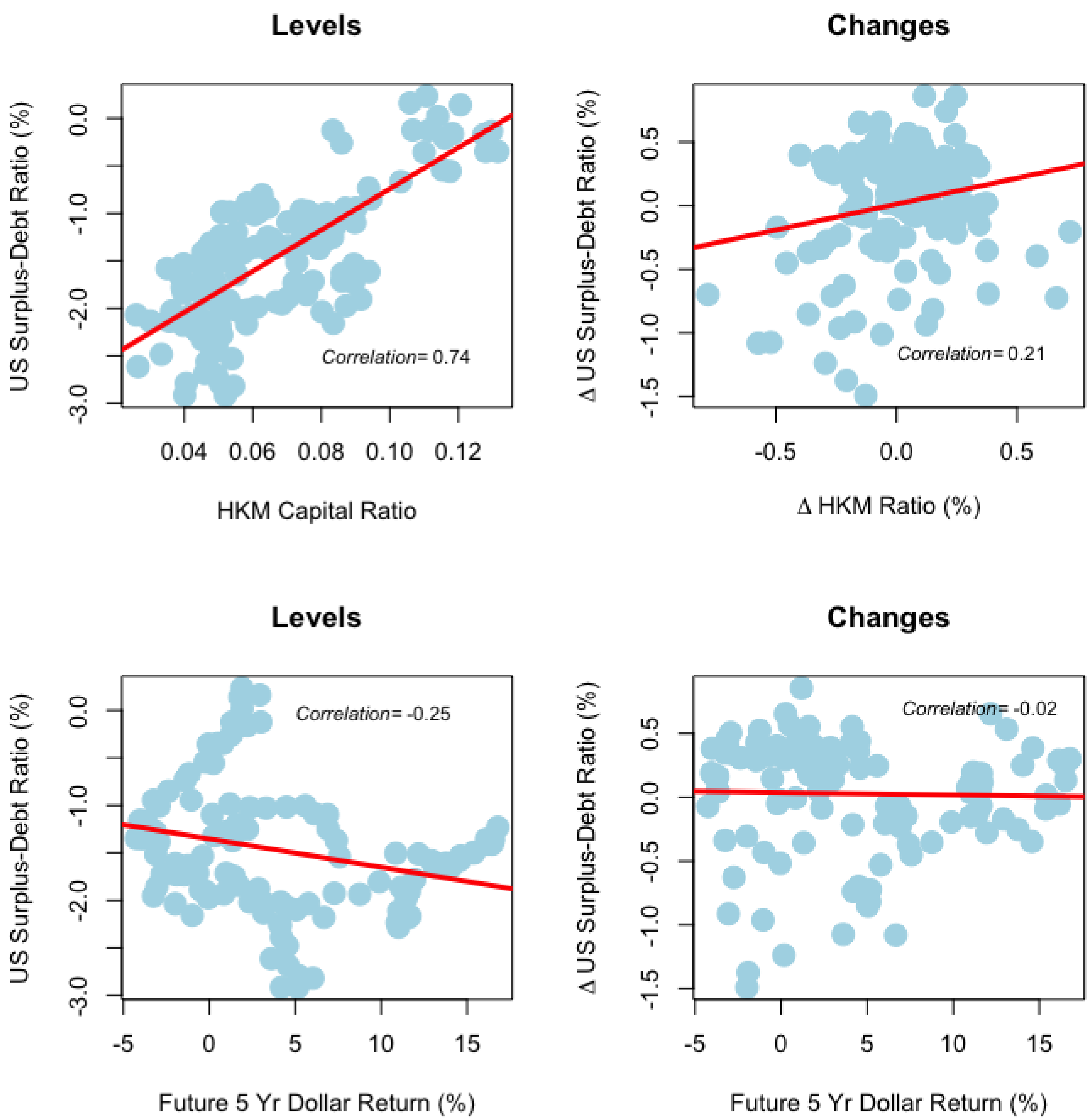
It is important to recognise however that these results, whilst informative, do not fully establish the independence of my results from the forces of US monetary policy. After all, US monetary policy can drives global risky asset prices through the risk premium component of the pricing kernel as opposed to the risk-free rate component (Kekre and Lenel, 2021; Miranda-Agrippino and Rey, 2020). It is commonly understood that US monetary policy drives global risk premia through its impact on the risk-bearing capacity of US intermediaries who are marginal in global financial markets. Since the dollar is the global funding currency, positive shocks to the US policy rate tighten US intermediary constraints by appreciating the dollar exchange rate, driving up dollar demand and consequently lowering the dollar risk premium moving forward (Miranda-Agrippino and Rey, 2020). Linking this to the fiscal side of the economy, recent work by Jiang (2021) argues that such an intermediary mechanism can explain the link between the US fiscal condition and dollar risk premia. Thus US monetary policy could conceivably be driving my resulting linking the US fiscal condition to global risky asset prices through this intermediary mechanism.

To rule this possibility out, I plot the US fiscal condition against a proxy for the global intermediary risk bearing capacity: the intermediary capital ratio constructed by He, Kelly and Manela (HKM, 2017. This plot is contained in figure 2 which suggests that the empirical link between the US fiscal condition and intermediary risk-bearing capacity is far from perfect. It suggests an interesting dichotomy: whilst the US surplus-debt ratio and the HKM capital ratio exhibit a strong positive correlation in levels (74%), they are much more poorly correlated in the changes (21%). Furthermore the link between the dollar and the US surplus-debt ratio is also far more pronounced in the levels: for the changes, there is no link between the US surplus-debt ratio and long run dollar predictability.

This implies that my novel empirical evidence linking ***changes*** in the US surplus-debt ratio to global risk premia cannot be fully accounted for by the intermediary mechanism that is thought to drive the global footprint of US monetary policy. It is for this reason I argue that the global footprint of US fiscal policy is a distinct phenomena relative to that of US monetary policy uncovered in previous literature. Thus a different underlying economic mechanism is at play driving the global footprint of US fiscal policy. I dig into this alternative mechanism in the theory section of the paper.

Figure 2: *Intermediary Mechanism*

Description: This figure plots the levels and changes in the US surplus-debt ratio against two variables: the intermediary capital ratio from He, Kelly and Manela (2017) and the 5 year dollar return vis-á-vis the rest of the world (ROW) as constructed by Jiang (2021). The sample period for all graphs is 1980Q1-2018Q4.



Cross-Section: Since the results presented thus far were panel specifications, they speak to the fact that *on average*, the US fiscal condition drives global risky asset prices. To demonstrate the power of the US fiscal policy in this regard, I now discuss results regarding the cross-section. I present the baseline specification country by country. These results are displayed in table 4. The results show that for both the dividend yield and market excess return regressions, the US fiscal condition remains statistically and economically significant for 12 out of the 14 countries.

Mirroring the panel regressions, the local fiscal condition is driven out in many of these regressions. For the dividend yield regressions, the local fiscal condition is driven out of the regressions for 7 of the 14 countries. Notice also that for the 7 countries where the local fiscal condition remains significant, the economic magnitude is smaller than that of the US fiscal condition for all cases except for Italy. Thus these cross-sectional results further underscore the explanatory power of US fiscal policy for risky asset prices across the world.

US vs Euro: The evidence thus far suggests evaluated the global footprint of US fiscal policy using the local and global fiscal variables as controls. Of course the US fiscal policy's explanatory power could also be driven by regional fiscal factors, such as an appropriately constructed Euro area fiscal factor. To explore this possibility, I follow Jiang et al (2020) in defining the following *Euro area fiscal cycle*:

$$\text{Euro Fiscal Cycle}_t = \frac{1}{N} \sum_{i \in \text{Euro}} \Delta\text{Country i's Surplus-Debt Ratio}_t \tag{8}$$

Using this variable, I run similar horserace panel regressions as before that compares the US fiscal condition vis-*á*-vis i) the local fiscal condition and ii) Euro fiscal cycle in its explanatory power for euro-zone risky asset prices. These results are demonstrated in table 23. Panel A demonstrates that the US fiscal condition still retains economic significance, further underscoring just how powerful the global footprint of US fiscal policy really is.

Table 4: *US Fiscal Condition and Global Risky Asset Prices: Cross-Section*

Description: This table reports the estimation results for the baseline specification (A.6) country-by-country. Since these are time series regressions, standard errors are Newey-West with four lags.

Dependent Variable: $\Delta DY_{i,t}$						
Country i	ΔCountry i's Surplus-Debt Ratio_t^{US}		ΔUS Surplus-Debt Ratio_t		Global Fiscal $\text{Cycle}_{i,t}^{US}$	
	Coefficient	(s.e)	Coefficient	(s.e)	Coefficient	(s.e)
Australia	−0.079	(0.429)	−11.030***	(1.425)	5.759	(2.110)
Belgium	−5.350	(4.751)	−18.441***	(3.640)	10.975*	(4.626)
Canada	3.060	(1.689)	−3.493	(1.993)	−5.420***	(1.633)
Denmark	5.970	(2.450)	−11.423***	(2.244)	0.9744	(3.954)
France	−2.698	(1.708)	−7.983***	(1.554)	−3.290	(1.981)
Germany	−1.260	(0.526)	−21.688***	(3.011)	−3.734	(2.221)
Italy	−19.410***	(4.740)	−17.288***	(2.444)	−0.831	(2.791)
Japan	−4.510	(2.412)	−12.115***	(2.273)	2.087	(2.410)
Netherlands	5.010**	(2.055)	−27.530***	(3.772)	−1.050	(0.420)
Norway	2.403***	(0.716)	−10.736**	(4.501)	−0.255	(0.005)
New Zealand	1.182**	(0.487)	−3.420	(2.494)	0.432	(1.231)
Sweden	−4.186**	(1.976)	−12.664***	(4.553)	5.068	(3.393)
Switzerland	14.185***	(3.145)	−5.654***	(1.449)	−3.124	(1.764)
United Kingdom	−1.837**	(0.872)	−7.567***	(1.444)	−0.007	(0.001)
Dependent Variable: r_t^i						
Country j	ΔCountry i's Surplus-Debt Ratio_t^{US}		ΔUS Surplus-Debt Ratio_t		Global Fiscal $\text{Cycle}_{i,t}^{US}$	
	Coefficient	(s.e)	Coefficient	(s.e)	Coefficient	(s.e)
Australia	−0.057	(0.310)	7.414***	(1.455)	0.839	(1.559)
Belgium	0.883	(2.331)	17.923***	(2.444)	−3.556	(2.226)
Canada	−2.733	(1.994)	2.865	(2.201)	8.702***	(1.834)
Denmark	−1.503	(1.501)	13.887***	(2.440)	6.203**	(2.432)
France	1.542	(1.566)	8.632***	(1.863)	3.523	(1.789)
Germany	1.255**	(0.396)	22.208***	(2.466)	0.877	(1.590)
Italy	5.867	(3.420)	11.312***	(2.940)	2.154	(2.143)
Japan	8.443	(2.163)	15.621***	(2.974)	2.840*	(2.171)
Netherlands	−0.923	(1.132)	16.401***	(2.753)	3.851	(1.820)
Norway	-0.210	(0.477)	5.340	(3.115)	13.684***	(3.601)
New Zealand	0.367	(0.226)	7.814***	(2.000)	−2.300	(1.721)
Sweden	−0.828	(0.591)	4.992***	(1.567)	0.0001	(0.0001)
Switzerland	5.762***	(1.492)	11.833***	(1.884)	3.983	(2.564)
United Kingdom	0.458	(0.792)	5.552***	(1.998)	5.180	(3.471)

Table 5: *US vs Euro Fiscal Condition and Global Risky Asset Prices*

Panel (a) evaluates the US fiscal condition against the Euro fiscal cycle for all countries in the panel specification. Panel (b) looks specifically at Eurozone countries. Data is from 1980Q1-2018Q4. Standard errors contained in parentheses and are clustered at the country and date (quarter) level.

	Panel (a): All Countries					
	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	-11.716***	-11.537***	-12.133***	15.376***	14.828***	14.473***
	(2.003)	(1.871)	(2.088)	(2.018)	(2.040)	(2.034)
Δ Country i's Surplus-Debt Ratio$_t^{US}$	-0.294	-0.244	-0.379	0.930*	1.048**	0.844**
	(0.549)	(0.572)	(0.577)	(0.530)	(0.435)	(0.444)
Δ Euro Fiscal Cycle$_{i,t}^{US}$	−2.508**	−2.332**	−2.618*	5.166***	5.855***	5.281***
	(1.250)	(1.224)	(1.434)	(2.484)	(2.236)	(2.237)
$\Delta R_{F,t}^{US}$	−0.045***	−0.052***	−0.046***	0.039***	0.057***	0.040***
	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.009)
$\Delta R_{F,t}^{i}$	2.420***	2.305***	2.367***	−1.484**	−1.241***	−1.543***
	(0.803)	(0.935)	(0.937)	(0.488)	(0.477)	(0.604)
Euro Consumption Growth$_t$	0.405			2.031***		
	(0.449)			(0.526)		
Euro GDP Growth$_t$		0.368***			−0.398***	
		(0.083)			(0.088)	
Euro IP Growth$_t$			0.241			0.446***
			(0.280)			(0.163)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,167	3,167	3,167	3,167	3,167	3,167
Adjusted R^2	0.091	0.111	0.092	0.240	0.264	0.236

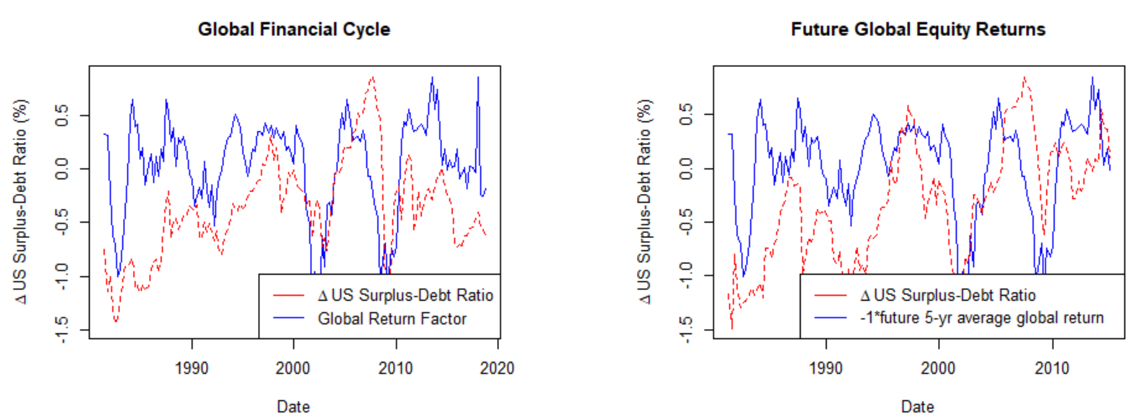
	Panel (a):Eurozone					
	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	-14.942***	-14.844***	-14.499***	18.974***	17.498***	16.277***
	(2.833)	(2.441)	(2.491)	(3.110)	(2.645)	(2.140)
Δ Country i's Surplus-Debt Ratio$_t^{US}$	−3.222***	−3.226***	−3.232	1.583	1.550	1.522
	(0.972)	(1.271)	(1.253)	(0.960)	(0.955)	(0.971)
Euro Fiscal Cycle$_{i,t}^{US}$	2.111	2.375	2.871	3.021	4.411*	3.068
	(2.234)	(2.524)	(2.850)	(1.990)	(2.040)	(2.018)
$\Delta R_{F,t}^{US}$	−0.054***	−3.341***	−3.309***	−2.885***	−2.980***	−2.544***
	(0.088)	(0.697)	(0.653)	(0.780)	(0.857)	(0.639)
$\Delta R_{F,t}^{i}$	−0.532	−0.855***	−0.748**	−0.933***	−0.989**	−0.900**
	(1.777)	(0.299)	(0.272)	(0.310)	(0.272)	(0.283)
Euro Consumption Growth$_t$	0.611			0.897*		
	(1.231)			(0.471)		
Euro GDP Growth$_t$		0.888**			−0.713***	
		(0.243)			(0.282)	
Euro IP Growth$_t$			−0.255			−0.256
			(0.131)			(0.147)
Country FE	✓	✓	✓	✓	✓	✓
Observations	887	887	887	887	887	887
Adjusted R^2	0.118	0.129	0.119	0.256	0.272	0.246
Note:				*p<0.1; **p<0.05; ***p<0.01		

Predictability: Note that the results thus far have been ***correlative***: they demonstrate that US fiscal deteriorations ***coincide*** with depressed global risky asset prices. I also document suggestive evidence in favour of a ***causal*** link between US fiscal deteriorations and i) depressed global risky asset prices and ii) elevated levels of global risk premia. To accommodate space, I relegate these results to the appendix section A.6. These predictability results involve: i) predictability regressions, ii) structural vector autoregressions (SVAR), iii) high frequency identification around State of the Union (SOTU) addresses and iv) identified fiscal shocks using data from the Survey of Professional Forecasters (SPF) as in Ramey (2007).

I now conclude the main empirical section by visualising the key stylised facts about the global footprint of US fiscal policy in figure 3. This plots changes in the US surplus-debt ratio against i) the global return factor constructed by Miranda-Aggropino and Rey (2015) which captures the first principal component of world risky asset returns and ii) the subsequent 5-year average global market excess returns. The US surplus-debt ratio tracks both remarkably well, demonstrating my central finding that the US fiscal condition is tightly connected to the common variations in risk premia driving the GFC.

Figure 3: *US Fiscal Condition, GFC and Global Equity Return Predictability*

Description: The left panel plots ΔUS Surplus-Debt Ratio$_t$ against the global return factor constructed by Miranda-Aggropino and Rey (2015). The right panel plots ΔUS Surplus-Debt Ratio$_t$ (red) against the subsequent 5 year average global excess market return.



5 Model

Overview: Given these results, a natural question arises: what is the underlying economic force driving the global footprint of US fiscal policy? Here I propose a novel mechanism that emphasises *the special US role as global innovation leader*. When the US innovates, the rest of the world (ROW) follows by adopting her technology as an intermediate input. This ensures that the US fiscal policy has a large international transmission across the global innovation network, enabling it to shape i) foreign growth, ii) foreign fiscal conditions, iii) foreign policy uncertainty and consequently iv) global risk premia.

Framework: To formalise this mechanism, I now study fiscal policy transmission inside a multi-country endogenous growth model with i) EZ preferences and ii) a global innovation network that features international technology adoption. There are $N + 1$ countries indexed by $i \in \{0, 1, 2, ..., N\}$. Country 0 is the model analogue to the United States (US) and the remaining N countries compose the non-US world. All countries have a representative household with Epstein and Zin (1989) and Weil (1989) recursive preferences, a government sector and a production process that involves four sectors: final goods, intermediate goods, R&D and a foreign adoption sector. The intermediate good sector is populated by monopolistically competitive firms that produce a differentiated good variety that is used for final good production. The R&D and foreign adoption sectors are perfectly competitive.

Growth is endogenously driven by two sources. Firstly local innovators in the R&D sector invest resources into R&D and create new patents that the intermediate good sector converts into new intermediate good varieties. Secondly foreign intermediate goods developed abroad can also be made available locally for use as an input in local production through the process of international adoption. This is made possible by the separate perfectly competitive foreign adoption sector that invests resources in foreign adoption. Finally governments institute expansionary fiscal policies during i) troughs in local and global business cycles and ii) low expected growth environments. The key asymmetry in the model is that unlike other countries, the US does not have access to the adoption technology. This is a reduced form way of capturing the key idea behind the model: the US is special because of her leadership role in global innovation. The ROW adopts US innovation to a greater degree than the US adopts foreign technology.

5.1 Fiscal Policy Block

5.1.1 Fiscal Processes and Fiscal Rules

Tax Base: Tax $\text{Base}_{i,t}$ constitutes the profits from all production sectors in country i including i) final good sector (D_t^i), ii) intermediary good sector across all local varieties j ($\sum_{j=1}^{N_{i,t}^i} \Pi_{j,t}^i$). $N_{i,t}^i$ is the number of local intermediate good varieties. g_t^i is an exogenous spending rate process that captures a lump-sum transfer to the household: TR_t^i:

$$
\begin{aligned}
TR_t^i =& g_t^i \text{Tax Base}_{i,t} \\
=& g_t^i (D_t^i + \sum_{j=0}^{N_{i,t}^i} \Pi_{j,t}^i)
\end{aligned} \tag{9}
$$

Fiscal Rule: Government spending is exogenous in my model. The exogenous fiscal rules governing g_t^i take the following form:

$$
\begin{aligned}
g_t^i &= \frac{1}{1 + e^{-\omega_t^i}} \\
\omega_t^i &= (1-\rho)\mu_\tau + \rho_T \omega_{t-1}^i - \sigma_{t-1}^i \underbrace{(\beta_t^i \epsilon_t^G}_{\text{Cyclicality}} + \underbrace{\mu - \mathbb{E}_t \Delta c_{t+1}^i}_{\text{Growth}} + \underbrace{\epsilon_{s,t}^i}_{\text{Spending}}) \\
\sigma_t^i &= \nu_\nu \sigma_{t-1}^i + \sigma^i w_t^i \\
\epsilon_t^i&, \epsilon_{s,t}^i, w_t^i \sim i.i.d\ N(0,1),\ i \in \{H, F\}
\end{aligned} \tag{10}
$$

The formulation of g_t^i guarantees that it lies in the open interval (0,1). ω_t^i is the exogenous local fiscal process which has persistence ρ_T. μ_r captures the average tax rate and will be calibrated to equal the average global tax rate. μ is the mean growth rate of the economy. $\sigma_t^i, \sigma_{s,t}$ are the fiscal volatility shocks with persistence ν_ν.

An interpretation of the exogenous fiscal rule captured by the second line of (10) is in order. Government spending is driven by three key forces. Firstly, there is *fiscal cyclicality*: government spending increases during troughs in the global business cycle, proxied by the global TFP shock ϵ_t^G, to insure local households during these periods of global stress. Secondly there is a *growth incentive*: local governments seek to support local economic growth by pursuing expansionary policies during periods of low expected growth, captured by $\mathbb{E}_t \Delta c_{t+1}^i$. Finally, there are exogenous fiscal shocks ($\epsilon_{s,t}^i$): this captures *the role of local political cycles* in driving fiscal policy and is orthogonal w.r.t the state of the economy.

Fiscal Cyclicality: Since ϵ_t^G is the global TFP shock, β_t^i captures the degree of countercyclicality in country i's fiscal policy. This follows a slow-moving AR(1):

$$\beta_t^i = \beta_i + \lambda \beta_{t-1}^i + \epsilon_{\beta,t}^i \tag{11}$$

5.1.2 Tax and Debt Policy

IGBC:Given exogenous government spending, tax and debt are endogenously determined by the intertemporal government budget constraint (IGBC). Define by τ_t^i the local tax rate. Further define the total tax flow T_t^i as:

$$T_t^i = \tau_t^i * \text{Tax Base}_t^i, \;\; i \in \{H, F\} \tag{12}$$

Further define by B_t^i the stock of real government debt. Given exogenous government spending, the IGBC below jointly determines taxes and debt:

$$\begin{aligned} B_t^i =& R_{b,t-1}^i B_{t-1}^i + TR_t^i - T_t^i \\ =& R_{b,t-1}^i B_{t-1}^i + \underbrace{(g_t^i - \tau_t^i) * \text{Tax Base}_t^i}_{\text{Country } i\text{'s Deficit}}, \ i \in \{H, F\} \end{aligned} \tag{13}$$

$R_{b,t}^i$ is the return on government debt and is pinned down by the following return identity:

$$R_{b,t}^i = \frac{B_t^i + s_t^i}{B_{t-1}^i} \tag{14}$$

s_t^i is the local primary surplus: $s_t^i = (\tau_t^i - g_t^i) * \text{Tax Base}_t^i$.

Debt Process: To close the fiscal policy block, I now define an exogenous debt accumulation process. To rule out unsustainable paths for the debt to output ratio $\frac{B_t^i}{Y_t^i}$, I impose the following debt accumulation rule to guarantee stationarity of the debt to output ratios (Bi and Leeper, 2010):

$$\frac{B_t^i}{Y_t^i} = \rho_G \frac{B_{t-1}^i}{Y_{t-1}^i} - \phi_G(\beta_t^i \epsilon_t^G + \mu - \mathbb{E}_t \Delta c_{t+1}^i), \ i \in \{H, F\} \tag{15}$$

The parameter $\rho_G \in (0, 1)$ measures the speed of repayment of debt: the higher the value of ρ_G, the slower the repayment of debt relative to output. Furthermore $\phi_G \in (0, 1)$ captures the fraction of the fiscal expansion financed by higher debt. Together, (13) and (15) pin down optimal tax and debt in this model, given exogenous government spending g_t^i. The key parameter determining how much of government spending shocks are financed via distortionary taxes (T_t^i) and government debt (B_t^i) is the parameter ϕ_G.

If $\phi_G = 0$, the government chooses a zero deficit policy ($g_t^i = \tau_t^i, \forall t$) where there is no tax smoothing: taxes are raised immediately to finance the entire fiscal expansion and there is no accumulation of government debt: $B_t^i = 0, \ \forall t$.[3] Since $\phi_G \in (0,1)$, the government does not pursue a zero-deficit strategy in this model, choosing to smooth the tax burden over time by accumulating government debt in the process. As will become evident, the accumulation of government debt is essential to the operation of the model's fiscal theory mechanism.

Fiscal Variables: Country i's fiscal capacity is measured by the surplus-debt ratio:

$$\text{Country } i\text{'s Surplus-Debt Ratio} = \frac{(\tau_t^{i,*} - \tau_t^i)\text{Tax Transfer}_t^i}{B_{t-1}^i} \tag{16}$$

Global Fiscal Cycle$_t$ is the common surplus factor as defined earlier:

$$\text{Global Fiscal Cycle}_t = \frac{1}{N}\sum_{i=1}^{N} \Delta\text{Country } i\text{'s Surplus-Debt Ratio} \tag{17}$$

A further comment is in order about the global fiscal cycle. Since both countries enact expansionary fiscal policies during global downturns ($\epsilon_t^G \downarrow$) and when future growth prospects are also deteriorating ($\mathbb{E}_t \Delta c_{t+1}^i \downarrow$), my model reproduces empirical evidence from Jiang (2022) documenting the existence of a global fiscal cycle: common fluctuations in surplus-debt ratios worldwide. This variable will be important as the interaction between the US fiscal condition, the global fiscal cycle and global policy uncertainty drives predictability in the model.

5.2 Final Goods Sector

Production Function: Final goods production is perfectly competitive. Country i's final good producer uses physical capital (K_t^i), labor (L_t^i) and a composite of intermediate goods (G_t^i) to produce a nontraded final good Y_t^i. The production function is Cobb-Douglas:

$$Y_t^i = [(K_t^i)^\alpha (\Omega_t^i L_t^i)^{1-\alpha}]^{1-\xi} (G_t^i)^\xi \tag{18}$$

[3] To see this note that if $\phi_G = 0$ then only $B_t^i = 0 \ \forall t$ satisfies (15). Combining this with (13) then implies that $g_t^i = \tau_t^i \ \forall t$. In other words $\phi_g = 0$ corresponds with a zero-deficit policy where all fiscal expansions ($\epsilon_{s,t}^i \uparrow$ are financed via tax increases). For any $\phi_G \in (0,1)$, the accumulation of government debt (B_t^i) forms a part of the mechanism.

α: Physical Capital Share

ξ: Intangible Capital Share

Intangible Capital: The composite of intermediate goods G_t^i is defined as:

$$G_t^i = \begin{cases} [\sum_{j=1}^{N_{j,t}^j} (h_j^i)^{\frac{1}{\nu}} (X_{j,t}^i)^{1-\frac{1}{\nu}}]^{\frac{\nu}{\nu-1}} & \text{if } i \neq US \\ X_{i,t}^i & \text{if } i = US \end{cases} \tag{19}$$

$N_{j,t}^j$ are the number of intermediate good varieties in country j that endogenously varies in accordance with the process of innovation and foreign adoption described later. ν is the elasticity of substitution across intermediate good varieties. $h_i^i > \frac{1}{2}$ is the home bias parameter. $X_{j,t}^i$ capture the amount of foreign produced intermediate good j that is used for country i's final production. $X_{j,t}^i$ is an intermediate goods bundle that aggregates all inputs from country j used for country i's final good production:

$$X_{j,t}^i = \Pi_{k=1}^{N_{j,t}^j} (X_{j,k,t}^i)^{\iota_i} \tag{20}$$

$X_{j,k,t}^i$ is the amount of intermediate good variety k produced in country j that is used for country i's final production. $N_{j,t}^j$ is the number of intermediate good varieties produced in country j that is endogenously generated by the process of innovation and international technology adoption described in the R&D and adoption block of the model. By construction $\sum_{k=1}^{N_{j,t}^i} \iota_k = 1$.

US as Global Innovation Leader: The key asymmetry is that *the US is central to the global innovation network*: $h_{US}^i > h_j^i, \ \forall i, j$. Furthermore the second line in (19) establishes that the US does not have access to the adoption technology, they only use local intermediate goods for their final goods production. These two assumptions ensure that the US fiscal policy exerts an outsized influence over i) global growth prospects, ii) global policy uncertainty and consequently iii) global risk premia relative to other countries.

Shocks: The exogenous TFP shock $a_t^i = log(\Omega_t^i)$ follows an AR(1):

$$a_t^i = \psi a_{t-1}^i + \rho_{ec}(a_{t-1}^i - \sum_{i \neq j} a_{t-1}^j) + \sigma \epsilon_t^i \tag{21}$$

ρ_{ec} captures the degree of cointegration between country i's TFP and TFP abroad. This assumption is necessary to ensure the stability of the higher order perturbation method I use to solve the model.

Problem: Final good producers own the physical capital stock and choose physical capital, labor, investment and intermediate goods to maximise shareholder value subject to the production technology (18):

$$\max_{\{I_{i,t}^i, L_t^i, K_{t+1}^i, X_{i,j,t}^i\}_{t=0}^{\infty}} \mathbb{E}_0[\sum_{t=0}^{\infty} M_t^i D_t^i] \tag{22}$$

$$s.t. \begin{cases} D_t^i = Y_t^i - I_t^i - w_t^i L_t^i - \sum_{j=1}^{N} P_{j,t}^i X_{j,t}^i & \text{if } i \neq US \\ D_t^i = Y_t^i - I_t^i - w_t^i L_t^i - \sum_{i=0}^{N_{i,t}^i} P_{i,t}^i X_{i,t}^i & \text{if } i = US \end{cases}$$

M_t^i is the stochastic discount factor (SDF). D_t^i are profits from the final goods sector. I_t^i is investment in physical capital and $P_{j,t}^i$ is the price of an intermediate good produced in country j that is used in country i's final production. The local numeraire is units of the local final good. Law of motion for physical capital is standard:

$$K_{t+1}^i = (1-\delta)K_t^i + \Lambda(\frac{I_t^i}{K_t^i})K_t^i \tag{23}$$

$\delta \in (0,1)$ is the depreciation rate and $\Lambda(\frac{I_t^i}{K_t^i})$ denotes convex capital adjustment costs that follows Jermann (1998):

$$\Lambda(\frac{I_t^i}{K_t^i}) = (\frac{\alpha_1}{\zeta})(\frac{I_t^i}{K_t^i})^{\zeta} + \alpha_2 \tag{24}$$

As in Kung and Schmid (2015), α_1, α_2 are chosen to ensure there are no adjustment costs in the deterministic steady state and $\frac{1}{1-\frac{1}{\zeta}}$ is the investment elasticity w.r.t Tobin's Q.

5.3 Intermediate Goods Sector

Overview: Intermediate good producers in each country use a specific patent accumulated by the independent R&D sector described later to build one unit of intermediate good using one unit of the local final good. They face a downward-sloping demand curve implied by the cost-minimization of the final goods producer.

Profits: The maximising profit level for intermediate good firm in country i producing variety k who sells this variety across all foreign countries indexed by N solves:

$$\Pi_{k,t}^i = \begin{cases} \max\limits_{\{P_{j,t}^i\}_{t=0}^{\infty}} \sum_{j=1}^{N} P_{j,k,t}^i \mathcal{E}_{j,t}^i (X_{j,k,t}^i)[X_{j,k,t}^i - 1] & \text{if } i \neq US \\ \max\limits_{\{P_{j,k,t}^i\}_{t=0}^{\infty}} \sum_{j=0}^{N} P_{j,k,t}^i \mathcal{E}_{j,t}^i (X_{j,k,t}^i)[X_{j,t}^i - 1] & \text{if } i = US \end{cases}$$

Notice that US intermediate good producers sell to all $N+1$ foreign markets outside the US but foreign producers can only sell to N foreign markets excluding the US. This is a result of my assumption that the US does not adopt foreign technology but each foreign country adopts US innovation. $P_{j,k,t}^i \mathcal{E}_{j,t}^i$ is the price of country i's intermediate good variety k sold in country j in units of the local final good. $\mathcal{E}_{j,t}^i$ is the real exchange rate: country i's consumption good per units of country j's consumption good. In a symmetric equilibrium,

$P^i_{j,k,t} = \frac{1}{\nu}\frac{1}{\mathcal{E}^i_{j,t}}$. This implies that equilibrium profits are:

$$\pi^i_{k,t} = \begin{cases} (\frac{1}{\nu} - 1)\sum_{j=1}^{N} X^i_{j,k,t} & \text{if } i \neq US \\ (\frac{1}{\nu} - 1)\sum_{j=0}^{N} X^i_{j,k,t} & \text{if } i = US \end{cases} \tag{25}$$

5.4 Innovation and Adoption Process

Innovation: In each country, endogenous growth is driven by two sources. Firstly innovation is conducted in a local R&D sector that features perfect competition. Innovators use the local final good to conduct R&D expenditure S^i_t and accumulate stock of intermediate goods or patents:

$$N^i_{i,t+1} = \vartheta^i_t S^i_{t+1} + (1-\phi)N^i_{i,t} \tag{26}$$

ϕ: Innovation Depreciation Rate

ϑ^i_t: local innovation productivity

Innovation Productivity: Following Jermann (1998), ϑ^i_t follows:

$$\vartheta^i_t = \chi(\frac{S^i_t}{N^i_{i,t}})^{\eta-1} \tag{27}$$

$\chi > 0$ is a scale parameter and $\eta \in (0,1)$ is the elasticity of patents (new intermediate goods) w.r.t R&D. This specification is intuitive: it indicates a love of variety effect for innovation ($\frac{\partial \vartheta^i_t}{\partial N^i_{i,t}} > 0$) and decreasing returns to scale for R&D expenditure ($\frac{\partial \vartheta^i_t}{\partial S^i_t} < 0$).

Adoption Process: The second source of endogenous growth is the process of international technology adoption that makes foreign intermediate good varieties available to local final good producers for use as intermediate inputs. This process is conducted by an independent foreign adoption sector that is perfectly competitive. Foreign adopters in country j invests $h_{i,t}^{j}$ units of the local final good to adopt 1 unit of local innovation from country i and are successful with probability $\vartheta_{i,t}^{j}$. Following Santacreu (2015), this follows:

$$\vartheta_{i,t}^{j} = \chi_a \left(\frac{h_{i,t}^{j}(N_{i,t+1}^{i} - N_{i,t+1}^{j})}{N_{i,t+1}^{j}}\right)^{\frac{\eta}{1-\eta}} \tag{28}$$

$\chi_\alpha > 0$ is a scaling parameter and $\eta \in (0,1)$ is the elasticity of adoption w.r.t investment in adoption. The law of motion for home produced intermediate goods that can be adopted by the foreign final good producer evolves according to:

$$N_{i,t+1}^{j} - (1-\phi)N_{i,t}^{j} = \vartheta_{i,t}^{j}(1-\phi)(N_{i,t+1}^{i} - N_{i,t}^{j}), \ \forall i,j \in \{1,2,...,N\} \tag{29}$$

5.4.1 Households

Preferences: Each country is populated by a representative household who have EZ utility:

$$U_t^i = [(1-\delta)(C_t^i)^{1-\frac{1}{\psi}} + \delta(E_t {U_{t+1}^i}^{1-\gamma})^{\frac{1-\frac{1}{\psi}}{1-\gamma}}]^{\frac{1}{1-\frac{1}{\psi}}}, i \in \{1,2,...,N\}$$

SDF: As shown by Epstein and Zin (1991), the stochastic discount factor (SDF) is:

$$M_{t+1}^i = \beta\left(\frac{C_{t+1}^i}{C_t^i}\right)^{\theta-1}\left(\frac{U_{t+1}^i}{\mathbb{E}_t[(U_{t+1}^i)^{1-\gamma}]^{\frac{1}{1-\gamma}}}\right)^{1-\theta-\gamma} \tag{30}$$

Budget Condition: They are subject to the following budget constraint

$$C_t^i + P_t^i s_t^i + B_t^i = (P_t^i + D_t^i)s_{t-1}^i + B_{t-1}^i R_{b,t}^i + (1-\tau_t^i)w_t^i L_t^i + TR_t^i \tag{31}$$

s_t^i is the local equity holding.[4] w_t^i is the local wage, L_t^i is labour supply and C_t^i is local consumption. TR_t^i is the tax transfer remitted from government sector defined earlier.

[4] Since the local output is non-traded, $s_t^i = 1$ in equilibrium.

5.4.2 Asset Prices

Stock Market: The stock market is a risky claim to the combined production of all sectors. Thus the dividend $\mathcal{D}_t^i$ is the after-tax combined profits across all sectors:

$$\mathcal{D}_t^i = \begin{cases} (1-\tau_t^i)[D_t^i + \sum_{j=0}^{N_t^j} \Pi_{j,t}^i] - S_t^i - \sum_{j=1}^{N} h_{j,t}^i & \text{if } i \neq US \\ (1-\tau_t^i)[D_t^i + \sum_{j=0}^{N_t^j} \pi_{j,t}^i] - S_t^i & \text{if } i = US \end{cases} \tag{32}$$

Each stock market is priced by the local SDF through the standard euler equation:

$$P_t^i = \mathbb{E}_t[M_{t+1}^i(P_{t+1}^i + \mathcal{D}_{t+1}^i)] \tag{33}$$

Bonds: Interest rate pinned down by:

$$\frac{1}{R_{f,t}^i} = \mathbb{E}_t M_{t+1}^i \tag{34}$$

Exchange Rate: Frictionless benchmark pins down exchange rate dynamics for $\mathcal{E}_{0,t}^i$:

$$\Delta\mathcal{E}_{0,t}^i = log(M_t^i) - log(M_t^0) \tag{35}$$

Pareto Weight and Risk Sharing: Underpinning these exchange rate dynamics is an endogenous state variable: Υ_t^i: country i's relative pareto weight. This captures country i's relative share of global resources vis-$\acute{a}$-vis country 0 (US) (35) and follows the endogenous law of motion:

$$\Upsilon_t^i = \Upsilon_{t-1}^i(\frac{M_t^0}{M_t^i})(\frac{C_t^0/C_{t-1}^0}{C_t^i/C_{t-1}^i}) \tag{36}$$

Υ_t^i governs the risk-sharing scheme that is operative in the intermediate goods market in the model. When US marginal utility rises relative to country i and the dollar appreciates

($\Delta\mathcal{E}^i_{0,t} \uparrow$), the ROW transfers intermediate goods to the US ($X^0_{i,t} \uparrow$). Conversely the transfer of intermediate goods goes the other way when ROW marginal utility is adversely impacted.[5]

5.4.3 Equilibrium System

Resource Constraint: The local final good Y^i_t is used for i) consumption (C^i_t), investment in ii) physical capital (I^i_t), iii) R&D (S^i_t), iv) adoption ($h^i_{j,t}$) and v) intermediate inputs ($X^i_{i,t}, X^i_{j,t}$):

$$Y^i_t = \begin{cases} C^i_t + I^i_t + S^i_t + \sum_{j=1}^N h^i_{j,t} + \sum_{j=1}^N N^i_{j,t} X^i_{j,t} & \text{if } i \neq US \\ C^i_t + I^i_t + S^i_t + \sum_{j=0}^N N^i_{j,t} X^i_{j,t} & \text{if } i = US \end{cases} \tag{37}$$

FOCs for Consumption and Labor: Optimal labor and investment follow:

$$W^i_t = (1-\tau^i_t)(1-\alpha)(1-\zeta)\frac{Y^i_t}{L^i_t} \tag{38}$$

$$q^i_t = \frac{1}{(\alpha_1)(\frac{I^i_t}{K^i_t})^{\zeta-1}} \tag{39}$$

$$1 = \mathbb{E}_t[M^i_{t+1}(\frac{1}{q^i_t}(\alpha(1-\zeta)\frac{Y^i_{t+1}}{K^i_{t+1}} + q^i_{t+1}(1-\delta) - \frac{I^i_{t+1}}{K^i_{t+1}} + q_{i,t+1}\Lambda^i_{t+1}))] \tag{40}$$

Demand for local and foreign intermediate goods for country $i \in \{1, 2, ..., N\}$ follow:

$$X^i_{i,t} = (h^i \nu Y^i_t (G^i_t)^\nu)^{\frac{1}{1-\nu}} \tag{41}$$

$$X^i_{j,t} = X^i_{i,t}(\mathcal{E}^i_t \frac{h^i}{h^j})^{\frac{1-\nu}{\nu}} \tag{42}$$

FOCs for Optimal Innovation and Adoption: Since the innovation and adoption sectors are perfectly competitive, the free entry conditions pins down optimal local investment in

[5]This risk-sharing arrangement is a common feature of international long-run risk models with international trade (Colacito and Croce, 2013; Colacito et al, 2018). The difference here is that the risk-sharing takes place in the intermediate goods market, not the consumption market. These previous models are cast in endowment economy setting where there is no intermediate good sector.

R&D:

$$S_t^i = \mathbb{E}_t[M_{t+1}^i \mathcal{V}_{i,t+1}^i](N_{i,t+1}^i - (1-\phi)N_{i,t}^i) \tag{43}$$

The first order condition for investment in adopting country i's technology by country j is:

$$h_{i,t}^j(N_{i,t+1}^i - N_{i,t}^j) = \eta_a(1-\phi)\vartheta_{i,t}^j \mathbb{E}_t[M_{t+1}^j(\mathcal{V}_{i,t+1}^j - \mathcal{J}_{i,t+1}^j)] \tag{44}$$

Pareto Weight and Risk Sharing: Risk-sharing in intermediate goods markets is driven by the US pareto weight, or US share of global resources Υ_t^i. This follows the law of motion:

$$\Upsilon_t^i = \Upsilon_{t-1}^i(\frac{M_t^0}{M_t^i})(\frac{C_t^0/C_{t-1}^0}{C_t^i/C_{t-1}^i}) \tag{45}$$

Value Functions: $\mathcal{V}_{i,t}^i$ is the value for country i's local innovation and $\mathcal{V}_{i,t}^j$ is the value to adopter in foreign country j that adopts a technology developed in the country i:

$$\mathcal{V}_{i,t}^i = (1-\tau_t^i)\Pi_{i,t}^i + (1-\phi)\mathbb{E}_t[M_{t+1}^i \mathcal{V}_{i,t+1}^i] \tag{46}$$

$$\mathcal{V}_{i,t}^j = \Pi_{i,t}^j(1-\tau_t^j) + (1-\phi)\mathbb{E}_t[M_{t+1}^j \mathcal{V}_{i,t+1}^j] \tag{47}$$

$\mathcal{J}_{i,t}^j$ is the value of country i's innovation that has yet to be adopted by the country j:

$$\mathcal{J}_{i,t}^j = \underset{h_{i,t}^j}{max} - h_{i,t}^j + [(1-\phi)\mathbb{E}_t(M_{t+1}^j(\vartheta_{i,t}^j V_{i,t+1}^j + (1-\vartheta_{i,t}^j)\mathcal{J}_{i,t+1}^j))],\ \forall i,j \in \{1,2,...,N\} \tag{48}$$

Innovation Stock: Optimal investment in R&D (S_t^i) and adoption ($h_{i,t}^j$) defined by (43) and (44) and the following laws of motion pins down stocks of local innovation ($N_{i,t}^i$) and foreign adoption ($N^j_{i,t}$):

$$N^i_{i,t+1} = \vartheta^i_t S^i_t + (1-\phi)N^i_{i,t} \tag{49}$$

$$N^j_{i,t+1} - (1-\phi)N^j_{i,t} = \vartheta^j_{i,t}(1-\phi)(N^i_{i,t+1} - N^j_{i,t}) \tag{50}$$

Local innovation productivity $\vartheta^i_{i,t}$ and rate of foreign adoption $\vartheta^j_{i,t}$ is:

$$\vartheta^i_t = \chi(\frac{S^i_t}{N^i_{i,t}})^{\eta-1} \qquad \vartheta^j_{i,t} = \chi_\alpha(\frac{h^j_{i,t}(N^i_{i,t+1} - N^j_{i,t})}{N^j_{i,t}}) \tag{51}$$

Solution Method: I use third order perturbation methods to solve the model (Colacito et al, 2018; Gavazzoni and Santacreu, 2020). Taking at least a third order approximation is necessary to guarantee time varying second moments and consequently time varying risk premia in the model. I approximate the equilibrium system to third order around a point close to the zero debt ($\overline{B}^i = 0,\ \forall i$), zero deficit ($\overline{\tau}^{*,i} = \overline{\tau}^i$) steady state where tax rates are at the average global rate: $\overline{\tau}^i = \overline{\tau}$.[6] The baseline calibration is described in table 31 and preferences and production parameters are motivated by standard choices in the international long-run risk (LRR) literature (Colacito et al 2018; Gavazzoni and Santacreu, 2020). Fiscal parameters are set to match standard unconditional moments of the US and foreign fiscal processes (Croce, Kung and Schmid, 2012; Croce, Nguyen, Raymond and Schmid, 2019; Nguyen, 2022).

Calibration: To keep the simulation exercise tractable, I set $N = 3$. Calibration parameters are motivated by literature and described in table 31.

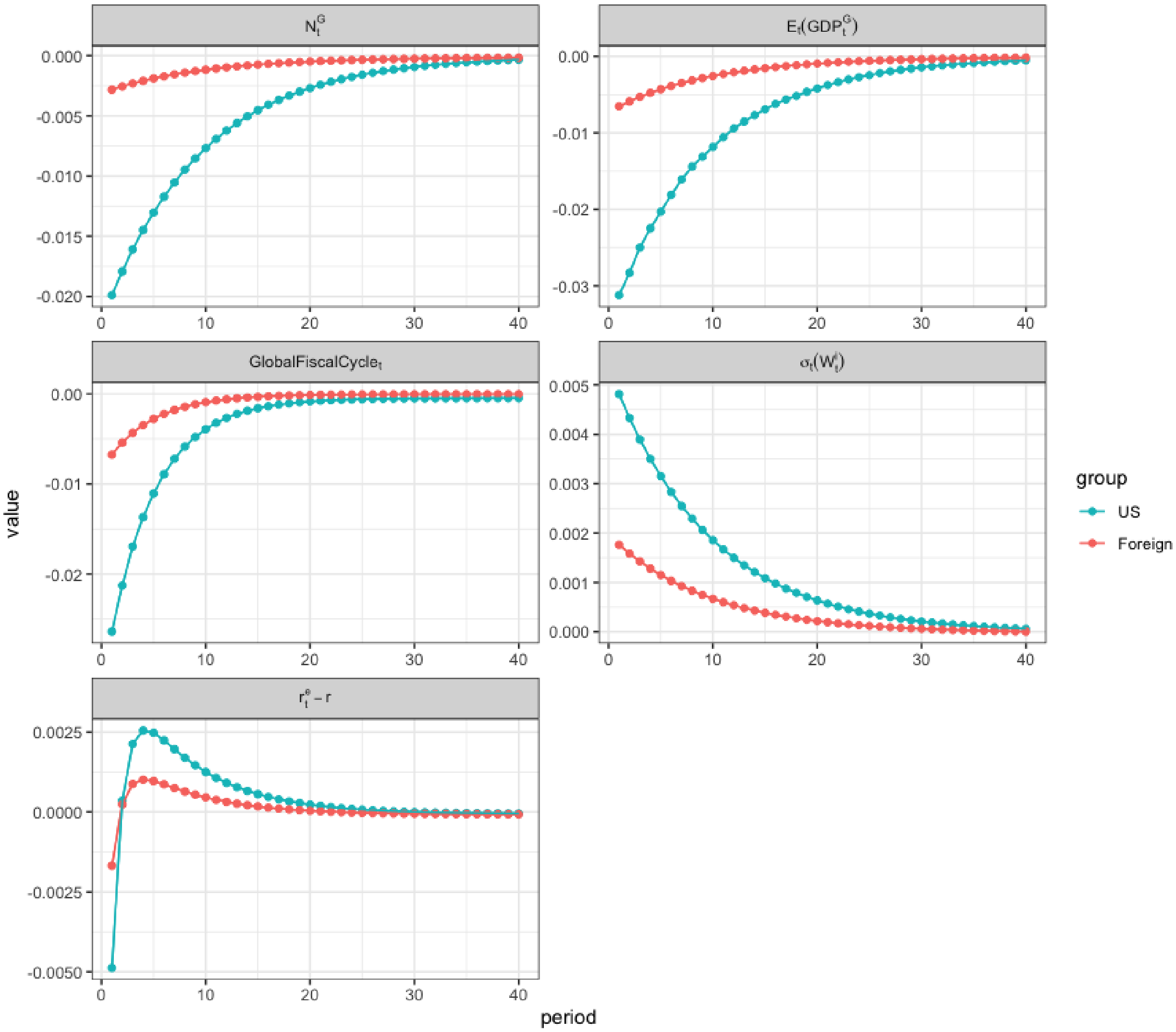
[6]The steady state debt-GDP ratio $\frac{\overline{B}}{Y} = (\frac{\phi_G \mu}{1-\rho_G})$ and $\overline{\tau} = \frac{1}{1+e^{\frac{\rho-1}{1-\rho_T}}}$. Thus steady state debt-GDP ratio is indexed by steady state growth rate μ which I set to a number close to zero. This closely approximates the zero deficit, zero debt steady state explored in the literature (Croce, Kung and Schmid, 2012; Croce, Nguyen, Raymond and Schmid, 2019; Nguyen, 2022). I don't exactly use this steady state because the surplus-debt ratio is not defined with zero debt.

Table 6: *Baseline Calibration*

Panel A: Preference Parameters		
Parameter	Description	Value
γ	Relative Risk Aversion	10
ψ	Intertemporal Elasticity of Substitution	2
β	Discount Factor	0.99
Panel B: Production Parameters		
Parameter	Description	Value
α	Capital Share	0.33
ξ	Intangible Capital Share	0.50
η	Intangible Capital Elasticity w.r.t R&D	0.83
δ	Physical Capital Depreciation Rate	0.02
ζ	Physical Capital Adjustment Costs, Elasticity	13.30
$\frac{1}{1-\frac{1}{\vartheta}}$	Investment Adjustment Cost	0.03
ν	Elasticity of Demand (Mark up)	0.4
h	Home Bias	0.99
Panel C: Exogenous Processes		
Parameter	Description	Value
φ	TFP Autocorrelation	0.98
ρ_{ec}	TFP Cointegration	0.03
σ	TFP Volatility	0.02
σ^G	Fiscal Volatility	0.08
Panel D: Innovation and Adoption Parameters		
Parameter	Description	Value
χ	Innovation Scale	0.424
χ_a	Adoption Scale	1.428
ϕ	Innovation Depreciation Rate	0.05
ϑ_j^i	International Adoption (Steady State)	0.05
η_a	Elasticity of Adoption w.r.t R&D	0.30
Panel E: Fiscal Parameters		
Parameter	Description	Value
μ_τ	Average Global Tax Rate	0.20
ρ_T	Fiscal Persistence	0.70
ρ_G	Debt Persistence	0.70
ϕ_G	Debt elasticity w.r.t fiscal Shock	0.30
ν_ν	Fiscal Volatility Persistence	0.90
σ^G	Fiscal Volatility of Volatility	0.70

Figure 4: *Fiscal Mechanism at Work*

Description: This figure plots the impulse responses of global innovation growth ($N_{G,t}$), global growth expectations ($\mathbb{E}_t GDP_t^G$), the global fiscal cycle (Global Fiscal Cycle$_t$), global wealth volatility ($\sigma_t(W_t^G)$) and excess global equity returns ($r_t^e - r_f$) to a 1 S.D bad US fiscal shock ($\tau_t^{US} \downarrow$).



6 Equilibrium Dynamics

6.1 Fiscal Mechanism

Overview: Figure 4 visualises the model's fiscal mechanism at work. At the core of this mechanism is the interaction between the fiscal theory, global innovation and growth, the global fiscal cycle and global policy uncertainty. I explain this fiscal mechanism in great detail here. To communicate this economics clearly, I walk through the mechanism step-by-step, highlighting the key model ingredients along the way.

6.1.1 Part I: Government Debt and the Fiscal Theory

IGBC: Underpinning the model is a traditional fiscal theory mechanism. To communicate the economics behind this fiscal mechanism clearly, note that by definition the local government debt portfolio is a claim to the path of future primary surpluses: $\{s^i_{t,t+k} = (\tau^i_t - g^i_t) * \text{Tax Base}^{US}_t\}^{\infty}_{k=0}$. Thus the log gross return on the local government debt portfolio $R^i_{b,t}$ follows the identity:

$$r^i_{b,t} = log(\frac{B^i_t + S^i_t}{B^i_{t-1}}) = \Delta b^i_t + log(1 + \frac{S^{US}_t}{B^{US}_t}) \\ = \Delta b^i_t + s^i_t \quad (52)$$

Here Δb^i_t is the local debt growth rate and $s^i_t = log(1 + \frac{S^i_t}{B^i_t}) \approx 2 + log(\frac{S^i_t}{B^i_{t-1}})(1 - \Delta b^i_t)$ for small $\frac{S^i_{t+1}}{B^i_{t+1}}$. Since $1 - \Delta b^i_t \geq 0$, s^i_t tracks the local primary surplus-debt ratio: $\frac{S^i_t}{B^i_{t-1}}$, the relevant measure of the local fiscal condition in the model. Similar to Campbell, Gao and Martin (2023), I log-linearize this return identity around the model's deterministic steady state where the local surplus-debt ratio is small using techniques similar to Campbell and

Shiller (1988). Thus s_t^i can be expressed as:

$$
\begin{aligned}
s_t^i \approx & (1-\rho)\mathbb{E}_t \sum_{j=0}^{t-1} \rho^j [\underbrace{r_{b,t+1+j}^i}_{\text{Discount Rates}} - \underbrace{[\frac{1}{1-\beta}\Delta\tau_{t+1+j}^i - \frac{\beta}{1-\beta}\Delta g_{t+1+j}^i]}_{\text{Cash Flows}}] \\
= & (1-\rho)\mathbb{E}_t \sum_{j=0}^{t-1} \rho^j [\underbrace{\Delta b_{t+1+j}^i}_{\text{Debt Growth}} + \underbrace{s_{t+1+j}^i}_{\text{Future Surplus-Debt}} - \frac{1}{1-\beta}(\underbrace{\Delta\tau_{t+1+j}^i}_{\text{Taxes}} - \beta\underbrace{\Delta g_{t+1+j}^i}_{\text{Spending}})]
\end{aligned} \tag{53}
$$

(53) is analogous to the Campbell-Shiller decomposition for the dividend yield if we interpret the local surplus-debt ratio to be the dividend yield on the local government debt portfolio. This equation illustrates the sources of fiscal adjustment in response to a decline in the local surplus-debt ratio. Firstly there can be a lower future path of discount rates can adjust: $\{r_{b,t+j+1}^i\}_{j=0}^{\infty} \downarrow$. Conversely there can be an actual fiscal correction: cash flows can adjust through a higher future path of primary surpluses.

In my model the cashflow component is quantitatively more relevant. Due to EZ preferences and an EIS larger than unity, the volatility of risk-free rates is low, generating low overall discount rate volatility on the government debt portfolio.[7] This leaves the cash flow component as the key source of fiscal adjustment. Since government spending is exogenous in my model, higher future cash flows on the government debt portfolios require a higher future path of US and ROW taxes. Due to the larger fiscal deterioration in the US, the higher future path of taxes is more pronounced for the US than the ROW.

6.1.2 Part II: Fiscal Theory and Global Growth Prospects

US Growth Prospects: This persistently higher path of future corporate taxes implied by the fiscal theory has distortionary real effects on global innovation and expected future global growth prospects. As shown in the top left column of figure 4, global innovation stock (N_t^G) and consequently expected future global growth deteriorates over the long-run in response to the US fiscal expansion ($\tau_t^{US} \uparrow$) during global downturns. The higher future

[7] It is a well-known result that risk-free rate volatility is an inverse function of the EIS in an asset pricing framework with EZ preferences (Bansal and Yaron, 2004).

path of corporate tax hikes depress the market value of US innovation, depressing incentives to innovate within US, lowering US growth prospects moving forward.

To see this point analytically, note that when we combine (43), (27) and (24), we can connect the R&D intensity $\frac{S_t^i}{N_t^i}$ to the expected present value of future monopoly profits:

$$\frac{1}{\chi}(\frac{S_t^i}{N_{i,t}^i})^{1-\eta} = [\mathbb{E}_t[\sum_{k=1}^{\infty}(1-\phi)^{k-1}M_{t+k}^i(1-\tau_{t+k}^i)\Pi_{t+k}^i]^{\frac{\eta}{1-\eta}}] \tag{54}$$

Here Π_{t+k}^i denotes monopoly profits for country i's innovators at time $t+k$. This can further be expressed as a function of innovation:

$$\Pi_t^i = \underbrace{(\frac{1}{\nu}-1)}_{\text{Mark-Up}}\underbrace{[\xi\nu((K_t^i)^{\alpha}(\Omega_t^i)^{1-\alpha})^{1-\xi}\mathcal{N}_t^i]^{\frac{1}{1-\xi}}}_{\text{Demand: } X_t^i} \tag{55}$$

Where:

$$\mathcal{N}_t^i = \begin{cases} (N_{i,t}^i + \sum_{j=0}^{N} N_{j,t}^i(\frac{h_i^i}{h_j^i}\mathcal{E}_{j,t}^i))^{\frac{1-\nu}{\nu(1-\nu)}} & \text{if } i \neq US \\ (N_{i,t}^i)^{\frac{\xi}{\nu}-1} & \text{if } i = US \end{cases} \tag{56}$$

(54) can be interpreted as a Q-theory equation for R&D: it equates optimal R&D intensity $\frac{S_t^i}{N_{i,t}^i}$ to the discounted present value of after tax profits. The equation makes clear the distortionary impact that a fiscal expansion partially financed by a higher future path in US corporate taxes ($\tau_{t+k}^{US}\uparrow, \forall k>0$) can have on US innovation. This higher path of future tax increases lowers the present value of future monopoly profits (right hand side of (54)) in the local innovation sector. To enforce (54), local R&D intensity $\frac{S_t^i}{N_t^i}$ falls in response to a decline in the expected present value of future monopoly profits.

Through the law of motion for $N_{i,t}^i$ (49), this decline in R&D effort maps directly into lower US innovation stock ($N_{US,t}^{US}\downarrow$) and also depressed US growth prospects. This latter point can be seen by noting that country i's output in the model follows:

$$Y_t^i = (Z_t^i L_t^i)^{1-\alpha}(K_t^i)^\alpha \tag{57}$$

where:

$$Z_t^i = (\xi\nu)^{\frac{\xi}{1-\xi}}\mathcal{N}_t^i \tag{58}$$

Thus the depressed US innovation effort endogenously depresses US growth through the term $\mathcal{N}_t^i$ which is a function of the local innovation stock $N_{i,t}^i$, as can be seen through (56).

Foreign Growth Prospects: The distortionary impact of the US fiscal policy is not limited to US innovation: it also has ramifications for global innovation and growth prospects. Due to the network structure in global innovation operating in the model, the ROW adopts US innovation as a primary input in her own local innovation. Thus the lower market values for US innovation also depresses foreign incentives to adopt US technology ($h_{ROW,t}^{US} \downarrow$). This can be seen by (44) which ties optimal investment in foreign country j's adoption of US innovation: $h_{j,t}^{US}$ to the discounted present value of future monopoly profits in US innovation through the value function $\mathcal{V}_{US,t}^j$ given by (47). Since this present value is depressed by the US corporate tax hike, $h_{j,t}^{US}$ is depressed as well. This slowdown in adoption investment maps directly into i) depressed foreign innovation stock through the law of motion for adoption ($N_{j,t}^i$) given by (50) and ii) depressed foreign growth prospects through (57).

US as Global Innovation Leader: The top left and right panels of figure 4 demonstrate the key asymmetry operating in the model: US fiscal policy has a stronger distortionary impact on global innovation and growth prospects than any other foreign country's fiscal policy. This outsized influence of the US fiscal policy stems from the US role as the global innovation leader: since the US does not adopt foreign technology, the stock of

US innovation drives foreign innovation and growth prospects but not vice versa. This asymmetry is clearly highlighted through (56) where foreign innovation stocks do not enter $\mathcal{N}_t^{US}$. Thus the accumulation of US government, and the higher future path of corporate taxes accompanying it, levied to finance US fiscal expansions can distort global innovation patterns in a way that cannot be replicated by foreign fiscal policies. This gives the US fiscal policy enormous influence over i) global growth prospects, ii) global policy uncertainty and consequently iii) global risk premia. I discuss points ii) and iii) next.

6.1.3 Part III: Global Fiscal Cycle and Global Risk Premia

Global Fiscal Cycle: How does the outsized distortionary impact of US fiscal policy over global innovation and growth prospects map into higher global policy uncertainty and global risk premia? The key force driving this mapping is the response of foreign fiscal authorities to the US fiscal policy. Recall from the exogenous fiscal rules (10) that local governments in the model respond with more expansionary fiscal policy during low expected growth environment. Thus *the US fiscal policy leads the global fiscal cycle*: the worldwide depression in growth prospects caused by the US fiscal deterioration results in a common deterioration in fiscal conditions around the world. This model implication is clearly shown in the middle left panel of figure 4 which depicts the relatively sharp decline in the global fiscal cycle in response to a US fiscal deterioration vis-*á*-vis a foreign fiscal deterioration.

Global Policy Uncertainty and Global Risk Premia: These common deteriorations in fiscal conditions are then linked to higher global risk premia through higher global policy uncertainty. This mapping is generated through the role of government debt in the fiscal mechanism. Since governments smooth the local tax burden by accumulating more government debt, these global fiscal deteriorations raise uncertainty over future global tax policy and consequently global long-run growth prospects. This can be seen in the middle right panel of figure (4) which documents that uncertainty about future global growth, or global wealth volatility rises in response to the US fiscal expansion.

The mapping with global risk premia is then immediate. Since preferences are recursive, this increase in global wealth uncertainty, or global long-run risks, is priced into global risky asset prices, generating a rise in global risk premia. This manifests itself via a drop in global risky asset prices on impact followed by higher future global returns moving forward (middle right panel of figure 4). Thus the model reproduces my empirical evidence tying US fiscal deteriorations to i) depressed global growth expectations, ii) higher global uncertainty and iii) depressed global risky asset prices and higher global risk premia.

6.2 Quantitative Performance

Correlation Evidence: Here I show that the model can reproduce my horserace regressions results whereby the US fiscal condition drives out both i) the local fiscal condition and ii) the global fiscal cycle in explaining local risky asset prices. To do this, I evaluate the panel horserace specification in the model and compare the results to the data.

Table 7: *Model vs Simulated Regressions (Horserace Valuation Regressions)*

Description: Data columns reproduce empirical results from previous sections. To map the model to my empirical analysis, ΔUS Surplus-Debt Ratio$_t$ is used as the fiscal variable. For the model regressions, $\frac{(\tau_t^{US} - \tau_t^{*,US})\text{Tax Transfer}_t^{US}}{B_{t-4}^{US}}$ represents the US surplus-debt ratio. Model regressions are computed as the average results over 1,000 simulations for 1000 quarters each.

	Dependent variable: ΔDY_t^i		*Dependent variable:* r_t^i	
	Data	Model	Data	Model
ΔUS Surplus-Debt Ratio$_t$	-10.236	-4.325	10.133	4.232
	(1.719)		(1.261)	
ΔCountry i's Surplus-Debt Ratio$_t^{US}$	1.220	-0.624	0.66	0.724
	(0.388)		(0.285)	
Global Fiscal Cycle$_{i,t}^{US}$	-3.110	-0.210	-0.462	0.203
	(1.248)		(0.916)	

Note: $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

Table 7 displays the results: since the US leads the global fiscal cycle in my model, the model reproduces the results of my empirical horserace regressions whereby the US is the winner. The coefficients on the US fiscal condition are magnitudes larger than the other two fiscal variables in my model, as in the data.

Decomposition: I now move onto model implied predictability. In my model, an endogenous global long-run risk mechanism generates the mapping between the US fiscal policy, global policy uncertainty and global risk premia. In other words, both cash flow and risk premium news are driving the US fiscal transmission into global risky asset prices in the model. To show that this mechanism is consistent with the data, I decompose the global stock market return, in the model and data, into a i) risk-free rate, ii) cash flow and risk-premium components for both the model and the data using the first-order approximation introduced earlier in section 4:

$$r_t^W - \mathbb{E}_{t-1} r_t^W \approx (\mathbb{E}_t - \mathbb{E}_{t-1})[\underbrace{\sum_{\tau=0}^{\infty} \rho^\tau r_{F,t+\tau}^W}_{\text{Risk Free Rate } (\mathcal{N}_{R_F})} + \underbrace{\sum_{\tau=0}^{\infty} \rho^\tau \Delta d_{t+\tau}}_{\text{Cash Flow } (\mathcal{N}_{CF})} + \underbrace{\sum_{\tau=0}^{\infty} \rho^\tau (r_{t+\tau}^W - r_{F,t+\tau}^W)}_{\text{Risk Premium } (\mathcal{N}_{R_P})}]$$

Table 8: US Fiscal Transmission Variance Decomposition (Model vs Data)

Component	Share (Data)	C.I	Share (Model)	Share (No Vol)
Risk-Free Rate ($\mathcal{F}_{R_F}$)	7.4%	[-20%, 17%]	5.4%	0.0%
Cash Flow ($\mathcal{F}_{CF}$)	35.8%	[17%, 62%]	56.25%	71.23%
Risk-Premium ($\mathcal{F}_{R_P}$)	56.8%	[32%, 95%]	36.25%	28.75%

Note: Empirical CIs constructed using wild bootstrap with 5,000 iterations

Results are documented in table 8. The data moments reproduce the empirical decomposition results presented in section 4. These results again highlight the important role that the fiscal volatility shock plays in matching the decomposition in the data: in the absence of the fiscal volatility shock, the cash flow component dominates (over 70%) of the variance decomposition due to the endogenous global long-run risk mechanism that operates in the model. This is in contrast to the data the risk premium component is the strongest single contributor to the global return variance. Adding the fiscal volatility shock brings the model closer to the data, though the cash flow news component is still the single largest contributor. The results are however contained within the empirical CIs.

Predictability Regressions: To show that the model's novel fiscal mechanism can quantitatively reproduce global return predictability consistent with the data, I generate model regressions where I evaluate the predictive power of the US fiscal condition using simulated data. The model is a quarterly calibration where the average results over 1,000 simulations of 100 quarters each is used to estimate the model regressions. I compare these results to the predictability results documented in this paper.

Table 9: *Model vs Simulated Regressions (Return Predictability Regressions)*

Description: The empirical regressions use the total return for the MSCI world index excluding the US as the dependent variable. As in my empirical analysis, ΔUS Surplus-Debt Ratio$_t$ is used as the fiscal variable. For the model regressions, $\frac{(\tau_t^{US} - \tau_t^{*,US})\text{Tax Transfer}_t^{US}}{B_{t-4}^{US}}$ captures the US surplus-debt ratio. The last column computes results when the fiscal volatility shock is removed from the model (ω_t^i). Model regressions are computed as the average results over 1,000 simulations for 1000 quarters each.

	Coefficient	*Data*	*Model*	*No Vol*
Panel (a): Global Equity Return Predictability				
$r^W_{t,t+4} = \alpha + \beta(\Delta\text{US Surplus-Debt Ratio}_t) + \epsilon$	β	1.935	-2.038	-1.231
		(0.800)		
$r^w_{t+4,t+8} = \alpha + \beta(\Delta\text{US Surplus-Debt Ratio}_t) + \epsilon$	β	-6.123	-8.091	-1.80
		(0.821)		
$r^w_{t+8,t+12} = \alpha + \beta(\Delta\text{US Surplus-Debt Ratio}_t) + \epsilon$	β	-7.853	-6.298	-0.68
		(0.721)		
$r^w_{t+12,t+16} = \alpha + \beta(\Delta\text{US Surplus-Debt Ratio}_t) + \epsilon$	β	-11.873	-4.000	-0.32
		(0.758)		
$r^w_{t+16,t+20} = \alpha + \beta(\Delta\text{US Surplus-Debt Ratio}_t) + \epsilon$	β	-4.932	-2.000	0.00
		(0.152)		
Note:	*p<0.1; **p<0.05; ***p<0.01			

The results depicted in table 9 suggest that the baseline model broadly captures the predictive power of the US fiscal policy for global equity returns, though the predictability of the US fiscal policy shock for future global equity returns is far more long-lasting in the model, whereas in the data it largely dies out after 5 years (20 quarters). A comment is in order about the role of the fiscal volatility shock (ω_t^i). Whilst ***qualitatively***, the model endogenously generates time varying global uncertainty (middle right panel of figure 12) and consequently time varying global risk premia (bottom left panel of figure 12), ***quantitatively*** it is not enough. Adding the exogenous fiscal volatility shock to quantitatively go close to matching the degree of predictability we see in global asset prices in response to movements in the US fiscal condition.

Model Mechanism: Key to the model's fiscal mechanism is the endogenous link between the US fiscal condition and global growth prospects: a deterioration in the US fiscal condition lowers expected future global growth moving forward, confirming that the US fiscal condition can predict future global consumption growth, up to a 5 year horizon, consistent with the data.

Table 10: *Model vs Simulated Regressions (Global Consumption Predictability)*

Description: The empirical regressions use an equally weighted average of consumption growths as my measure for global consumption growth. As in my empirical analysis, ΔUS Surplus-Debt Ratio$_t$ is used as the fiscal variable. For the model regressions, $\frac{(\tau_t^{US}-\tau_t^{*,US})\text{Tax Transfer}_t^{US}}{B_{t-4}^{US}}$ represents the US surplus-debt ratio. The last column computes results when the fiscal volatility shock is removed from the model (ω_t^i). Model regressions are computed as the average results over 1,000 simulations for 1000 quarters each.

	Coefficient	*Data*	*Model*	*No Vol*
Panel (a): Global Consumption Growth Predictability				
$\Delta c^W_{t,t+4} = \alpha + \beta(\Delta\text{US Surplus-Debt Ratio}_t) + \epsilon$	β	1.034	-0.413	-1.231
		(0.330)		
$\Delta c^w_{t+4,t+8} = \alpha + \beta(\Delta\text{US Surplus-Debt Ratio}_t) + \epsilon$	β	1.932	0.901	0.961
		(0.480)		
$\Delta c^w_{t+8,t+12} = \alpha + \beta(\Delta\text{US Surplus-Debt Ratio}_t) + \epsilon$	β	1.938	1.441	1.645
		(0.878)		
$\Delta c^w_{t+12,t+16} = \alpha + \beta(\Delta\text{US Surplus-Debt Ratio}_t) + \epsilon$	β	0.873	1.880	1.771
		(0.558)		
$\Delta c^w_{t+16,t+20} = \alpha + \beta(\Delta\text{US Surplus-Debt Ratio}_t) + \epsilon$	β	0.488	1.850	1.880
		(0.252)		

Note: *p<0.1; **p<0.05; ***p<0.01

Cross-Section: To investigate the mechanism further, I explore the model's implications for the cross-section. In particular, the model predicts that growth news exposures to the US fiscal condition traces out the cross-section of global equity risk exposures and consequently the global financial cycle. The reason is simple: the US fiscal condition endogenously generates global long-run risk in the model. Thus countries whose growth prospects are more exposed to the US fiscal condition are adversely exposed to this global risk factor, resulting in their stock markets being more tightly connected with the global financial cycle.

To test this prediction, I extract country i's growth news exposure to the US fiscal condition (β^i_{LRR}) via the following country level regression:

$$\mathbb{E}_t \Delta GDP^i_{t,t+4} = \alpha + \beta^{LRR}_i \Delta \text{US Surplus-Debt Ratio}_t + \epsilon_{i,t} \tag{59}$$

Following Andrews et al (2021), country level GDP growth expectations $\mathbb{E}_t \Delta GDP^i_{t,t+4}$ are proxied by the four quarter ahead OECD growth forecasts for each country.

Interpretation: Table 11 regresses average bilateral equity return correlations between the US and each country i ($corr(r^{US}_t, r^i_t)$) against country i's growth news exposure to the US fiscal condition (β^i_{LRR}). The results indicate that *countries whose growth expectations are* ***more*** *exposed to the US fiscal condition have larger bilateral equity correlations with the US*. To visualise this phenomenon, I plot the bilateral equity correlations against the growth news betas w.r.t the US fiscal condition (β^i_{LRR}) in figure 5. Clearly the equity markets of countries whose growth prospects are more exposed to the US fiscal condition are more synchronized with the US equity markets. Thus growth news exposures to the US fiscal condition trace out the cross-section of global equity risk exposures.

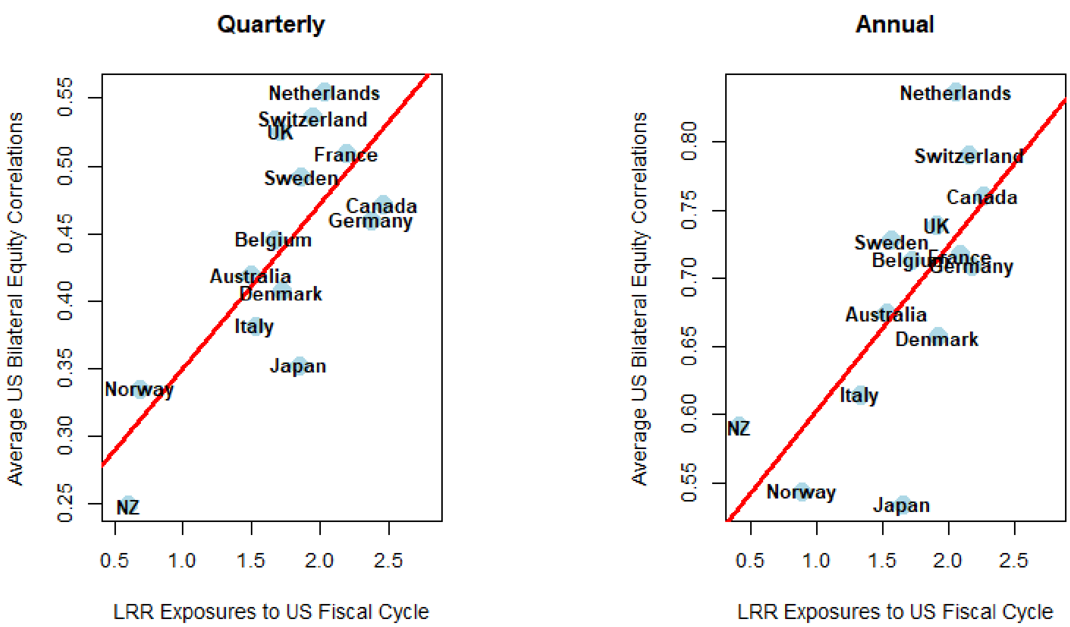
Table 11: *Growth News Exposures to US FP and the Cross-Section of Global Equity Risk*

Description: I regress average bilateral equity correlations with the US against country level growth exposures to the US fiscal condition (β^i_{LRR}).

	Dependent variable: $corr(r^{US}_t, r^i_t)$	
	Quarterly	*Annual*
β^i_{LRR}	0.121***	0.120***
	(0.031)	(0.034)
Constant	0.230***	0.483***
	(0.056)	(0.061)
Observations	14	14
Adjusted R^2	0.525	0.464
Note:	*p<0.1; **p<0.05; ***p<0.01	

Figure 5: *Growth News Exposures to US FP and the Cross-Section of Global Equity Risk*

Description: This figure plots average bilateral equity correlations with the US against country level growth exposures to the US fiscal condition (β^i_{LRR}). The left panel constructs the variables using quarterly data and the right panel uses annual data.



7 Model Validation

Overview: To conclude the paper, I now discuss how I bring the model's novel fiscal mechanism to the data. Since the model is very rich, it has many testable implications that can be explored. In specific terms, the model generates three main testable predictions (in no particular order):

1. **US leads the Global Innovation Network**: Due to the global innovation network, depressed US incentives to innovate depress i) global innovation flows and ii) global growth prospects.
2. **US Fiscal Condition, US Innovation and Global Growth**: Deteriorations in US fiscal condition predict both i) lower US innovation and ii) global innovation growth.
3. **US FP, Global Fiscal Cycle and Global Policy Uncertainty**: US Fiscal Policy leads the global fiscal cycle: US fiscal policy drives the global fiscal cycle: a US fiscal deterioration drives common deteriorations in global fiscal conditions and consequently drives up i) global policy uncertainty and ii) global risk premia.

7.1 US leads the Global Innovation Network

Overview: The central model implication is that the US is a global innovation leader: the US leads the global innovation cycle. To confirm this prediction, I investigate the predictive power of US innovation growth, proxied by the US R&D growth rate, for i) global innovation growth and ii) global consumption and GDP growths. This is confirmed in table 12: up to a 10 year horizon, US RD effort predicts i) future global innovation and ii) future global consumption and GDP growth rates outside the US.

Table 12: *US Innovation leads Global Innovation and Global Growth*

This table estimates panel specification using annual data from 1980-2021. Standard errors contained in parentheses are blockwise bootstrapped using panel blocks of length $NT = 21$ (Developed Only), $NT = 17$ (Emerging Only) and $N = 38$ (All countries) and computed using 5,000 iterations. Country fixed effects are included in all regressions and the US is omitted from each dependent variable. Global R&D Growth$_t^{US}$ is global R&D growth orthogonalised w.r.t US R&D growth.

	Dependent Variable: R&D Growth$_{t,t+k}$								
	All Countries			*Developed Only*			*Emerging Only*		
	1YR	5YR	10YR	1YR	5YR	10YR	1YR	5YR	10YR
US R&D Growth$_t$	0.464***	0.694***	0.823***	0.410***	0.630***	0.723***	0.612***	0.854***	1.097***
	(0.083)	(0.146)	(0.200)	(0.131)	(0.289)	(0.203)	(0.231)	(0.243)	(0.234)
Global R&D Growth$_t^{US}$	0.723***	1.482***	1.222***	0.618***	0.641***	1.388***	0.684***	1.514***	1.325***
	(0.114)	(0.240)	(0.354)	(0.151)	(0.230)	(0.189)	(0.194)	(0.300)	(0.482)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	1,068	925	751	1,068	925	751	1,068	925	751
Adjusted R^2	0.135	0.238	0.313	0.159	0.293	0.340	0.106	0.071	0.140

	Dependent Variable: Consumption Growth$_{t,t+k}$								
	All Countries			*Developed Only*			*Emerging Only*		
	1YR	5YR	10YR	1YR	5YR	10YR	1YR	5YR	10YR
US R&D Growth$_t$	0.012***	0.072***	0.104***	0.010***	0.056***	0.074***	0.019***	0.115***	0.183***
	(0.003)	(0.015)	(0.028)	(0.003)	(0.008)	(0.019)	(0.004)	(0.028)	(0.056)
Global R&D Growth$_t^{US}$	0.038***	0.078***	0.059***	0.033***	0.043***	0.188***	0.071***	0.164***	0.245***
	(0.006)	(0.019)	(0.022)	(0.005)	(0.012)	(0.058)	(0.028)	(0.034)	(0.081)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	1,068	925	751	1,068	925	751	1,068	925	751
Adjusted R^2	0.015	0.069	0.087	0.016	0.087	0.079	0.030	0.088	0.153

	Dependent Variable: GDP Growth$_{t,t+k}$								
	All Countries			*Developed Only*			*Emerging Only*		
	1YR	5YR	10YR	1YR	5YR	10YR	1YR	5YR	10YR
US R&D Growth$_t$	0.013**	0.067***	0.097***	0.019**	0.057***	0.075***	0.009***	0.057***	0.071***
	(0.004)	(0.019)	(0.032)	(0.004)	(0.008)	(0.019)	(0.003)	(0.018)	(0.013)
Global R&D Growth$_t^{US}$	0.037***	0.089***	0.117***	0.027***	0.071***	0.100***	0.027***	0.071***	0.100***
	(0.007)	(0.023)	(0.040)	(0.005)	(0.013)	(0.039)	(0.007)	(0.024)	(0.021)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	1,068	925	751	1,068	925	751	1,068	925	751
Adjusted R^2	0.020	0.084	0.101	0.021	0.110	0.123	0.021	0.110	0.123

Note: *p<0.1; **p<0.05; ***p<0.01

7.2 US Fiscal Policy, US Innovation and Global Growth

Overview: Given that the US is the global innovation leader, disruptions in US innovation also disrupts global innovation flows. Thus the US fiscal policy plays an outsized role in shaping global innovation, global growth prospects and global risk premia in the model. The key mechanism through which this occurs are the distortionary impacts of US corporate taxes on US innovation adopted overseas.

Survey Data: To begin, I plot the link between the US fiscal condition and global growth expectations in figure 6. Following Andrews et al (2021), I use OECD survey data to measure these global growth expectations as an equally weighted average of country specific four quarter ahead GDP growth forecasts. Table 13 builds on this result, quantifying the economically and statistically significant link between ΔUS Surplus-Debt Ratio$_t$ and global growth expectations. In the univariate regression (column 1), ΔUS Surplus-Debt Ratio$_t$ alone accounts for close to 20% of all the variation in global growth forecasts and up to 45% when global consumption growth is also controlled for.

Figure 6: *US Fiscal Condition and Global Growth Expectations*

Description: This figure plots ΔUS Surplus-Debt Ratio$_t$ (red) against the global GDP growth forecast (blue). The sample period is from 1980Q1-2018Q4.

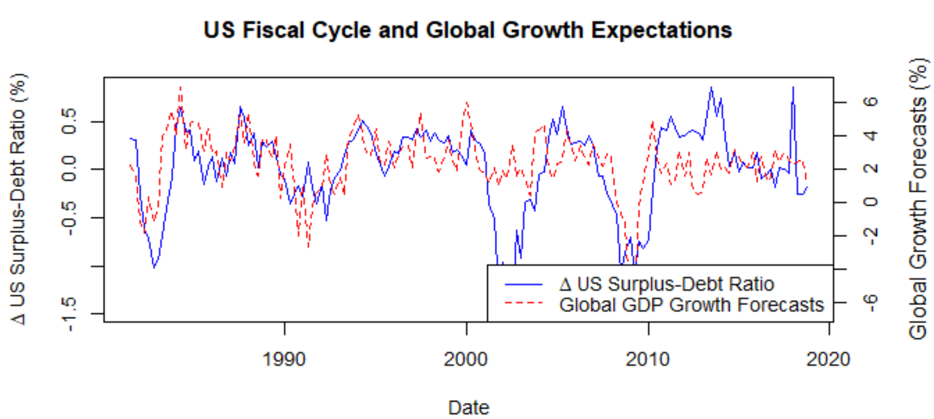


Table 13: *US Fiscal Condition and Global Growth Expectations*

This table documents estimation results associated with running the following estimation:

$$\begin{aligned}\text{Global GDP Growth Forecast}_{t,t+4} =& \alpha + \beta_1 \Delta\text{US Surplus-Debt Ratio}_t \\ &+ \beta_2 \text{Global Fiscal Cycle}_t^{US} + \delta' Macro_t + \epsilon_{i,t}\end{aligned} \quad (60)$$

Description: Standard errors are Newey West with four lags and the global fiscal cycle is orthogonalised w.r.t ΔUS Surplus-Debt Ratio$_t$. The sample period is from 1980Q1-2018Q4.

	Dependent variable: Global GDP Growth Forecasts					
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	1.790***		1.795***	0.806***	1.822***	1.069***
	(0.173)		(0.163)	(0.131)	(0.164)	(0.173)
Global Fiscal Cycle$_t^{US}$		0.674***	0.681***	0.187***	0.677***	0.276**
		(0.143)	(0.133)	(0.137)	(0.139)	(0.144)
Global Consumption Growth$_t$				0.917***		
				(0.0621)		
Global GDP Growth$_t$					-0.024***	
					(0.008)	
Global IP Growth$_t$						0.209***
						(0.029)
Observations	150	150	150	150	150	150
Adjusted R^2	0.181	0.049	0.232	0.458	0.244	0.324
Note:				*p<0.1; **p<0.05; ***p<0.01		

Predictability Regressions: Beyond the survey data, I confirm via predictability regressions, the key model implication that the US fiscal condition has distortionary effects for global innovation and growth. Table 14 confirms the predictive power of the US tax and debt-GDP ratios for i) global innovation growth, proxied by global R&D growth, ii) global consumption growth and iii) global GDP growth up to a 10 year horizon. This result is robust to controlling for global fiscal conditions outside the US.

Table 14: *US Fiscal Policy, Global Innovation and Global Growth*

This table estimates panel specification using annual data from 1980-2021. Standard errors contained in parentheses are blockwise bootstrapped using panel blocks of length $NT = 38$ (All countries) and computed using 5,000 iterations. Country fixed effects are included in all regressions and the US is omitted from each dependent variable. Global Tax-GDP Ratio$_t^{US}$ and Global Debt-GDP Ratio$_t^{US}$ is the average non-US tax-GDP and debt-GDP ratios orthogonalised w.r.t US tax-GDP and debt-GDP ratios respectively.

	All Countries								
	R&D Growth$_{t,t+k}$			Consumption Growth$_{t,t+k}$			GDP Growth$_{t,t+k}$		
	1YR	5YR	10YR	1YR	5YR	10YR	1YR	5YR	10YR
US Tax-GDP Ratio$_t$	−0.954**	−2.224***	−3.535***	−0.07***	−0.222***	−0.746***	−0.07***	−0.184***	−0.564***
	(0.209)	(0.582)	(0.692)	(0.021)	(0.060)	(0.111)	(0.022)	(0.055)	(0.076)
Global Tax-GDP Ratio$_t^{US}$	−0.578**	−0.883**	−0.477***	−0.084***	−0.155***	−0.262***	−0.138***	−0.120***	−0.282***
	(0.235)	(0.332)	(0.482)	(0.033)	(0.041)	(0.128)	(0.033)	(0.048)	(0.108)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	1,068	925	751	1,068	925	751	1,068	925	751
Adjusted R^2	0.031	0.024	0.086	0.069	0.015	0.0899	0.012	0.017	0.140

	All Countries								
	R&D Growth$_{t,t+k}$			Consumption Growth$_{t,t+k}$			GDP Growth$_{t,t+k}$		
	1YR	5YR	10YR	1YR	5YR	10YR	1YR	5YR	10YR
US Debt-GDP Ratio$_t$	−0.823**	−1.531**	−2.132***	−0.182***	−0.233***	−0.338***	−0.200***	−0.344***	−0.581***
	(0.238)	(0.223)	(0.244)	(0.085)	(0.078)	(0.141)	(0.029)	(0.088)	(0.114)
Global Debt-GDP Ratio$_t^{US}$	−0.249**	−0.198**	−0.433***	−0.126***	−0.181***	−0.343***	−0.132***	−0.173***	−0.391***
	(0.388)	(0.492)	(0.689)	(0.071)	(0.088)	(0.133)	(0.032)	(0.066)	(0.171)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	1,068	925	751	1,068	925	751	1,068	925	751
Adjusted R^2	0.048	0.044	0.111	0.049	0.075	0.119	0.032	0.037	0.160

Note: *p<0.1; **p<0.05; ***p<0.01

7.3 US FP, Global Fiscal Cycle and Global Uncertainty

Overview: The final testable prediction I take to the data is the endogenous link between US fiscal capacity, the global fiscal cycle and global uncertainty implied by the model. This link endogenously generates predictability in the model: Since i) the US fiscal policy drives down global growth prospects and ii) local fiscal authorities enact more expansionary policy when growth prospects are low, a deterioration in the US fiscal condition leads to a common deterioration in fiscal conditions worldwide (Global Fiscal Cycle$_t$ $\downarrow$). Since the fiscal rule allows the tax burden to be smoothed over time: these common fiscal deteriorations are partially financed via higher debt, they raise uncertainty about future tax policy, increasing global policy uncertainty and consequently the quantity of global long-run risk.

US leads the Global Fiscal Cycle: Table 15 evaluates the link between the US fiscal condition and global fiscal cycle: consistent with the model, the US leads the global fiscal cycle. Foreign governments respond to US fiscal deteriorations by deteriorating their own fiscal conditions for up to a 1 year horizon, as suggested by the positive coefficient on the 1 year change in the global fiscal cycle. The effect mean-revert around the 5 year horizon before effectively dying out after 10 years.

To further butress this point, figure 7 plots ΔUS Surplus-Debt Ratio$_t$ against the future 1 year change in the global fiscal cycle (ΔGlobal Fiscal Cycle$_t$). It clearly indicates a strong positive correlation, suggesting that foreign governments do indeed adopt the US fiscal policy stance by deteriorating their fiscal conditions in response to US fiscal deteriorations.

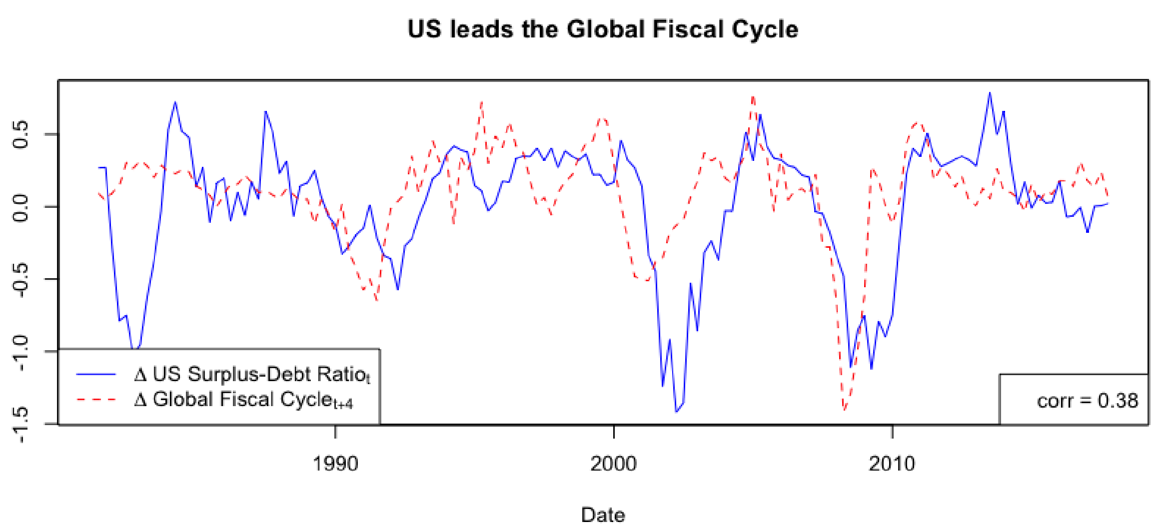
Table 15: *US Fiscal Policy and the Global Fiscal Cycle*

This table estimates panel specification using quarterly data from 1980-2021. Standard errors are blockwise bootstrapped using panel blocks of length $NT = 38$.

	Dependent Variable: Foreign Fiscal Conditions		
	ΔCountry i's Surplus-Debt Ratio$_{t,t+k}$		
	1YR	5YR	10YR
ΔUS Surplus-Debt Ratio$_t$	0.764***	−0.813***	−0.13
	(0.109)	(0.202)	(0.232)
Global Fiscal Cycle$_t^{US}$	−0.115	−0.473**	−1.200***
	(0.183)	(0.139)	(0.382)
Country FE	✓	✓	✓
Observations	1,388	1,228	1,028
Adjusted R^2	0.027	0.018	0.036
Note:			*p<0.1; **p<0.05; ***p<0.01

Figure 7: *US leads the Global Fiscal Cycle*

Description: This figure plots ΔUS Surplus-Debt Ratio$_t$ (blue) against the future 1 year change in the global fiscal cycle:



US FP and Global Uncertainty: Having shown that the US drives the global fiscal cycle, I now move to establish that the US fiscal policy drives global uncertainty and consequently global risk premia through this channel. Figure 8 confirms this model implication tying together the US fiscal condition and global uncertainty visually. Table 16 demonstrates that this correlation is robust via a regression approach.

Figure 8: *US Fiscal Cycle and Global Uncertainty*

Description: This figure plots the levels and changes in the US surplus-debt ratio against two proxies for global uncertainty: global stock market volatility defined as a cross-sectional average of realized stock market volatility as in Lustig and Verdelhan (2011) and the logarithm of the VIX. The sample period for all graphs is 1980Q1-2017Q2.

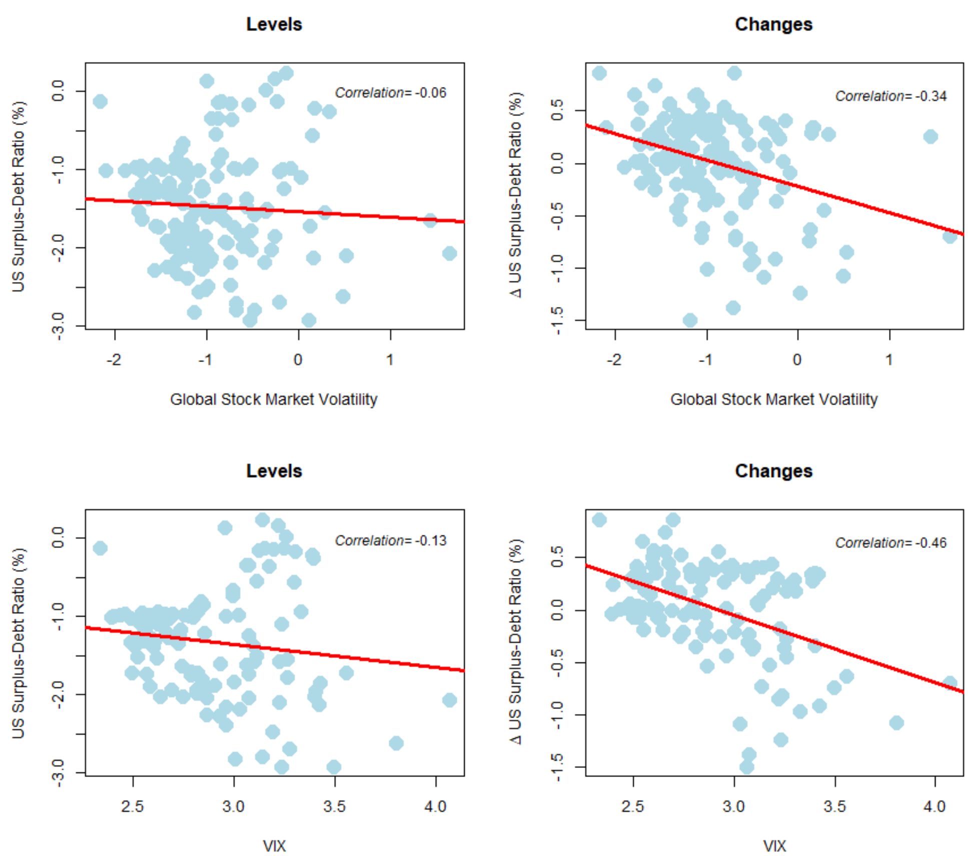


Table 16: *US Fiscal Condition and Global Uncertainty*

This table documents estimation results associated with running the following estimation:

$$\text{Global Uncertainty}_t = \alpha + \beta_1 \Delta \text{US Surplus-Debt Ratio}_t + \beta_2 \text{Global Fiscal Cycle}_t^{US} + \delta' Macro_t + \epsilon_{i,t}$$

Description: The global fiscal cycle is orthogonalised w.r.t the US. In addition to global market uncertainty proxies, I also look at the global economic policy uncertainty index (GEPU) constructed by Davis (2016) which is a GDP weighted average of EPU indexes for 16 countries obtained from Baker, Bloom and Davis (2016). GDP weights are computed using both current prices and a PPP adjustment. The sample period is from 1980Q1-2018Q4.

	Dependent variable: Global Market Uncertainty					
	Global Stock Market Volatility			VIX		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	-0.431***	-0.454***	-0.455***	-0.286***	-0.306***	-0.280***
	(0.11)	(0.10)	(0.12)	(0.06)	(0.06)	(0.07)
Global Fiscal Cycle$_t^{US}$	-0.166**	-0.182**	-0.182**	-0.038	-0.059	-0.031
	(0.081)	(0.071)	(0.089)	(0.049)	(0.039)	(0.051)
Global Consumption Growth$_t$	-0.021			-0.028		
	(0.050)			(0.034)		
Global GDP Growth$_t$		0.0001			-0.003	
		(0.005)			(0.004)	
Global IP Growth$_t$			-0.0003			-0.010
			(0.001)			(0.01)
Observations	150	150	150	115	115	115
Adjusted R^2	0.136	0.135	0.135	0.210	0.210	0.212
	Dependent variable: Global Economic Policy Uncertainty Index (GEPU)					
	Current Prices			PPP Adjusted		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	-0.159**	-0.158*	-0.178**	-0.165**	-0.163*	-0.183**
	(0.078)	(0.089)	(0.081)	(0.077)	(0.088)	(0.079)
Global Fiscal Cycle$_t^{US}$	0.001	0.001	0.007	0.002	0.002	0.001
	(0.006)	(0.006)	(0.005)	(0.0056)	(0.0061)	(0.005)
Global Consumption Growth$_t$	-0.001			-0.002		
	(0.005)			(0.005)		
Global GDP Growth$_t$		0.001			0.001	
		(0.001)			(0.001)	
Global IP Growth$_t$			0.002			0.002
			(0.001)			(0.002)
Observations	83	83	83	83	83	83
Adjusted R^2	0.025	0.013	0.026	0.030	0.017	0.031
Note:	*p<0.1; **p<0.05; ***p<0.01					

US Specialness: Since the US is the global innovation leader, my model predicts that the tight link between the US fiscal condition, global growth prospects, global uncertainty and global risk premia is unique to the US. This is the key reason why my model reproduces the unique international transmission of US fiscal policy relative to other countries. To empirically validate this assumption, I conduct panel horserace regressions of the form:

$$\begin{aligned} \mathrm{X}_t =& \alpha + \beta_1 \Delta \text{Country j's Surplus-Debt Ratio}_t^{US} + \beta_2 \Delta \text{US Surplus-Debt Ratio}_t \\ &+ \beta_3 \Delta \text{Global Fiscal Cycle}_{j,t}^{US} + \delta' Macro_t + \epsilon_{i,t}, \\ X_t \in& \{\text{Global GDP Growth Forecast}_{t,t+4}, \text{Global Stock Market Volatility}_t\} \end{aligned} \tag{61}$$

In these horserace regressions, ΔCountry j's Surplus-Debt Ratio$_t^{US}$ denotes the four quarter change in country j's surplus-debt ratio orthogonalised w.r.t four quarter changes in the US surplus-debt ratio. Global Fiscal Cycle$_{j,t}^{US}$ is the global fiscal cycle denoted by (2) orthogonalised w.r.t four quarter changes in US and country j's surplus-debt ratios. The results contained in table 17 confirm US specialness in driving global growth expectations and global uncertainty: the US fiscal condition drives out essentially all other foreign fiscal conditions out of both horse race regressions.

These results are related to a growing literature emphasising the special role that the US plays in driving fluctuations in the global economy. This existing literature on this subject however focuses on the financial dimension: US policy actions have a unique global footprint because of the dollar's status as the global reserve currency (Jiang et al, 2018, 2020). My results hint at a distinct real dimension: US policy actions also have a global footprint of their unique influence over i) future global growth prospects and ii) global policy uncertainty. In the model that follows, I tie this real dimension of US specialness to the US leadership role in the global innovation network. Thus US fiscal policy can uniquely shape i) global growth prospects, ii) global policy uncertainty and consequently iii) global risk premia, as implied by my results, through its distortionary impact on global innovation growth.

Table 17: *Foreign Fiscal Conditions, Global LRRs, Global Uncertainty*

Description: This table documents specifications captured by (61). In all regressions, Global GDP Growth$_t$ is used as the macro control. Global fiscal cycle is orthogonalised w.r.t US and country j. This is denoted by Global Fiscal Cycle$^{US}_{j,t}$. Each country j's fiscal variable (ΔCountry j's Surplus-Debt Ratio) is orthogonalised w.r.t ΔUS Surplus-Debt Ratio. Sample period is 1980Q1-2018Q4.

Dependent Variable: Global GDP Growth Forecasts						
Country j	ΔCountry j's Surplus-Debt Ratio$^{US}_t$		ΔUS Surplus-Debt Ratio$_t$		Global Fiscal Cycle$^{US}_{j,t}$	
	Coefficient	(s.e)	Coefficient	(s.e)	Coefficient	(s.e)
Australia	0.108	(0.088)	0.796**	(0.344)	0.597***	(0.190)
Belgium	0.201	(0.217)	0.818***	(0.300)	0.552**	(0.233)
Canada	0.275	(0.346)	0.666***	(0.239)	0.477**	(0.190)
Denmark	0.249	(0.174)	0.624**	(0.297)	0.514**	(0.227)
France	0.407***	(0.150)	0.709***	(0.209)	0.515**	(0.243)
Germany	−0.039	(0.038)	0.875***	(0.307)	0.602**	(0.245)
Italy	0.249	(0.370)	0.831***	(0.302)	0.549**	(0.234)
Japan	0.238	(0.264)	0.828***	(0.304)	0.557**	(0.245)
Netherlands	−0.092	0.162	0.915***	(0.288)	0.617***	(0.231)
Norway	0.054	(0.049)	0.747**	(0.315)	0.680**	(0.323)
New Zealand	0.392	(0.312)	0.111***	(0.040)	1.131***	(0.350)
Sweden	0.465***	(0.139)	1.310***	(0.384)	0.800***	(0.297)
Switzerland	−0.159	(0.221)	0.875***	(0.309)	0.694***	(0.265)
United Kingdom	0.150	(0.138)	0.654**	(0.327)	−0.568**	(0.246)

Dependent Variable: Global Uncertainty						
Country j	ΔCountry j's Surplus-Debt Ratio		ΔUS Surplus-Debt Ratio		Global Fiscal Cycle$^{US}_{j,t}$	
	Coefficient	(s.e)	Coefficient	(s.e)	Coefficient	(s.e)
Australia	-0.041	(0.028)	−0.532***	(0.114)	−0.075	(0.098)
Belgium	-0.167	(0.088)	−0.445***	(0.114)	−0.159**	(0.077)
Canada	-0.844	(1.345)	−0.473***	(0.111)	−0.205**	(0.077)
Denmark	−0.147**	(0.058)	−0.417***	(0.111)	−0.132	(0.080)
France	−0.081	(0.082)	−0.474***	(0.108)	−0.246***	(0.079)
Germany	−0.019	(0.027)	−0.423***	(0.117)	−0.213***	(0.079)
Italy	−0.018	(0.138)	−0.422***	(1.090)	−0.230***	(0.074)
Japan	−0.252***	(0.096)	−0.398***	(0.111)	−0.164**	(0.079)
Netherlands	−0.085	−0.065	−0.554***	(0.113)	−0.210***	(0.081)
Norway	−0.016	(0.021)	−0.431***	(0.117)	−0.227**	(0.093)
New Zealand	−0.096	(0.172)	−0.436***	(0.141)	−0.066	(0.120)
Sweden	−0.115	(0.071)	−0.690***	(0.148)	−0.216***	(0.108)
Switzerland	0.034	(0.133)	−0.483***	(0.174)	−0.294**	(0.119)
United Kingdom	0.150	(0.138)	−0.654**	(0.327)	0.568**	(0.246)

8 Conclusion

In conclusion, this paper sheds new light on the economic origins of the global financial cycle, establishing that it is as much a fiscal phenomenon as it is a monetary one. In specific terms, I demonstrated that like US monetary policy, the US fiscal policy has a global footprint: deteriorations in the US fiscal condition i) coincide with depressed global risky asset valuations and ii) predict higher future global equity returns moving forward. These results are not spanned by i) local fiscal conditions or ii) the global fiscal cycle or iii) macro controls of any persuasion. Furthermore, this global footprint is unique to the US: other foreign countries do not have the same influence over global risky asset prices once the US fiscal condition is controlled for.

To explain these results, I advance a novel fiscal mechanism that emphasises the special US role as the global innovation leader. Since the US is central to the global innovation network, her fiscal policy can uniquely shape i) global growth prospects, ii) the global fiscal cycle, iii) global policy uncertainty and iv) global risk-premia through her outsized distortionary impact on global innovation. Thus the global footprint of US fiscal policy is an artefact of the US leadership role in the global economy, an asymmetry that is distinct from the dollar's global reserve currency status that is thought to drive the global footprint of US monetary policy.

To explain these striking results, I propose a novel fiscal mechanism that emphasises the central role of the US as the global innovation leader. When the US innovates, foreign countries follow by adopting her innovation as an intermediate input in her own innovation. This US centrality in the global innovation network empowers the US fiscal policy with an outsized influence over i) global growth prospects, ii) global policy uncertainty and consequently iii) global risk premia through its distortionary impact on global innovation. This argument is formalised using a multi-country endogenous growth model with i) Epstein-Zin preferences and ii) a global innovation network that features international technology adoption. Key model implications linking the US fiscal policy to i) global innovation, ii) global growth prospects, iii) global policy uncertainty and iv) global risk premia are empirically confirmed by the data.

Taken together, the model sheds new light on the sources of US specialness driving the international transmission of US policy shocks. Whilst the traditional focus has been on ***financial*** channels that emphasise the central role of the dollar as the global reserve currency (Jiang, 2021), I uncover a ***real*** channel based on the US leadership role in global innovation. This novel mechanism can also explain the unique international transmission of US policy shocks into global risky asset prices and is empirically confirmed by the data. This implies that the sources of US specialness driving global financial markets is quite multi-faceted and extends beyond the dollar's global reserve currency status to include her leadership role in the global economy, a perspective that has received surprisingly little emphasis thus far.

Moving forward, I extend this novel fiscal mechanism to explain other puzzling features of the global financial system beyond the global financial cycle. In a related work (Kim, 2022a), I use a two country version of this framework with excess US fiscal capacity vis-*á*-vis the ROW to simultaneously resolve i) the reserve currency paradox (Maggiori, 2017), ii) relative US safety during global downturns and iii) the countercyclical US wealth share, a set of facts I refer to as the US safety puzzle in that paper. In another related work, I extend this multi-country framework to include defaultable debt to explain the common global factor in credit spreads uncovered by Bai, Kehoe and Perri (2019). Thus the big picture agenda emerging from this work is a simple idea: the US fiscal policy plays a central role in driving puzzling features of the modern global financial system. This is a simple but ultimately novel idea that has received surprisingly little emphasis thus far.

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A Empirical Appendix

A.1 Other Identification Schemes

Overview: The causal link between the US fiscal condition and global risk premia presented thus far has been presented using the US surplus-debt ratio as a proxy for US fiscal capacity. Here I explore robustness w.r.t other identification schemes for US fiscal shocks.

Ramey Shocks: Firstly, I follow Ramey (2011) and use survey data from the Survey of Professional Forecasters (SPF). This data asks professional forecasters to predict real government spending growth from 1981Q2 onwards.[8] The SPF forecast error, the difference between this forecast and the observed real fiscal spending growth, is my measure of the US fiscal shock. Using this alternative identification, I estimate a four variable, one lag system that is recursively ordered as followed:

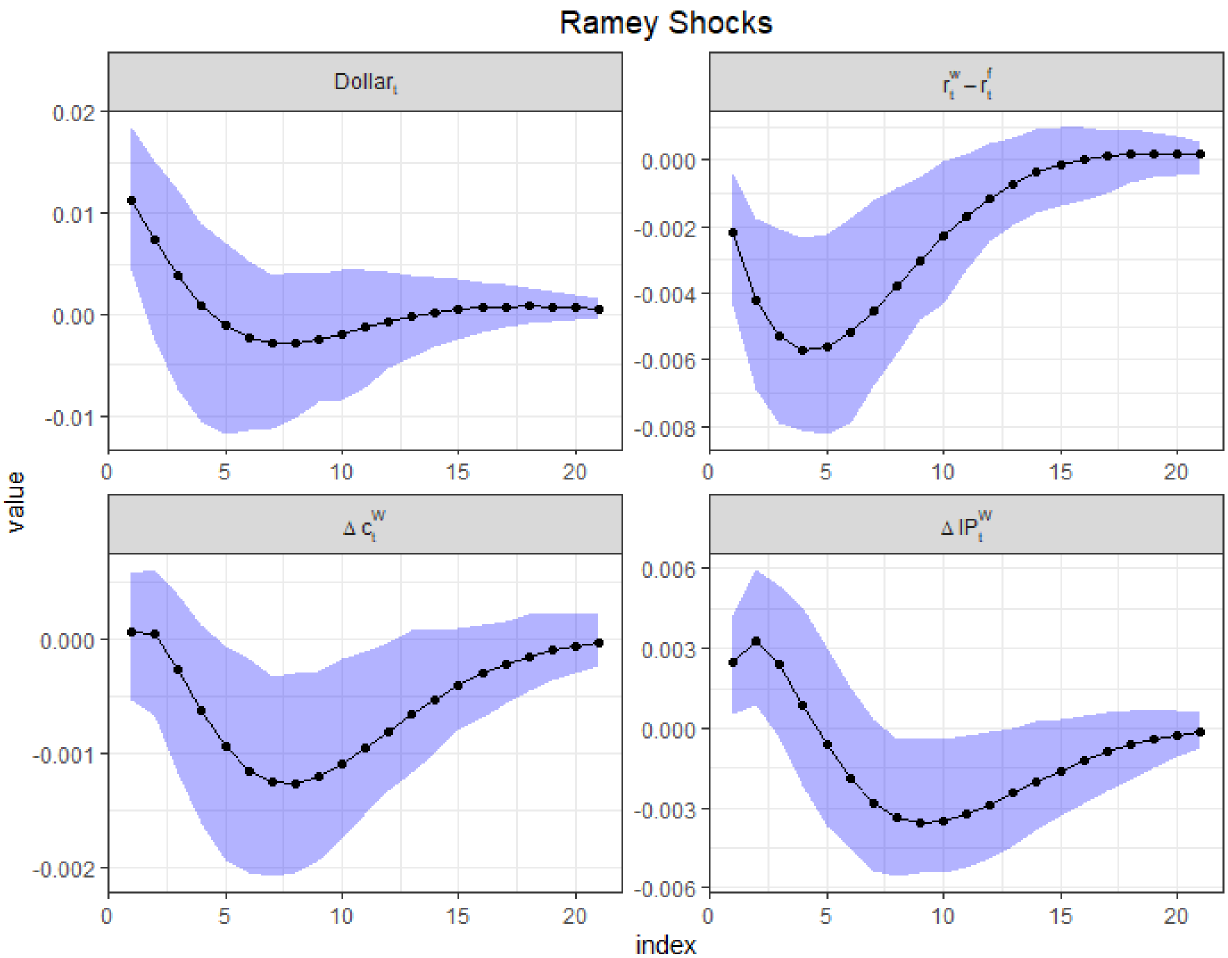
$$z_t^i = \left[Shock_t, \quad \Delta c_t^W, \quad \Delta IP_t^W, \quad Dollar_t, \quad r_t^w - r_t^f \right]^T \tag{A.1}$$

$Shock_t$ is the identified US fiscal shock using SPF data. Δc_t^W, ΔIP_t^W are global consumption and industrial production growth respectively. $r_t^w - r_t^f$ is the global market excess return using the 1 year US treasury bill rate as the reference global risk-free asset. Finally $Dollar_t$ is the dollar carry trade return as per Lustig and Verdelhan (2014) which tracks the dollar appreciation rate. I order the fiscal shock first, as is customary in the empirical macro literature (Blanchard and Perotti, 2002; Ramey and Shapiro, 1998). The estimated IRFs are depicted in figure 9 which confirm the robustness of the US fiscal condition's predictability for global risky asset prices found in previous sections.

[8] I look at data after this date because before this date SPF asked forecasters to predict real defense spending, not total government spending growth.

Figure 9: *IRFs to a 1 SD negative SD negative fiscal shock using SPF Data*

Description: The figure plots IRFs to a ***negative*** 1 SD shock to the US fiscal shock $Shock_t$ identified using SPF data as per Ramey (2011). The blue areas indicate 95% confidence intervals. Standard errors were generated using 10,000 Monte Carlo simulations. Sample is from 1981Q2-2018Q4.



A.2 Robustness Checks for Proxy Evidence

A.2.1 Local Macro Controls

Overview: In the baseline valuation regressions presented in the main text, the local macro controls were either global or US business cycle variables. Table 18 shows that the robustness of the main results are unaffected by including the local country i's business cycle variables as the macro controls instead. The US fiscal condition still wins the horse race and the local fiscal condition is driven out of the regression.

Table 18: *US Fiscal Condition and Global Risky Asset Valuations (Local Macro Controls)*

Description: This table modifies the baseline specification (A.6) by including local macro control. Panel A uses global macro controls and panel B uses country level macro controls. All regressions include country fixed effects and standard errors are included in parentheses.

	Panel (b): Other Macro Controls					
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	-10.234^{***}	-13.704^{***}	-10.273^{***}	-14.453^{***}	-14.557^{***}	-12.706^{***}
	(1.442)	(1.309)	(1.796)	(1.432)	(1.428)	(1.496)
Δ Country i's Surplus-Debt Ratio$_t^{US}$	-0.004	-0.004	-0.004	-0.272^{**}	-0.294^{**}	-0.193
	(0.005)	(0.005)	(0.005)	(0.136)	(0.132)	(0.134)
Global Fiscal Cycle$_{i,t}^{US}$	1.097	-0.490	0.413	-0.532	-0.607	0.561
	(0.953)	(0.953)	0.992	(1.046)	(1.038)	(1.077)
US Consumption Growth$_t$	-2.416^{***}					
	(0.438)					
US GDP Growth$_t$		-0.024				
		(0.016)				
US IP Growth$_t$			-0.575^{***}			
			(0.210)			
Country i's Consumption Growth$_t$				-0.186		
				(0.255)		
Country i's GDP Growth$_t$					0.014	
					(0.016)	
Country i's IP Growth$_t$						-0.586^{***}
						(0.149)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,543	3,543	3,543	3,543	3,543	3,543
Adjusted R^2	0.023	0.023	0.023	0.046	0.046	0.053
Note:	*p<0.1; **p<0.05; ***p<0.01					

A.2.2 Expected Business Cycle Controls

Overview: In the baseline valuation regressions presented in the main text, the macro controls were *contemporaneous* business cycle variables. Here I control for *expected business cycle* conditions which are important to control for given the important role that expected real economic activity plays in driving equity risk premia (Fama and French, 1992). To proxy for these expectations, I use OECD survey data to construct an equally weighted average of one year (four quarter ahead) country specific growth forecasts as a proxy for global growth expectations. Table 19 below shows that the robustness of the main results are unaffected by including these expected business cycle controls.

Table 19: *US Fiscal Condition, Expected Business Cycle Conditions and Global Risky Asset Valuations*

Description: This table modifies the baseline specification (A.6) by including expected business cycle controls. Panel A uses global macro controls and panel B uses country level macro controls. All regressions include country fixed efffects and standard errors clustered at the country and date (quarter) level.

	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	-8.368^{***}	-7.524^{***}	-6.796^{***}	8.702^{***}	7.785^{***}	7.407^{***}
	(1.881)	(1.792)	(1.854)	(1.433)	(1.395)	(1.464)
Δ Country i's Surplus-Debt Ratio$_t^{US}$	1.234^{***}	1.534^{***}	1.419^{***}	0.014	-0.049	0.051
	(0.380)	(0.372)	(0.364)	(0.289)	(0.289)	(0.286)
Global Fiscal Cycle$_{i,t}^{US}$	4.216^{***}	3.264^{**}	-0.822	2.900^{***}	4.059^{***}	6.093^{***}
	(1.453)	(1.387)	(1.658)	(1.106)	(1.075)	(1.304)
$\Delta R_{F,t}^{US}$	-0.030^{***}	-0.032^{***}	-0.034^{***}	0.024^{***}	0.028^{***}	0.025^{***}
	(0.007)	(0.007)	(0.008)	(0.006)	(0.006)	(0.006)
$\Delta R_{F,t}^{i}$	3.371^{***}	4.022^{***}	3.091^{***}	-2.355^{***}	-2.679^{***}	-2.065^{***}
	(0.723)	(0.681)	(0.688)	(0.550)	(0.528)	(0.541)
Global Consumption Growth$_t$	1.037^{**}			0.183		
	(0.405)			(0.308)		
Global GDP Growth$_t$		0.103			0.125	
		(0.934)			(0.711)	
Global IP Growth$_t$			0.012			-0.015
			(0.017)			(0.013)
Global GDP Growth Forecast	-5.805^{***}	-5.371^{***}	-6.052^{***}	4.278^{***}	4.018^{***}	4.643^{***}
	(0.472)	(0.419)	(0.433)	(0.360)	(0.327)	(0.342)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,167	3,167	3,167	3,167	3,167	3,167
Adjusted R^2	0.193	0.209	0.222	0.365	0.354	0.356
Note:					*p<0.1; **p<0.05; ***p<0.01	

A.2.3 Rotating Order of Orthogonalisation

Overview: In the baseline specification, I orthogonalised ΔUS Surplus-Debt Ratio$_t$ with respect to the local and global fiscal cycles. Here I show that these results are unaffected by altering the order of orthogonalisation by running the following specification here:

$$\begin{aligned} X_{i,t} =& \alpha + \beta_1 \Delta \text{US Surplus-Debt Ratio}_t^i + \beta_2 \Delta \text{Country i's Surplus-Debt Ratio}_t \\ &+ \beta_3 \Delta \text{Global Fiscal Cycle}_{i,t}^{US} + \beta_4 \Delta r_{F,t}^{US} + \beta_4 \Delta r_{F,t}^{i} + \delta' Macro_t^{US} + \epsilon_{i,t} \\ X_{i,t} \in& \{\Delta \text{credit spread}_{i,t}, \Delta \text{term spread}_{i,t}\} \end{aligned} \tag{A.2}$$

Here ΔUS Surplus-Debt Ratio$_t^i$ denotes the US fiscal condition orthogonalised w.r.t local fiscal conditions. I leave the local fiscal condition untouched by the orthogonalisation procedure in this exercise to give it the best chance to win the horserace. The result clearly show that even in this case, the economic and statistical significance of the local fiscal condition is dwarfed by the US fiscal condition.

	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t^i$	-6.759^{***}	-8.244^{***}	-8.017^{***}	7.313^{***}	8.831^{***}	8.772^{***}
	(1.802)	(1.774)	(1.797)	(1.404)	(1.381)	(1.411)
Δ Country i's Surplus-Debt Ratio$_t$	1.222^{***}	1.235^{***}	1.249^{***}	0.134	0.119	0.110
	(0.336)	(0.367)	(0.371)	(0.287)	(0.288)	(0.292)
Global Fiscal Cycle$_{i,t}^{US}$	-0.976	-2.357^{*}	-3.920^{**}	5.335^{***}	6.483^{***}	7.289^{***}
	(1.060)	(1.001)	(1.240)	(1.112)	(8.485)	(0.979)
$\Delta R_{F,t}^{US}$	-0.035^{***}	-0.045^{***}	-0.043^{***}	0.029^{***}	0.038^{***}	0.0344^{***}
	(0.012)	(0.010)	(0.018)	(0.009)	(0.012)	(0.010)
$\Delta R_{F,t}^{i}$	3.181^{***}	2.481^{***}	2.446^{***}	-1.971^{***}	-1.339^{***}	-1.455^{***}
	(1.009)	(0.657)	(0.689)	(0.515)	(0.514)	(0.535)
Global Consumption Growth$_t$	-4.100^{***}			4.151^{***}		
	(0.789)			(0.788)		
Global GDP Growth$_t$		-0.464^{***}			-0.353^{***}	
		(0.113)			(0.111)	
Global IP Growth$_t$			0.549			-0.162
			(0.384)			(0.204)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,167	3,167	3,167	3,167	3,167	3,167
Adjusted R^2	0.097	0.106	0.082	0.278	0.275	0.255
Note:				*p<0.1; **p<0.05; ***p<0.01		

A.2.4 Other Proxies

VAR decomposed discount rate shocks: Finally I look at VAR decomposed discount rate shocks identified using the ICAPM framework of Campbell et al (2017). This framework estimates discount rate shocks directly, assuming a linear relationship between a state vector containing equity return predictors and country level discount rate shocks $N^i_{D,t}$.

Table 20: *US Fiscal Cycle and VAR decomposed discount rate shocks*

This table regresses the 1-year change in discount rate shocks on the US fiscal cycle, other fiscal and global macro controls. All regressions include country fixed effects and standard errors clustered at the country and date (quarter) level. These standard errors are contained in the parentheses.

	Dependent variable: VAR decomposed discount rate shocks (ND^i_t)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Δ US Surplus-Debt Ratio$_t$	-0.227**	-0.235**	-0.227**	-0.235**	-0.180*	-0.237**	-0.224**
	(0.095)	(0.101)	(0.095)	(0.101)	(0.108)	(0.101)	(0.110)
Δ Country i's Surplus-Debt Ratio$_t$		0.006		0.006	0.015	0.006	0.008
		(0.024)		(0.024)	(0.025)	(0.024)	(0.025)
Global Fiscal Cycle$^{US}_{i,t}$			-0.003	-0.003	0.029	-0.001	0.006
			(0.078)	(0.078)	(0.081)	(0.078)	(0.084)
Global Consumption Growth$_t$					-0.064		
					(0.044)		
Global GDP Growth$_t$						0.003	
						(0.005)	
Global IP Growth$_t$							-0.004
							(0.015)
Country FE	✓	✓	✓	✓	✓	✓	✓
Observations	3,801	3,801	3,801	3,801	3,801	3,801	3,801
Adjusted R^2	0.003	0.003	0.004	0.004	0.003	0.005	0.005
Note:					*p<0.1; **p<0.05; ***p<0.01		

A.3 Other Results

A.3.1 Decomposing US Surplus-Debt Ratio

Surplus vs Debt: To dig deeper into the key economic drivers behind the link between US Surplus-debt ratio and global risky asset prices, I decompose the variable into its constituent parts. Firstly I explore the role of the numerator (surplus) relative to the denominator (debt). Notice that US Surplus-Debt Ratio_t can mechanically be decomposed into i) surplus/GDP ratio and ii) debt/GDP ratio:

$$\text{US Surplus-Debt Ratio}_t = \frac{\text{Surplus}_t^{US}}{\text{Debt}_{t-1}^{US}} = \underbrace{(\frac{\text{Surplus}_t^{US}}{Y_t})}_{\text{Surplus-GDP Ratio}} \;/\; \underbrace{(\frac{\text{Debt}_{t-1}^{US}}{Y_t})}_{\text{Debt-GDP Ratio}} \tag{A.3}$$

This decomposition is meaningful because both variables have been explored in recent asset pricing contexts: Jiang et al (2019, 2022) explore the unit root behaviour of the US surplus-GDP ratio and its implications for the US excess fiscal capacity, a phenomenon they call the US debt valuation puzzle. In addition, Croce et al, 2019 and Liu (2019) explore the asset pricing implications for the US debt-GDP ratio, showing its predictive power for risk premia in both the time series and the cross-section.

m To evaluate which component is driving my results, I decompose the US surplus-debt ratio into these two components and rerun the baseline specification:

$$\begin{aligned} X_{i,t} =& \alpha + \beta_1 \Delta \text{Y}_t^{US} + \beta_2 \Delta \text{Country i's Surplus-Debt Ratio}_t^{US} \\ & + \beta_3 \Delta \text{Global Fiscal Cycle}_{i,t}^{US} + \beta_4 \Delta r_{F,t}^{US} + \beta_4 \Delta r_{F,t}^{i} + \delta' Macro_t^{US} + \epsilon_{i,t} \\ X_{i,t} \in& \{\Delta DY_{i,t}, r_{i,t}\}, Y_{i,t} \in \{\Delta \text{Surplus-GDP Ratio}_t^{US}, \Delta \text{Debt-GDP Ratio}_t\} \end{aligned} \tag{A.4}$$

The results are presented in table 22 and indicate that although both components are contributing to the global transmission of the US surplus-debt ratio, the results are stronger for the US surplus-GDP ratio.

Table 21: *US Surplus-Debt Ratio vs US Debt-GDP Ratio*

This table estimates the baseline panel specification (A.6) using the US debt-GDP ratio or the US surplus-GDP ratio as the relevant US fiscal variable. When the US surplus-GDP ratio is used, Global Fiscal Cycle$_t$ is defined as an equally weighted average of surplus-GDP ratios for non-US foreign countries. It is defined similarly as an equally weighted average of debt-GDP ratios when the debt-GDP ratio is used instead. Standard errors contained in parentheses are blockwise bootstrapped using panel blocks of length $NT = 14$ and computed using 5,000 iterations.

	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-GDP Ratio$_t$	-2.489***	-2.729***	-2.919***	2.751***	2.757***	2.845***
	(0.631)	(0.566)	(0.598)	(0.463)	(0.437)	(0.462)
Δ Country i's Surplus-GDP Ratio$_t^{US}$	0.110	0.264	0.209	0.631**	0.561	0.635
	(0.354)	(0.317)	(0.330)	(0.260)	(0.248)	(0.258)
Global Fiscal Cycle$_{i,t}^{US}$	2.016*	0.004	0.308	1.334	4.022***	3.928***
	(0.983)	(0.005)	(0.286)	(0.778)	(0.678)	(0.843)
$\Delta R_{F,t}^{US}$	-0.047***	-0.048***	-0.045***	0.032***	0.044***	0.035***
	(0.008)	(0.007)	(0.007)	(0.008)	(0.006)	(0.007)
$\Delta R_{F,t}^{i}$	1.335	2.234***	0.687	-1.244	-0.915*	0.187
	(0.829)	(0.688)	(0.766)	(0.809)	(0.530)	(0.312)
Global Consumption Growth$_t$	−5.312***			5.730***		
	(0.956)			(0.701)		
Global GDP Growth$_t$		0.423***			−0.454***	
		(0.088)			(0.082)	
Global IP Growth$_t$			0.098			-0.314
			(0.321)			(0.211)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,167	3,167	3,167	3,167	3,167	3,167
Adjusted R^2	0.091	0.090	0.073	0.315	0.268	0.240

	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Debt-GDP Ratio$_t$	−0.155***	0.100***	−0.005***	−0.063*	−0.316***	−0.214***
	(0.049)	(0.042)	(0.013)	(0.038)	(0.057)	(0.043)
Δ Country i's Debt-GDP Ratio$_t^{US}$	−0.123**	−0.131**	−0.137**	-0.001	0.020	0.036
	(0.640)	(0.049)	(0.047)	(0.037)	(0.044)	(0.003)
Δ Global Fiscal Cycle$_{i,t}^{US}$	-0.492***	−0.413***	−0.786***	0.436***	0.275***	0.612***
	(0.100)	(0.097)	(0.099)	(0.078)	(0.077)	(0.073)
$\Delta R_{F,t}^{US}$	−0.062***	−0.079***	−0.061***	0.052***	0.069***	0.049***
	(0.009)	(0.007)	(0.1007)	(0.005)	(0.006)	(0.005)
$\Delta R_{F,t}^{i}$	-0.387***	0.317	-0.901	-0.123	-0.176	0.598
	(0.817)	(0.702)	(0.736)	(0.635)	(0.112)	(0.962)
Global Consumption Growth$_t$	−10.357***			10.012***		
	(1.249)			(0.764)		
Global GDP Growth$_t$		0.274***			−0.316***	
		(0.077)			(0.069)	
Global IP Growth$_t$			-1.896			1.692***
			(0.498)			(0.244)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,167	3,167	3,167	3,167	3,167	3,167
Adjusted R^2	0.156	0.105	0.145	0.283	0.165	0.204

Note: *p<0.1; **p<0.05; ***p<0.01

Spending vs Tax: To dig even deeper, notice that US Surplus-Debt Ratio_t can mechanically be decomposed into i) tax/debt ratio and ii) spending/debt ratio:

$$\text{US Surplus-Debt Ratio}_t = \frac{\text{Surplus}_t^{US}}{\text{Debt}_{t-1}^{US}} = \underbrace{(\frac{\text{Tax}_t^{US}}{Debt_{t-1}^{US}})}_{\text{Tax-Debt Ratio}} - \underbrace{(\frac{\text{Spending}_t^{US}}{Debt_{t-1}^{US}})}_{\text{Spending-Debt Ratio}} \tag{A.5}$$

To evaluate which component is driving my results, I decompose the US surplus-debt ratio into these two components and rerun the baseline specification:

$$\begin{aligned} X_{i,t} =& \alpha + \beta_1 \Delta \text{Y}_t^{US} + \beta_2 \Delta \text{Country i's Surplus-Debt Ratio}_t^{US} \\ & + \beta_3 \Delta \text{Global Fiscal Cycle}_{i,t}^{US} + \beta_4 \Delta r_{F,t}^{US} + \beta_4 \Delta r_{F,t}^{i} + \delta' Macro_t^{US} + \epsilon_{i,t} \\ X_{i,t} \in& \{\Delta DY_{i,t}, r_{i,t}\}, Y_t \in \{\Delta \text{US Tax-Debt Ratio}_t, \Delta \text{US Spending-Debt Ratio}_t\} \end{aligned} \tag{A.6}$$

The results are presented in table 22 and indicate that the results are strongest for the US tax-debt ratio. This has an intuitive interpretation: it is really the financing choice of the fiscal policy (tax vs debt) rather than the fiscal policy itself (spending/debt) that drives the US fiscal transmission into global risky asset prices. When the US tax-debt ratio is low, a greater proportion of fiscal expansions are financed via an accumulation of government debt as opposed to contemporaneous tax increases. This corresponds with higher risk premia, as captured by the negative (positive) coefficient on the dividend yield (excess return) regressions.

This is consistent with the economic interpretation that the accumulation of US government debt has distortionary effects that drive up global risk premia on aggregate. These results therefore challenge the conventional view that increasing the supply of dollar safe assets is a source of safety for the global economy that drives down dollar convenience yields and consequently lowers global risk premia (Kekre and Lenel, 2021). It is also an important source of global risk that drives up global risk premia on aggregate.

Table 22: *Spending vs Tax*

Description: This table estimates the baseline panel specification (3) using either the US tax-debt ratio or the US spending-tax ratio as the relevant US fiscal variable. When the US tax-debt ratio is used, Global Fiscal Cycle$_t$ is defined as an equally weighted average of tax-debt ratios for non-US foreign countries. It is defined similarly as an equally weighted average of spending-debt ratios when the spending-debt ratio is used instead. Standard errors contained in parentheses are clustered at country and date (quarter) level.

	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Tax-Debt Ratio$_t$	-9.288***	-13.505***	-9.844***	11.656***	16.220***	13.599***
	(1.588)	(1.696)	(1.452)	(1.883)	(1.837)	(1.662)
Δ Country i's Tax-Debt Ratio$_t^{US}$	0.689**	0.901**	0.868**	0.073	-0.006	-0.034
	(0.310)	(0.407)	(0.305)	(0.243)	(0.247)	(0.256)
Global Fiscal Cycle$_{i,t}^{US}$	8.378***	7.058***	8.765***	−4.073***	-2.437***	-4.272***
	(0.983)	(1.023)	(1.235)	(0.939)	(0.666)	(0.855)
$\Delta R_{F,t}^{US}$	-0.057***	-0.064***	-0.055***	0.045***	0.052***	0.041***
	(0.008)	(0.007)	(0.007)	(0.008)	(0.006)	(0.007)
$\Delta R_{F,t}^{i}$	-0.147	1.177	-0.267	-0.934	-1.314*	-0.401
	(0.789)	(0.878)	(0.719)	(0.613)	(0.757)	(0.602)
Global Consumption Growth$_t$	−6.467***			6.717***		
	(0.954)			(0.747)		
Global GDP Growth$_t$		0.232***			−0.358***	
		(0.069)			(0.062)	
Global IP Growth$_t$			−1.238***			0.807***
			(0.221)			(0.311)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,167	3,167	3,167	3,167	3,167	3,167
Adjusted R^2	0.194	0.165	0.180	0.310	0.231	0.225

	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Spending-Debt Ratio$_t$	1.023	−2.689	0.541	−0.197	6.628***	1.459***
	(1.883)	(1.668)	(1.798)	(0.938)	(1.454)	(1.533)
Δ Country i's Spending-Debt Ratio$_t^{US}$	0.365	0.606	0.612	-0.034	-0.022	-0.289
	(0.330)	(0.421)	(0.423)	(0.261)	(0.278)	(0.275)
Δ Global Fiscal Cycle$_{i,t}^{US}$	9.016	8.268***	8.951***	−5.431***	−4.577***	−5.489***
	(0.890)	(1.197)	(1.199)	(0.975)	(0.778)	(0.987)
$\Delta R_{F,t}^{US}$	−0.053***	−0.075***	−0.058***	0.050***	0.082***	0.053***
	(0.009)	(0.007)	(0.1007)	(0.005)	(0.006)	(0.006)
$\Delta R_{F,t}^{i}$	-0.616	-0.028	-1.314	-0.051	0.558	0.723
	(0.778)	(0.015)	(0.714)	(0.614)	(0.578)	(0.609)
Global Consumption Growth$_t$	−7.177***			9.778***		
	(1.281)			(0.964)		
Global GDP Growth$_t$		0.236***			−0.332***	
		(0.077)			(0.060)	
Global IP Growth$_t$			−0.828**			1.466***
			(0.254)			(0.217)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,167	3,167	3,167	3,167	3,167	3,167
Adjusted R^2	0.215	0.176	0.196	0.320	0.173	0.216

Note: *p<0.1; **p<0.05; ***p<0.01

A.3.2 US vs Euro

Overview: In addition to another foreign country j's fiscal condition, regional fiscal factors, such as a Euro area fiscal factor, may also drive local country i's asset prices independently of the US fiscal condition where $j \neq i$. To explore this, I follow Jiang et al (2020) in defining the following *Euro area fiscal cycle*:

$$\text{Euro Fiscal Cycle}_t = \frac{1}{N} \sum_{i \in \text{Euro}} \Delta \text{Country i's Surplus-Debt Ratio}_t \tag{A.7}$$

Using this Euro fiscal cycle variable, I run similar horserace panel regressions as before that compares the US fiscal condition vis-*á*-vis i) the local fiscal condition and ii) Euro fiscal cycle in its explanatory power for local risky asset prices:

$$\begin{aligned} X_{i,t} =& \alpha + \beta_1 \Delta \text{US Surplus-Debt Ratio}_t + \beta_2 \Delta \text{Country i's Surplus-Debt Ratio}_t^{US} \\ & + \beta_3 \Delta \text{Euro Fiscal Cycle}_{i,t}^{US} + \beta_4 \Delta r_{F,t}^{US} + \beta_4 \Delta r_{F,t}^{i} + \delta' Macro_t^{US} + \epsilon_{i,t} \\ X_{i,t} \in & \{\Delta DY_{i,t}, r_{i,t}\} \end{aligned} \tag{A.8}$$

To properly compare the explanatory power of the US fiscal condition against these two alternative fiscal variables, I orthogonalise i) ΔCountry i's Surplus-Debt Ratio$_t$: four quarter changes in country i's surplus-debt ratio w.r.t four quarter changes in the US surplus-debt ratio and ii) Euro Fiscal Cycle$_{i,t}^{US}$ w.r.t four quarter changes in the US and country i's surplus-debt ratios respectively. The specification also appropriately controls for global as well as risk free rates $(\Delta r_{F,t}^{US}, r_{F,t}^{i})$, both local and US.

These results are demonstrated in table 23. Whilst the Euro fiscal cycle is an economically significant driver of global risky asset prices, its relevance is still dwarfed by the US fiscal condition. Thus the US fiscal condition remains the single most important fiscal variable driving risky asset prices worldwide.

Table 23: *US vs Euro Fiscal Condition and Global Risky Asset Prices*

Panel (a) evaluates the US fiscal condition against the Euro fiscal cycle for all countries in the panel specification. Panel (b) looks specifically at Eurozone countries. Data is from 1980Q1-2018Q4. Standard errors contained in parentheses are blockwise bootstrapped using panel blocks of length $NT = 14$ and computed using 5,000 iterations.

	Panel (a): All Countries					
	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	-11.716***	-11.537***	-12.133***	15.376***	14.828***	14.473***
	(2.003)	(1.871)	(2.088)	(2.018)	(2.040)	(2.034)
Δ Country i's Surplus-Debt Ratio$_t^{US}$	-0.294	-0.244	-0.379	0.930*	1.048**	0.844**
	(0.549)	(0.572)	(0.577)	(0.530)	(0.435)	(0.444)
Δ Euro Fiscal Cycle$_{i,t}^{US}$	−2.508**	−2.332**	−2.618*	5.166***	5.855***	5.281***
	(1.250)	(1.224)	(1.434)	(2.484)	(2.236)	(2.237)
$\Delta R_{F,t}^{US}$	−0.045***	−0.052***	−0.046***	0.039***	0.057***	0.040***
	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.009)
$\Delta R_{F,t}^{i}$	2.420***	2.305***	2.367***	−1.484**	−1.241***	−1.543***
	(0.803)	(0.935)	(0.937)	(0.488)	(0.477)	(0.604)
Euro Consumption Growth$_t$	0.405			2.031***		
	(0.449)			(0.526)		
Euro GDP Growth$_t$		0.368***			−0.398***	
		(0.083)			(0.088)	
Euro IP Growth$_t$			0.241			0.446***
			(0.280)			(0.163)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,167	3,167	3,167	3,167	3,167	3,167
Adjusted R^2	0.091	0.111	0.092	0.240	0.264	0.236

	Panel (a):Eurozone					
	Dependent variable: $\Delta DY_{i,t}$			*Dependent variable:* $r_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	-14.942***	-14.844***	-14.499***	18.974***	17.498***	16.277***
	(2.833)	(2.441)	(2.491)	(3.110)	(2.645)	(2.140)
Δ Country i's Surplus-Debt Ratio$_t^{US}$	−3.222***	−3.226***	−3.232	1.583	1.550	1.522
	(0.972)	(1.271)	(1.253)	(0.960)	(0.955)	(0.971)
Euro Fiscal Cycle$_{i,t}^{US}$	2.111	2.375	2.871	3.021	4.411*	3.068
	(2.234)	(2.524)	(2.850)	(1.990)	(2.040)	(2.018)
$\Delta R_{F,t}^{US}$	−0.054***	−3.341***	−3.309***	−2.885***	−2.980***	−2.544***
	(0.088)	(0.697)	(0.653)	(0.780)	(0.857)	(0.639)
$\Delta R_{F,t}^{i}$	−0.532	−0.855***	−0.748**	−0.933***	−0.989**	−0.900**
	(1.777)	(0.299)	(0.272)	(0.310)	(0.272)	(0.283)
Euro Consumption Growth$_t$	0.611			0.897*		
	(1.231)			(0.471)		
Euro GDP Growth$_t$		0.888**			−0.713***	
		(0.243)			(0.282)	
Euro IP Growth$_t$			−0.255			−0.256
			(0.131)			(0.147)
Country FE	✓	✓	✓	✓	✓	✓
Observations	887	887	887	887	887	887
Adjusted R^2	0.118	0.129	0.119	0.256	0.272	0.246
Note:				*p<0.1; **p<0.05; ***p<0.01		

A.3.3 Global Bond Valuations

Table 24: *US Fiscal Condition, Risk Free rates and Global Bond Market Valuations*

Description: This table regresses the following panel specification using *US or local* macro controls. All regressions include country fixed effects and standard errors are clustered at the country and date (quarter) level. These standard errors are contained in the parentheses.

	Dependent variable: Δ*credit spread*$_{i,t}$			*Dependent variable:* Δ*term spread*$_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	-5.023***	-5.285***	-4.812**	-8.091***	-7.666**	-6.231**
	(0.633)	(0.691)	(0.821)	(1.166)	(1.017)	(1.323)
Δ Country i's Surplus-Debt Ratio$_t^{US}$	-0.0001	-0.0001	-0.0001	-0.0001	-0.001	-0.0001
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Global Fiscal Cycle$_{i,t}^{US}$	-1.575***	-1.777***	-1.791***	-1.872**	-1.472**	-1.433**
	(0.544)	(0.568)	(0.523)	(0.618)	(0.604)	(0.641)
$\Delta R_{F,t}^{US}$	-2.242***	-2.648***	-2.747***	-2.735***	-2.747***	-2.744***
	(0.688)	(0.677)	(0.653)	(0.650)	(0.659)	(0.645)
$\Delta R_{F,t}^{i}$	-0.792***	-0.852***	-0.759**	-0.783***	-0.799**	-0.788**
	(0.347)	(0.333)	(0.312)	(0.210)	(0.353)	(0.322)
Global Consumption Growth$_t$	−0.322			-0.385		
	(0.449)			(0.324)		
Global GDP Growth$_t$		−0.062***			−0.064***	
		(0.016)			(0.012)	
Global IP Growth$_t$			-0.733***			-0.675***
			(0.208)			(0.152)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,006	3,006	3,006	3,006	3,006	3,006
Adjusted R^2	0.223	0.231	0.241	0.251	0.242	0.249

	Dependent variable: Δ*credit spread*$_{i,t}$			*Dependent variable:* Δ*term spread*$_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
Δ US Surplus-Debt Ratio$_t$	-6.219***	-6.623***	-4.982**	-8.000***	-8.231***	-7.225***
	(2.703)	(2.761)	(2.442)	(2.813)	(2.745)	(2.999)
Δ Country i's Surplus-Debt Ratio$_t^{US}$	0.161	0.052	0.174*	0.173	0.072	0.211**
	(0.107)	(0.099)	(0.100)	(0.109)	(0.089)	(0.106)
Global Fiscal Cycle$_{i,t}^{US}$	−1.673***	−1.762***	-0.766	−1.871***	−1.849***	-0.800
	(0.394)	(0.338)	(0.533)	(0.387)	(0.299)	(0.537)
$\Delta R_{F,t}^{US}$	−2.541***	−2.941***	−2.817***	−2.415***	−2.917***	−2.804***
	(0.588)	(0.707)	(0.773)	(0.700)	(0.759)	(0.735)
$\Delta R_{F,t}^{i}$	−1.192***	−1.032***	−1.249**	−1.203***	−0.909**	−0.938**
	(0.347)	(0.333)	(0.312)	(0.410)	(0.450)	(0.427)
US Consumption Growth$_t$	−0.135			0.137		
	(0.421)			(0.371)		
US GDP Growth$_t$		−0.008			−0.013	
		(0.089)			(0.122)	
US IP Growth$_t$			−0.695***			−0.675***
			(0.231)			(0.182)
Country FE	✓	✓	✓	✓	✓	✓
Observations	3,006	3,006	3,006	3,006	3,006	3,006
Adjusted R^2	0.263	0.271	0.241	0.271	0.273	0.289
Note:				*p<0.1; **p<0.05; ***p<0.01		

A.4 Additional Uncertainty Proxies

Here I use other uncertainty proxies to solidify the link between the US fiscal cycle and global uncertainty.

Micro Uncertainty: Dew-Becker and Giglio (2021) construct country level measures for ex-ante cross-sectional uncertainty using firm level options. This includes the US as well as the following European countries: Switzerland, Germany, France, United Kingdom, Netherlands and other constitutents of the Euro Stoxx 50 index. I define *Global Micro-Uncertainty* as a GDP weighted average of these country level measures.

Table 25: *US Fiscal Cycle and Global Micro-Uncertainty*

This table regresses global micro uncertainty (IV_t^{Global}) against the US fiscal cycle, other fiscal and macro controls:

$$IV_t^{Global} = \alpha + \beta_1 \Delta \text{US Surplus-Debt Ratio}_t + \beta_3 \Delta \text{Global Fiscal Cycle}_{i,t}^{US} + \delta' Macro_t + \epsilon_{i,t} \quad \text{(A.9)}$$

Description: The sample is from 2002Q1-2018Q4.

	Dependent variable: Global Micro Uncertainty			
	(1)	(2)	(3)	(4)
Δ US Surplus-Debt Ratio$_t$	-8.638***	-5.477***	-6.584***	-8.396***
	(1.692)	(1.965)	(1.721)	(1.985)
Global Fiscal Cycle$_t^{US}$	-3.201**	-1.269	-2.686**	-2.908*
	(1.218)	(1.347)	(1.155)	(1.739)
Global Consumption Growth$_t$		-4.223***		
		(1.508)		
Global GDP Growth$_t$			-0.876***	
			(0.282)	
Global IP Growth$_t$				-0.077
				(0.322)
	(0.009)	(0.030)	(0.088)	(0.011)
Observations	67	67	67	67
Adjusted R^2	0.327	0.392	0.407	0.317
Note:				*p<0.1; **p<0.05; ***p<0.01

GEPU: Evidence thus far looks at economic uncertainty. I also evaluate the link between news based policy uncertainty to the US fiscal condition. In specific terms, I look at the global economic policy uncertainty index (GEPU) constructed by Davis (2016) which is a GDP weighted average of EPU indexes for 16 countries obtained from Baker, Bloom and Davis (2016). GDP weights are computed using both current prices and a PPP adjustment.

Table 26: *US Fiscal Cycle and GEPU*

This table regresses the 1-year (four quarter) change in GEPU on the US fiscal cycle, other fiscal and macro controls:

$$\Delta GEPU_t = \alpha + \beta_1 \Delta \text{US Surplus-Debt Ratio}_t + \beta_3 \Delta \text{Global Fiscal Cycle}^{US}_{i,t} + \delta' Macro_t + \epsilon_{i,t} \tag{A.10}$$

Description: Estimations involve GDP weights constructed using both current prices and a PPP adjustment. The sample is from 1997Q1-2018Q4.

	Dependent variable: Global Economic Policy Uncertainty Index (GEPU)							
	Current Prices				PPP Adjusted			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ US Surplus-Debt Ratio$_t$	-0.159**	-0.158*	-0.178**	-0.227**	-0.165**	-0.163*	-0.183**	-0.225**
	(0.078)	(0.089)	(0.081)	(0.089)	(0.077)	(0.088)	(0.079)	(0.088)
Global Fiscal Cycle$_t^{US}$	0.001	0.001	0.007	-0.007	0.002	0.002	0.001	-0.006
	(0.006)	(0.006)	(0.005)	(0.008)	(0.0056)	(0.0061)	(0.005)	(0.007)
Global Consumption Growth$_t$		-0.001				-0.002		
		(0.005)				(0.005)		
Global GDP Growth$_t$			0.001				0.001	
			(0.001)				(0.001)	
Global IP Growth$_t$				0.002				0.002
				(0.001)			(0.001)	
Observations	83	83	83	83	83	83	83	83
Adjusted R^2	0.025	0.013	0.026	0.042	0.030	0.017	0.031	0.041
Note:					*p<0.1; **p<0.05; ***p<0.01			

A.5 SVAR Robustness

Robustness: The VAR results presented before assumed that the fiscal shock ($Fiscal_t^i$) moved first. Here I rotate the recursive ordering to confirm the robustness of my VAR predictability results. Here I focus on the US fiscal condition and use the following four variable, one lag system:

$$z_t = \left[\Delta IP_t^W, \;\; \Delta IP_t^{US}, \;\; \Delta \text{US Surplus-Debt Ratio}_t, \;\; r_t^w \right]^T \tag{A.11}$$

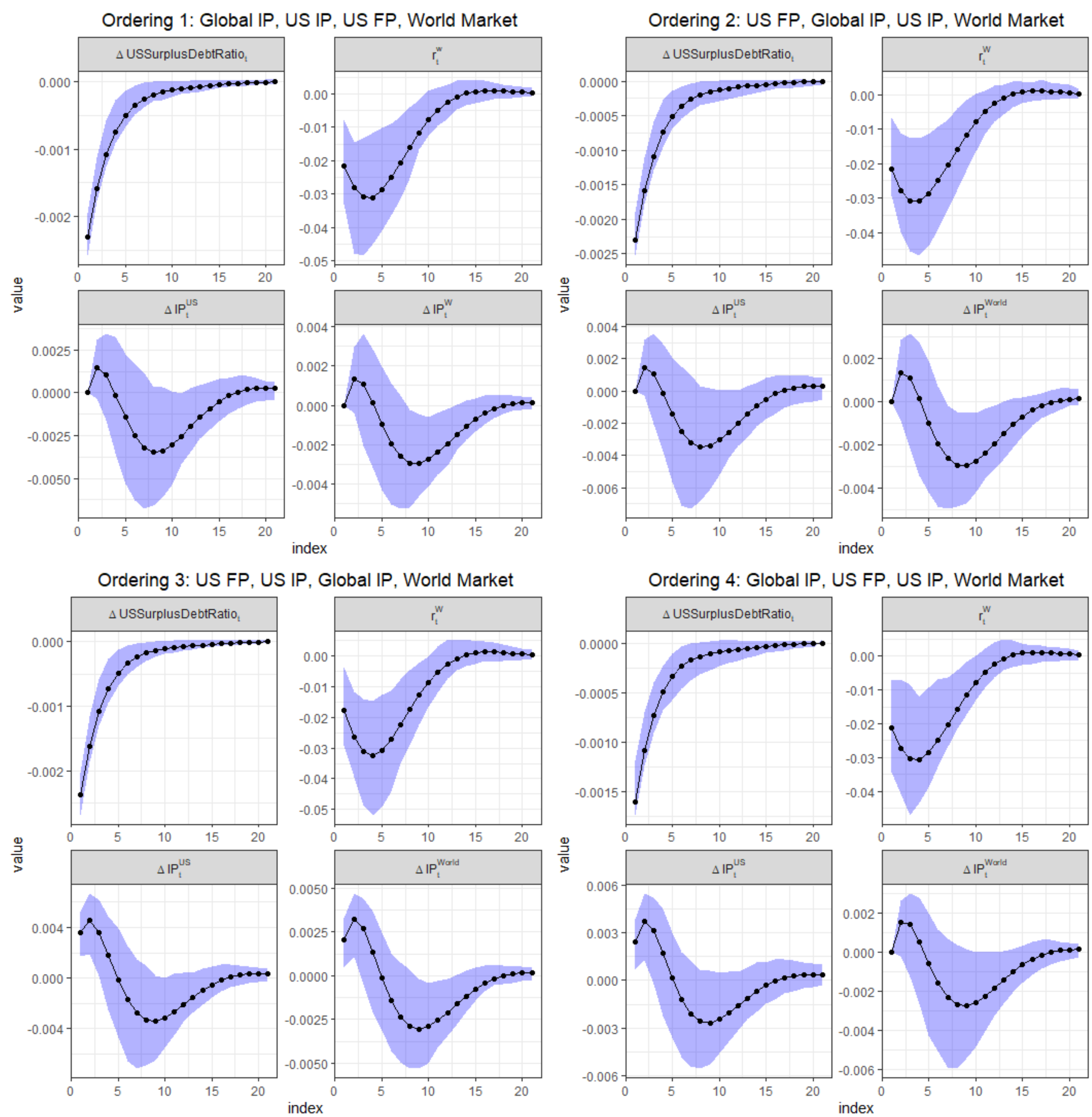
State System: ΔIP_t^W, ΔIP_t^{US} are world and US industrial production growth respectively. ΔUS Surplus-Debt Ratio$_t$ is the yearly (four quarter) change in the US surplus-debt ratio and r_t^w is the world market return.

Ordering Assumption: I identify structural shocks using the baseline recursive ordering given by (A.15). However I also rotate the ordering to ensure the robustness of the predictability results w.r.t the recursive ordering assumption. In all cases the procedure identifies innovations to ΔUS Surplus-Debt Ratio$_t$ as a pure US fiscal shock that is not driven by the US or global economy.

IRFs: The orthogonalised impulse responses to a ***negative*** 1 standard deviation shock to ΔUS Surplus-Debt Ratio are produced in figure 11. In each of the alternative orderings the world market return is ordered last, implying that global risky asset prices respond instantaneously to the structural macro and fiscal shocks. In each case the response of the world market return (r_t^W) matches the predictability regression results: ***deteriorations*** in the US fiscal condition predicts ***higher*** future global equity returns over the short, medium and long run. In line with the earlier predictability regressions, the world market return declines initially over the first four quarters before sharply rising subsequently over the next 4 years (16 quarters).

Figure 10: *IRFs to a 1 SD negative SD negative SD positive US fiscal shock (ΔUS Surplus-Debt Ratio$_t$ $\downarrow$)*

Description: The figure plots IRFs to a ***negative*** 1 SD shock to ΔUS Surplus-Debt Ratio$_t$. The four panels estimates the IRFs using a different recursive ordering that is labelled in the figure. The blue areas indicate 95% confidence intervals. Standard errors were generated using 10,000 Monte Carlo simulations. Sample is from 1980Q1-2018Q4.



A.6 Predictability

Overview: Taking stock, it is worth noting that the results thus far have been ***correlative***: they demonstrate that deteriorations in the US fiscal condition ***coincide*** with depressed global risky asset prices. Here I now provide suggestive evidence in favour of a ***causal*** link between US fiscal deteriorations and i) depressed global risky asset prices and ii) elevated levels of global risk premia. Using an overlapping predictive regressions framework, I show here that deteriorations in the US fiscal condition can predict higher global equity returns over short, medium and long run horizons. The empirical specification is the following:

$$\begin{aligned} r^i_{t+j,t+j+4} =& \alpha + \beta_1 \Delta \text{US Surplus-Debt Ratio}_t + \beta_2 \Delta \text{Country i's Surplus-Debt Ratio}^{US}_t \\ &+ \beta_3 \text{Global Fiscal Cycle}^{US}_{i,t} + \delta' X_t + \epsilon_{i,t} \end{aligned} \tag{A.12}$$

The control vector X_t includes traditional risk controls that are well known to predict equity returns identified by Campbell et al (2017):

$$X_t = \begin{bmatrix} \Delta DY_{i,t} & \Delta TS_{i,t} & \text{VOL}_{i,t} \end{bmatrix}^T \tag{A.13}$$

The control vector includes country level dividend yields, term spread and stock market volatility respectively. I take the first difference of dividend yields and term spreads due to the well documented persistence in these variables (Stambaugh, 1999). The panel predictive regressions are reported in table 28. I also report time series predictability regression results at the country level in table 27.

Interpretation: The results are clear: table 28 clearly indicates that deteriorations in the US fiscal condition predict higher global equity returns over the short, medium and long run. In response to a positive US fiscal shock, global equity returns initially decline over the next year, captured by the positive coefficient on $r^i_{t,t+4}$, before subsequently rising sharply over the next four years, as captured by negative coefficients on $r^i_{t+4,t+8}, r^i_{t+8,t+12}, r^i_{t+12,t+16}$ and $r^i_{t+16,t+20}$. These predictability patterns are robust across a range of different countries: the time series predictability regressions reported in table 27 indicate that these predictability patterns are pervasive across all global equity markets.

Is the predictive power of the US fiscal condition spanned by other fiscal variables or by traditional risk controls? The multivariate results contained in panel B of table 28 illustrates that this is not the case: even after controlling for other fiscal variables and traditional risk controls such as the dividend yield, term spread and stock market volatility, the predictive power of the US fiscal condition is preserved.

Table 27: US Fiscal Condition and Cross-Sectional Predictability

Description: This table documents results associated with estimating (A.12) at the country level for each country i. Coefficient for ΔUS Surplus-Debt Ratio$_t$ are reported in this table. For each time series regression, standard errors are Newey-West with four lags.

Developed Countries										
Country	$r_{t,t+4}$		$r_{t+4,t+8}$		$r_{t+8,t+12}$		$r_{t+12,t+16}$		$r_{t+16,t+20}$	
	Coefficient	(t-stat)	Coefficient	(t-stat)	Coefficient	(t-stat)	Coefficient	(t-stat)	Coefficient	(t-stat)
Australia	10.130***	(2.63)	-0.66	(-0.03)	−6.192**	(-2.46)	−9.760***	(-2.89)	−3.73	(-1.01)
Belgium	9.627*	(1.78)	−5.506*	(-1.63)	−15.11***	(-3.10)	−14.015**	(-2.23)	−0.39	(-0.11)
Canada	9.504*	(1.91)	−7.144**	(-2.00)	−5.430**	(-1.86)	−8.900**	(-2.01)	−1.780	(-0.70)
Denmark	8.901	(1.08)	−7.083	(-1.03)	−7.929*	(-1.94)	−3.950	(-0.99)	−3.950	(-1.12)
France	10.973*	(1.78)	−1.900	(-0.02)	−6.344*	(-1.72)	−14.630**	(-2.230)	−6.86**	(-2.00)
Germany	12.567**	(2.01)	−2.121	(-0.32)	−13.650**	(-2.32)	−13.819**	(-2.34)	−2.759	(0.84)
Italy	15.220**	(2.10)	−6.95*	(-1.66)	−16.476***	(-2.72)	−19.646***	(-3.00)	−2.12	(-0.59)
Japan	6.862	(0.11)	−2.359	(-0.56)	−8.617**	(-2.041)	−23.874***	(-4.00)	−7.303*	(-1.87)
Netherlands	9.774	(1.08)	−1.781	(-0.48)	−5.723*	(-1.70)	−16.810***	(-2.400)	−2.02	(-0.57)
Norway	20.668**	(2.38)	−1.900	(-0.41)	−5.055	(-1.26)	−23.315***	(-3.87)	−5.460	(-1.22)
New Zealand	2.704	(0.66)	−3.820*	(-1.73)	−2.833	(-1.360)	−6.430***	(-2.86)	−2.171	(-0.77)
Sweden	20.637***	(2.52)	−3.310	(-0.67)	−14.760***	(−3.280)	−14.09**	(-2.40)	−3.88	(-0.96)
Switzerland	14.519**	(2.01)	−5.520*	(-1.601)	−10.04***	(-3.42)	−14.860***	(-3.01)	−2.73	(0.91)
United Kingdom	5.876	(0.87)	−3.703	(-1.08)	−6.211**	(-2.01)	−12.300***	(-2.78)	−1.946	(-0.46)

Table 28: *US Fiscal Condition and Predictability*

This table runs the following horserace panel specification of country j's fiscal condition against the US fiscal condition in explaining country i's risk premium proxy $X_{i,t}$:

$$\begin{aligned} r^i_{t+j,t+k} =& \alpha + \beta_1 \Delta \text{US Surplus-Debt Ratio}_t + \beta_2 \Delta \text{Country i's Surplus-Debt Ratio}_t \\ & + \beta_3 \text{Global Fiscal Cycle}^{US}_{i,t} + \delta' X_t + \epsilon_{i,t} \end{aligned} \quad (A.14)$$

Description: Results are reported for the univariate and multivariate cases respectively. All regressions include country fixed effects and standard errors clustered at the country and date (quarter) level. These standard errors are contained in the parentheses.

	Panel A: Univariate Regressions				
	$r^i_{t,t+4}$	$r^i_{t+4,t+8}$	$r^i_{t+8,t+12}$	$r^i_{t+12,t+16}$	$r^i_{t+16,t+20}$
Δ US Surplus-Debt Ratio	1.950**	-6.121***	-7.578***	-11.375***	-4.187***
	(0.767)	(0.746)	(0.723)	(0.717)	(0.723)
Country FE	✓	✓	✓	✓	✓
Observations	3,543	3,439	3,335	3,231	3,127
Adjusted R^2	0.007	0.007	0.009	0.037	0.006

	Panel B: Multivariate Regressions				
	$r^i_{t,t+4}$	$r^i_{t+4,t+8}$	$r^i_{t+8,t+12}$	$r^i_{t+12,t+16}$	$r^i_{t+16,t+20}$
Δ US Surplus-Debt Ratio_t	6.029***	-2.764**	-9.258***	-12.467***	-1.803**
	(1.359)	(1.240)	(0.820)	(0.995)	(0.775)
	(1.059)	(1.051)	(1.025)	(1.020)	(1.048)
Δ Country i's Surplus-Debt Ratio^{US}_t	-0.002***	-0.003***	0.005***	-0.010	0.029***
	(0.0003)	(0.0001)	(0.0001)	(0.013)	(0.006)
Global Fiscal $\text{Cycle}^{US}_{i,t}$	-1.797*	2.282**	1.480*	1.653**	-3.315***
	(1.088)	(0.896)	(0.772)	(0.770)	(0.708)
$\Delta DY_{i,t}$	0.067*	0.094***	-0.008	-0.062***	0.096***
	(0.034)	(0.021)	(0.023)	(0.021)	(0.021)
$VOL_{i,t}$	0.215	-0.752	-3.806***	0.185	0.147
	(0.994)	(0.884)	(0.503)	(0.584)	(0.570)
$TS_{i,t}$	1.719	-0.302	-2.480	-9.714***	-8.274*
	(2.749)	(2.311)	(2.733)	(2.116)	(4.501)
Country FE	✓	✓	✓	✓	✓
Observations	2,854	2,750	2,646	2,544	2,445
Adjusted R^2	0.011	0.015	0.045	0.067	0.032

Note: *p<0.1; **p<0.05; ***p<0.01

SVAR: To complement the predictability regression results, I also demonstrate predictability using a structural vector autoregression (SVAR) approach. I estimate a four variable, one lag system that is recursively ordered as follows:

$$z_t^i = \left[Fiscal_t^i, \ \ \Delta c_t^W, \ \ \Delta IP_t^W, \ \ r_t^w - r_t^f \right]^T \tag{A.15}$$

State System: Δc_t^W, ΔIP_t^W are global consumption and industrial production growth respectively. $r_t^w - r_t^f$ is the global market excess return using the 1 year US treasury bill rate as the reference global risk-free asset. Finally $Fiscal_t^i$ is identified as the residuals (ϵ_t^i) from the following regression:

$$\Delta\text{Country i's Surplus-Debt Ratio}_t = \alpha + \beta_1 \Delta IP_t^i + \beta_2 \Delta IP_t^W + \epsilon_t^i \tag{A.16}$$

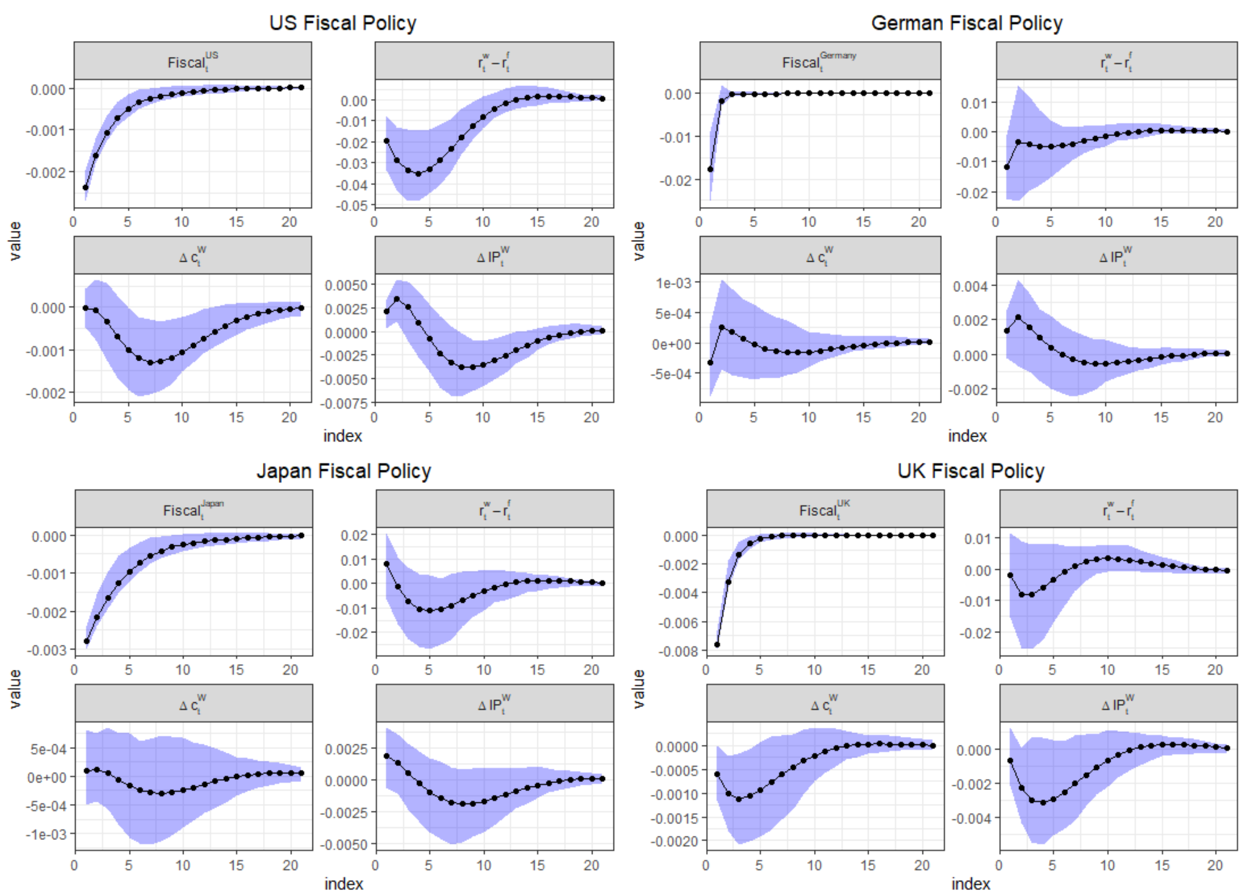
In other words, $Fiscal_t^i$ captures the component of country i's surplus fluctuations that is orthogonal to the local and global business cycles. Thus it captures a pure fiscal shock for country i, validating the timing restriction imposed by the SVAR that $Fiscal_t^i$ moves first and thus does not respond contemporaneously to the macroeconomy. The timing restriction also assumes that $Fiscal_t^i$ drives asset prices contemporaneously but only responds to asset prices with a lag. This restriction is likely to be satisfied for two reasons. Firstly, the denominator of Country i's Surplus-Debt Ratio$_t$: fiscal policy (surplus) is implemented with a lag, so it is unable to respond to large asset price fluctuations such as the global financial crisis (GFC) contemporaneously (Blanchard and Perotti, 2002). Moreover the denominator of Country i's Surplus-Debt Ratio$_t$ is the lagged, not concurrent, government debt market value: B_{t-1}^i, not B_t^i. Thus it also does not respond contemporaneously to concurrent asset price valuation shocks either. Thus the estimated orthogonalised impulse responses to this variable provide another way to confirm my predictability results.

IRFs: The orthogonalised impulse responses to a negative 1 standard deviation shock to

$Fiscal_t^i$ are produced in figure 11 for four large countries: US, Germany, Japan and UK. The VAR confirms that global return predictability is unique to the US fiscal condition: pure fiscal shocks to other large countries such as Germany, Japan or the UK do not exert the same influence over future global equity returns. The impulse response of global equity returns to these foreign fiscal shocks always contains zero in the confidence intervals. This supports my earlier correlation evidence suggesting that the international transmission of US fiscal policy into global risky asset prices is unique.

Figure 11: *IRFs to a 1 SD negative SD negative fiscal shock for US, Germany, Japan and UK*

Description: The figure plots IRFs to a ***negative*** 1 SD shock to $Fiscal_t^i$ for US, UK, Germany, Japan and UK. The blue areas indicate 95% confidence intervals. Standard errors were generated using 10,000 Monte Carlo simulations. Sample is from 1980Q1-2018Q4.



B Other Identification Schemes

Overview: The causal link between the US fiscal condition and global risk premia presented thus far has been presented using the US surplus-debt ratio as a proxy for US fiscal capacity. Here I explore robustness w.r.t other identification schemes for US fiscal shocks.

SOTU and SOTS: Here I focus on high frequency identification techniques. In particular, I look at scheduled legislative addresses by executive political office holders to identify the effect of fiscal news on global risky asset prices. For federal fiscal news, I follow Liu and Shaliastovich (2021) and evaluate global risky asset price responses around the State of the Union (SOTU) address given by the President of the United States in the beginning of nearly every year. As a placebo test, I also look at two other types of scheduled fiscal announcements. Firstly, I look at the State of the State (SOTS) addresses given by governors to a joint session of the state legislatures. Secondly, I also explore responses around foreign scheduled fiscal news announcements, which are defined as dates of scheduled speeches by government officers (Treasurer in Australia, Chancellor in the UK for example), announcing details of the national budget. Evaluating the differential response of global risky asset prices around the SOTU and these alternative fiscal announcements can be revealing. If returns are higher around SOTU days vs non-SOTU days but these other fiscal news days do not exhibit a similar differential price response, this would support my hypothesis that there is a causal link between discretionary US fiscal policy expansions and global equity risk premia.

Discussions: Table 29 confirms that there is a differential price response. Whilst global risky-asset prices rise on SOTU days (23 basis points vs 2 basis points on non-SOTU days), there is no statistical or economically significant evidence that they do on SOTS days relative to non-SOTS days. In addition, there is no differential price response around foreign scheduled fiscal, budgetary, news announcements.

Table 29: *SOTU, SOTS and Foreign FP Announcement Effects and Global Risky Asset Prices*

This table reports summary statistics for excess local equity returns for foreign non-US equity markets around State of the Union (SOTU) and State of the State (SOTS) addresses. Means and standard deviations are in basis points. The t-statistics are associated with testing the null that the difference in mean returns on SOTU (SOTS) days and non-SOTU (SOTS) days is zero. The sample period is 1980Q1-2018Q4.

Panel (a): Local Equity Returns around SOTU

Country	*SOTU*			*SOTU+1*			*Non-SOTU Days*	
	Mean	SD	T-Stat	Mean	SD	T-Stat	Mean	SD
Australia	14.09	123.08	0.79	34.23	73.24	1.72*	2.90	109.23
Belgium	27.09	97.20	1.69*	42.09	109.23	2.00**	2.43	92.10
Canada	11.80	88.30	0.72	1.71	80.10	0.13	1.48	98.2
Denmark	9.23	104.49	0.39	2.49	88.45	0.29	1.27	88.5
France	16.70	80.80	0.932	30.20	103.2	2.31**	1.97	149.2
Germany	38.20	78.10	3.21***	33.44	122.70	1.98**	3.08	135.67
Italy	30.91	88.10	1.89*	26.80	124.08	1.29	0.55	173.80
Japan	14.82	155.29	0.38	28.98	107.30	1.03	3.20	148.32
Netherlands	31.98	81.38	2.08**	20.10	131.77	1.30	1.3	107.80
Norway	36.23	82.32	3.00***	28.12	109.23	1.60	2.74	120.82
New Zealand	19.09	100.23	1.49	24.10	110.23	1.32	2.00	113.51
Sweden	31.28	92.39	2.01**	38.12	97.13	1.88*	2.41	118.23
Switzerland	22.38	109.65	1.53	26.23	117.23	1.68*	2.40	153.80
United Kingdom	24.21	144.23	1.11	49.23	93.24	3.42***	2.80	105.32
Aggregate	23.43	72.80	2.04**	27.56	60.84	2.60***	2.18	107.19

Panel (b): Global Equity Returns around SOTU vs SOTS

Type	*Announcement*			*Announcement+1*			*Non-Announcement Days*	
	Mean	SD	T-Stat	Mean	SD	T-Stat	Mean	SD
SOTU	23.43	72.80	2.04**	27.56	60.84	2.60***	2.18	107.19
SOTS	4.23	83.98	0.09	2.89	73.24	0.05	2.58	89.81
Australia	4.02	43.98	0.53 h58	4.11	43.28	0.28	1.91	79.22
Canada	3.01	43.33	0.42 h58	4.87	48.20	0.30	2.23	80.80
New Zealand	3.47	49.42	0.61 h58	4.89	43.19	0.32	1.22	89.20
United Kingdom	6.23	43.98	0.74 h58	7.89	43.10	0.75	2.09	79.23

C A Simple Risk-Sharing Model

Overview: Here I present a simpler risk-sharing model to make sense of my main empirical facts. This simpler model abstracts from production and investigates frictionless trading arrangements amongst EZ agents in response to fiscal shocks. The equilibrium risk-sharing scheme requires the US to internalise the global ramifications of her own policy actions by providing long-lasting insurance to the non-US world in response to deteriorations in her own fiscal condition. Since such persistent insurance is a source of long-run risk for these foreign countries, this risk-sharing arrangement reproduces my empirical evidence tying US fiscal deteriorations to i) lower global growth expectations, ii) higher global uncertainty and iii) higher global equity risk premia.

Framework: There are $N+1$ countries indexed by $i \in \{0, 1, 2, ..., N\}$. Country 0 is the model analogue to the United States (US) and the remaining N countries compose the non-US world. Each country is an endowment economy and produces a unique tradable good whose exogenous dynamics are described below:

$$x^i_{t+1} = \mu + x^i_t - \tau(x^i_t - \frac{1}{N}\sum_{j=0}^{N+1} x^j_t) + \xi^i_{t+1} + z^i_t \qquad \{\text{Endowments}\}$$

$$z^i_{t+1} = \begin{cases} \rho_x z^i_t + \epsilon^i_{s,t+1} + \beta^i_{US}\epsilon^{US}_{s,t+1} & \text{if } i \neq US \\ \rho_x z^i_t + \epsilon^{US}_{s,t+1} & \text{if } i = US \end{cases} \qquad \{\text{Persistent Component}\}$$

$$\Delta s^i_{t+1} = \mu_s(1-\rho_s) + \rho_s \Delta s^i_t + \epsilon^i_{s,t+1} \qquad \{\Delta\text{Surplus-Debt Ratio}\}$$

Parameters

μ: *Mean Endowment Growth Rate*

τ: *Degree of Cointegration*[9]

[9] Colacito, Croce and Liu (2019) show that cointegration is required to ensure a well-defined ergodic distribution of the relative supply of the two goods.

β^i_{US}: *Country i's LRR Exposure to US fiscal condition*

Fiscal Shocks and Growth News: To focus on the model's risk-sharing mechanism for US fiscal shocks, I impose an exogenous linear mapping between country level growth prospects and fiscal conditions.[10] The US is special here because her fiscal condition influences the growth prospects of all other countries, a trait that applies to no other country. I impose the assumption that $\beta^i_{US} > 1, \ \forall i$. Thus US fiscal policy has a relatively larger impact on foreign growth expectations than US growth expectations. This assumption is critical to the operation of the model's risk-sharing scheme: it ensures that foreign marginal utility is more adversely impacted and consequently the direction of insurance is from the US to the ROW in response to a US fiscal deterioration.

Consumption Preferences: Consumption streams for each country are defined over a general CES aggregator of the $N+1$ goods:

$$C^i_t = [\sum_{i=1}^{N+1} \alpha_{i,j}^{\frac{1}{\phi}} (C^i_{j,t})^{1-\frac{1}{\phi}}]^{\frac{\phi}{\phi-1}} \tag{C.1}$$

$C^i_{j,t}$: *country i's consumption of good j*

$\alpha_{i,j}$: *Country i's preference for good j*

ϕ: *Elasticity of Substitution across goods*

Consumption Home Bias: I assume that $\alpha_{i,i} = \alpha \in (\frac{1}{2}, 1), \ \forall i$. Since $\alpha < 1$, agents value both goods so there will be international trade in equilibrium. However since $\alpha > \frac{1}{2}$, international risk sharing will be limited by a natural desire for a *home biased consumption basket*. Preference for all other foreign goods are symmetric: $\alpha_{i,j} = \frac{1-\alpha}{N}, \ \forall j \neq i$

[10] This linear mapping can be microfounded in a more GE setup with endogenous growth where worsening fiscal capacity creates long-run risk by amplifying tax uncertainty and consequently uncertainty over long-run future consumption profiles (Croce et al, 2012).

Goods Prices: All consumption goods are internationally tradable at prices $\{p_{i,t}\}_{i=0}^{N}$ which are denominated in units of the *global numeraire*. I fix the *consumption basket of the US (country* 0*)* as the *global numeraire*. This means that goods prices $\{p_{i,t}\}_{i=0}^{N}$ are denominated in units of the US consumption basket.

Price Levels: Denote by Q_t^i the relative price of country i's consumption in units of the global numeraire. By construction:

$$Q_t^i = \begin{cases} \mathcal{E}_{i,t} = [\sum_{j=1}^{N+1}(\frac{1-\alpha}{N})^{\frac{1}{\phi}}(p_{j,t})^{1-\frac{1}{\phi}}]^{\frac{\phi}{\phi-1}} & \text{if } i \neq 0 \\ 1 & \text{if } i = 0 \end{cases} \tag{C.2}$$

Proof of these results are contained in theory appendix C.9.1. Note that since country 0 (US)'s consumption basket is the global numeraire, Q_t^i is the real dollar exchange rate $\mathcal{E}_t$ denoted by country i's consumption units per country 0 (US) consumption units.

Preferences: Each country is populated by a representative investor that has Epstein and Zin (1989) and Weil (1989) recursive preferences. These preferences are defined over the local consumption basket C_t^i defined in (C.1). Thus, the lifetime utility of investor i satisfies:

$$U_t^i = [(1-\delta)(C_t^i)^{1-\frac{1}{\psi}} + \delta(E_t {U_{t+1}^i}^{1-\gamma})^{\frac{1-\frac{1}{\psi}}{1-\gamma}}]^{\frac{1}{1-\frac{1}{\psi}}}, i \in \{0, 1, 2, ..., N\}$$

Parameters

δ: *Time Preference*

ψ: *Intertemporal Elasticity of Substitution (IES)*

γ: *Relative Risk Aversion*

C_t^i: *Consumption for country i at time t*

C.1 Financial Markets

Financial markets are dynamically complete: Real exchange rate growth $\Delta\mathcal{E}_t$ is pinned down by the equality of marginal utility growths (Backus, Foresi and Telmer, 2001):

$$\Delta\mathcal{E}_{i,t} = m_t^0 - m_t^i \tag{C.3}$$

m_t^i denotes the log stochastic discount factor (SDF) of country i.

C.2 Investor's Problem

Overview: Since markets are dynamically complete, the intertemporal budget constraint (IBC) can be written in static form:

$$\max_{\{\{C_{j,t}^i\}_{j=0}^{N+1}, W_{t+1}^i\}_{t=0}^{\infty}} U_0^i \tag{C.4}$$

$$s.t.\ \mathbb{E}_0 \sum_{t=0}^{\infty} \frac{\Lambda_t}{\Lambda_0} Q_t^i C_t^i \leq \mathbb{E}_0 \sum_{t=0}^{\infty} \frac{\Lambda_t}{\Lambda_0} Q_t^i W_t^i \tag{C.5}$$

$$Q_t^i C_t^i = \sum_{j=0}^{N} p_{j,t} C_{j,t}^i \tag{C.6}$$

$$C_t^i = [\sum_{i=1}^{N+1} \alpha_{i,j}^{\frac{1}{\phi}} (C_{j,t}^i)^{1-\frac{1}{\phi}}]^{\frac{\phi}{\phi-1}} \tag{C.7}$$

$$\alpha_{i,i} = \alpha \in (\frac{1}{2}, 1),\ \ \alpha_{i,j} = \frac{1-\alpha}{N},\ \ \forall i \neq j \tag{C.8}$$

Λ_t is the world state price density that prices country i's wealth portfolio in units of the global numeraire.

C.3 Solution Method

Table 30: Equilibrium System

Exogenous Processes
$(A1):\ x_t^i = logX_t^i = \mu + x_t^i - \tau(x_t^i - \frac{1}{N}\sum_{j=0}^{N+1} x_t^j) + \xi_{t+1}^i + z_t^i$
$(A2):\ z_{t+1}^i = \begin{cases} \rho_x z_t^i + \epsilon_{s,t+1}^i + \beta_{US}^i \epsilon_{s,t+1}^{US} & \text{if } i \neq US \\ \rho_x z_t^i + \epsilon_{s,t+1}^{US} & \text{if } i = US \end{cases}$
$(A3): \Delta s_{t+1}^i = \mu_s(1-\rho_s) + \rho_s \Delta s_t^i + \epsilon_{s,t+1}^i\ , \forall i$
Consumption FOCs
$(A4):\ C_{i,t}^i = X_t^i[1 + \frac{1-\alpha}{\alpha(N-1)} \sum_{j\neq i} \frac{S_{j,t}}{S_{0,t}}]^{-1}$
$(A5):\ C_{j,t}^i = \frac{1-\alpha}{\alpha}\frac{1}{N-1}\frac{S_{j,t}}{S_{i,t}} C_{i,t}^i$
Net Exports (vis-*á*-vis the US)
$(A6):\ NX_t^i = X_t^i - C_{i,t}^0 - \sum_{j=1}^{N+1} C_{i,t}^j$
Consumption Aggregators
$(A7): C_t^i = [\sum_{j=1}^{N+1} \alpha_{i,j}^{\frac{1}{\phi}} (C_{j,t}^i)^{1-\frac{1}{\phi}}]^{\frac{\phi}{\phi-1}}$
Relative Prices
$(A8):\ p_{i,t} = (\alpha_{0,i}\frac{C_t^0}{C_{i,t}^0})^{\frac{1}{\phi}}$
Price Levels
$(A9):\ Q_t^i = \begin{cases} \mathcal{E}_{i,t} = [\sum_{j=1}^{N+1} (\frac{1-\alpha}{N})^{\frac{1}{\phi}} (p_{j,t})^{1-\frac{1}{\phi}}]^{\frac{\phi}{\phi-1}} & \text{if } i \neq 0 \\ 1 & \text{if } i = 0 \end{cases}$
State Variable
$(A10):\ S_{i,t} = S_{i,t-1}(\frac{M_t^i}{M_t^0})^{\phi}(\frac{C_t^i/C_{t-1}^i}{C_t^0/C_{t-1}^0})$
Global Consumption Shares
$(A11):\ SWC_t^i = \frac{Q_t^i C_t^i}{\sum_{j=0}^{N+1} p_{j,t} X_{j,t}}$
Wealth-Consumption Ratios
$(A12):\ wc_t^i = [\mathbb{E}_t e^{\theta[ln\delta + (1-\frac{1}{\psi})\Delta c_{t+1}^i + log(1+wc_{t+1}^i)]}]^{\frac{1}{\theta}}$
Wealth Returns
$(A13):\ R_{m,t+1}^i = \frac{(1+wc_{t+1}^i)e^{\Delta c_{t+1}^i}}{wc_t^i}$
Price-Dividend Ratios
$(A14):\ pd_t^i = \mathbb{E}_t e^{\theta ln\delta - \frac{\theta}{\psi}\Delta c_{t+1}^i + (\theta-1)log(R_{m,t+1}^i) + log(1+pd_{t+1}^i) + \Delta x_{t+1}^i + \Delta p_{t+1}^i}$
Equity Returns
$(A15):\ R_{t+1}^i = \frac{(1+pd_{t+1}^i)e^{\Delta x_{t+1}^i}}{pd_t^i}$
SDFs
$(A16):\ M_{t+1}^i = e^{\theta ln\delta - \frac{\theta}{\psi}\Delta c_{t+1}^i + (\theta-1)log(R_{m,t+1}^i)}$
Exchange Rate
$(A17):\ \Delta\mathcal{E}_{i,t+1} = log(\frac{M_{t+1}^0}{M_{t+1}^i})$

Pareto Weight: The equilibrium system of equations is presented in table 30.[11] I follow Colacito et al (2018) and Anderson (2005) and recast the equilibrium in terms of the pareto weight distribution $\{S_{i,t}\}_{i=1}^{N}$. $S_{i,t}$ denotes country i's relative pareto weight vis-á-vie country 0 (US). The equilibrium system implies that $\{S_{i,t}\}_{i=1}^{N}$ is a key variable that determines equilibrium consumption allocations (A1-A4), relative prices (A7-A10) and consequently asset prices (A14).

Solution Method: I numerically approximate the model to third order. The approximation point is the symmetric steady state where global consumption and wealth are equally shared ($S_{i,t} = \overline{S} = 1$). At this steady state, $wc_t^i = pd_t^i = \overline{\mathcal{P}} = \frac{\delta}{1-\delta}$, $R_{m,t+1}^i = R_{t+1}^i = \overline{\mathcal{R}} = \frac{1}{\delta}$,$C_{i,t}^i = \alpha$, $C_{j,t}^i = 1 - \alpha$, $C_t^i = \overline{\mathcal{C}} = 1$, $p_{i,t} = \mathcal{E}_t = 1$ and $M_t^i = \overline{\mathcal{M}} = e^{\delta}$. Taking at least a third order approximation is necessary to guarantee time varying risk premia in the model.

Baseline Calibration: I set $N = 3$, a small number to make the simulation tractable. The three countries are assumed to be declining in their growth news exposures to US fiscal risks: $\beta_{US}^1 > \beta_{US}^2 > \beta_{US}^3 > 1$. All other parameters follow a symmetric calibration:[12]

Table 31: *Baseline Calibration*

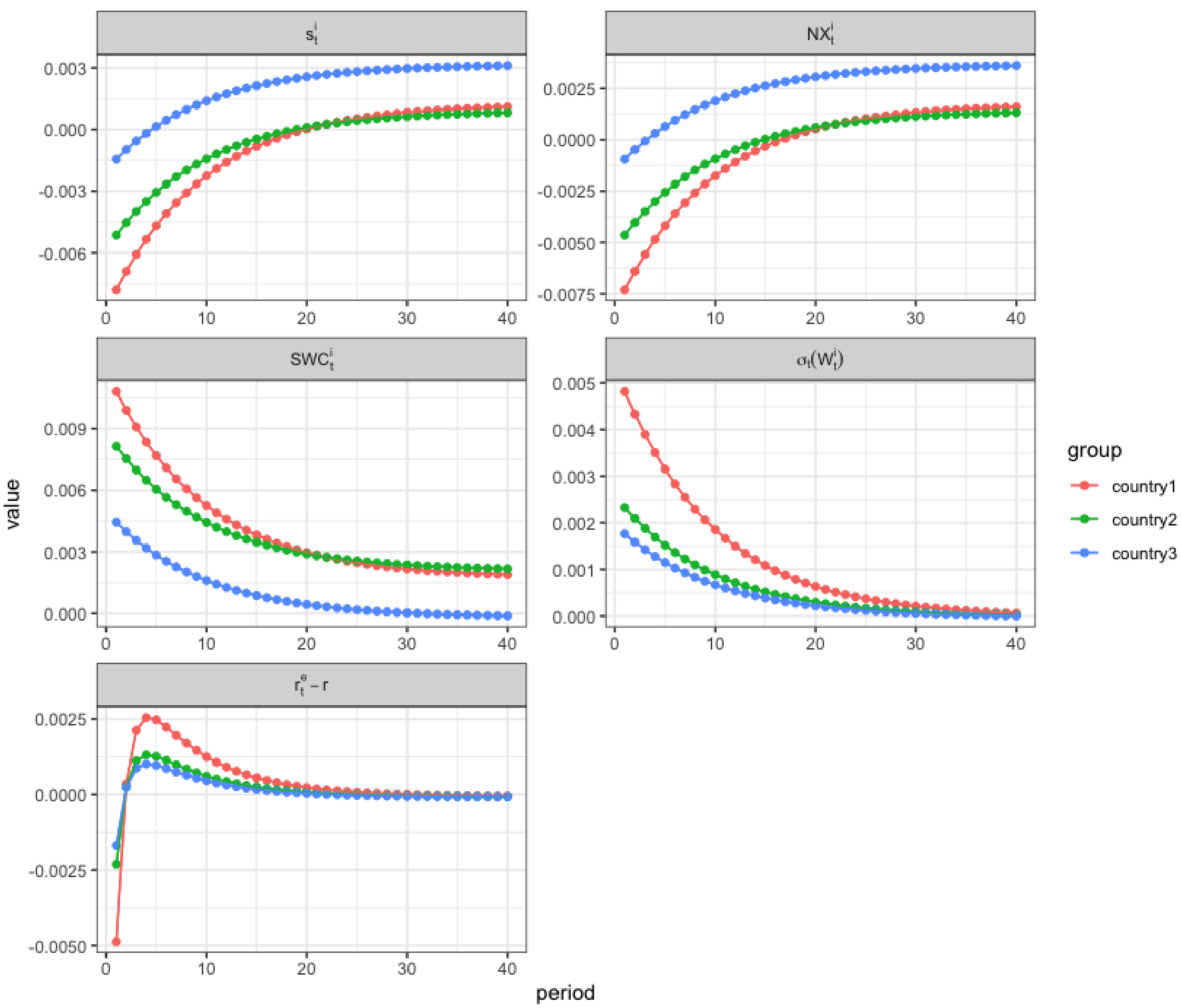
Panel A: Preference Parameters		
Parameter	Description	Value
γ	Relative Risk Aversion	7.5
ψ	Intertemporal Elasticity of Substitution	2
α	Home Bias Parameter	0.98
δ	Discount Factor	0.99
ϕ	Elasticity of Substitution across Goods	0.2
Panel B: Endowment Parameters		
Parameter	Description	Value
μ	Mean Endowment Growth Rate	0.005
β	Cointegration Parameter	0.01
ρ_x	LRR Persistence	0.98
ρ_s	Fiscal Persistence	0.70

[11] I relegate the proof of this equilibrium system to theory appendix C.9.2.
[12] Detailed discussion of calibration choices is relegated to empirical appendix section C.7

C.4 Numerical Solution

Figure 12: *Recursive Risk-Sharing Scheme in Action*

Description: This figure plots the impulse responses of the pareto weight ($S_{i,t}$), US exports to country i (NX_t^i), country i's global consumption share (SWC_t^i), country level wealth volatilities ($\sigma_t(W_t^i)$) and excess equity returns ($r_t^e - r_f$) to a 1 S.D bad US fiscal shock ($\epsilon_{s,t}^{US} \downarrow$).



C.5 Recursive Risk-Sharing Scheme

Overview: The key model mechanism reproducing my empirical evidence is a novel risk-sharing scheme whereby the US internalises the global ramifications of her actions by providing long-lasting insurance to the non-US world in response to deteriorations in her own fiscal condition. The key state variable governing this risk-sharing arrangement is the pareto weight distribution: $\{S_{i,t}\}_{i=1}^{N}$.

$S_{i,t}$: To see how this risk-sharing mechanism works, consider model dynamics in response to a deterioration in the US fiscal condition ($\epsilon_{s,t}^{US} \downarrow$). Since foreign growth expectations are adversely impacted and all agents have i) EZ utility and ii) a preference for early resolution of uncertainty ($\gamma > \frac{1}{\psi}$), foreign marginal utility is adversely impacted by the shock. Thus the perfect international risk-sharing condition (A10) requires the US pareto weight vis-á-vis all other foreign countries to decline ($s_{i,t} \downarrow \forall i$) to restore the equality of marginal utility growths between the US and the ROW. This is demonstrated by the top left panel of figure 12. Since the log pareto weights: $\{s_{i,t}\}_{i=1}^{N}$ capture the US share of global resources relative to each foreign country i, the endogenous decline in the relative US pareto weights means that the US insures the non-US world by transferring global resources abroad in response to the fiscal shock.

$S_{i,t}$ **and Risk Sharing Scheme**: In practical terms, this insurance from the US to the ROW manifests itself through the goods market via a decline in US net exports for each foreign country i ($NX_t^i \downarrow \forall i$). To see this analytically, note that combining consumption FOCs (A1-A4) with the net exports equations (A5-A6) yields the following expressions for $NX_t^i = X_t^i - C_{i,t}^0 - \sum_{j=1}^{N+1} C_{i,t}^j$, country i's exports to the US:

Lemma C.1. *(Net Exports). US net exports to country i NX_t^i follows:*

$$NX_t^i = A_2 X_t^0 \frac{S_{i,t} + \sum_{j \neq i} S_{j,t}}{\sum_{j \neq i} S_{j,t}} S_{i,t} \tag{C.9}$$

Simple algebra confirms $\frac{\partial NX_t^i}{\partial S_{i,t}} > 0$. This risk-sharing arrangement is also confirmed in the top right panel of figure 12 which depicts the impulse responses of each country i's net exports to the US fiscal shock. It indicates that these country level net exports decline, implying that the US is transferring global consumption resources abroad in response to the shock. Notice that this decline is peristent, implying that the goods market insurance that the US provides to foreign countries in response to the US fiscal shock is long lasting.

This long-lasting insurance manifests itself in a long run increase in each foreign country i's global consumption share (SWC_t^i). To see this analytically, note that combining consumption FOCs (A1-A4) with the consumption aggregator equations (A5-A6) yields the following lemma about log consumptions:

Lemma C.2. *(Aggregate Consumption). country i's log consumption c_t^i satisfies:*

$$c_t^i = A_1 (X_{i,t} S_{i,t})^{1-\frac{1}{\phi}} [\sum_{j=0}^{N+1} \frac{\alpha_{i,j}^{\frac{1}{\phi}}}{S_{j,t}} [\sum_{j=0}^{N+1} S_{j,t}]^{-1}]^{1-\frac{1}{\phi}} \tag{C.10}$$

Here $A_1 = [\frac{1-\alpha}{\alpha(N-1)+1-\alpha}]^{1-\frac{1}{\phi}} > 0$ is a constant. Algebra can confirm that $\frac{\partial c_t^i}{S_{i,t}} < 0$, suggesting that a persistent decrease in $s_{i,t}$ caused by the US fiscal deterioration can generate a persistent decrease in US consumption vis-$\acute{a}$-vie country i moving forward. Thus each country i's global consumption share rises over the long run in response to the US fiscal deterioration, as shown in the middle left panel of figure 12.

C.6 Global Uncertainty and Global Risk Premia

Overview: The analysis thus far reveals a novel insight emerging from this simple risk-sharing model: since foreign marginal utility is adversely impacted, perfect international risk-sharing requires the US to insure all other foreign countries against deteriorations in her own fiscal condition. In other words, the US is forced to internalise the global ramifications of her own policy actions in the model. Whilst this insight is interesting, how does this risk-sharing arrangement explain my empirical findings?

Risky Insurance: At the heart of the resolution is a peculiar feature of risk-sharing arrangements with EZ agents: *long-lasting insurance is a source of **long-run** risk for such agents* (Colacito and Croce, 2013; Sauzet, 2021). The intuition is straight forward: the persistent decline in the US global consumption share over time leaves foreign countries with less room for future risk sharing with the US. Thus foreign exposure to future global macro risk increases, raising uncertainty about future long-run foreign consumption, or wealth volatility, relative to the US.

This endogenous increase in global long-run risk is visualised in the middle right panel of figure 12 which shows that *global wealth uncertainty **rises***: the wealth volatility of each foreign country ($\sigma_t(W_t^i)$) rises in response to the US fiscal deterioration. Since the foreign agents have a strong preference for early resolution of uncertainty, this endogenous increase in global long-run risk maps directly into higher global equity risk premia. To see this point analytically, notice that the ordinal transformation of a given foreign country i's utility: $V_t^i = \frac{(U_t^i)^{1-\frac{1}{\psi}}}{1-\frac{1}{\psi}}$ can be approximated to second order around $\theta = 1$ (CRRA benchmark) as:

$$V_t^i \approx (1-\delta)\frac{(C_t^i)^{1-\frac{1}{\psi}}}{1-\frac{1}{\psi}} + \delta \mathbb{E}_t[V_{t+1}^i] - \frac{\delta}{2}\frac{1-\theta}{\mathbb{E}_t V_{t+1}^i} var_t V_{t+1}^i \tag{C.11}$$

Proof is contained in C.8. (C.11) suggests that the long-lasting insurance that country i receive from the US in response to the US fiscal deterioration generates two offsetting forces on her utility. Firstly, the insurance increases country i's utility through the expected future wealth term ($\mathbb{E}_t V_{t+1}$) since it leads to a persistent increase in the ROW's global consumption share (middle left panel of figure 12). Secondly, the insurance also endogenously generates more long-run risk for country i ($var_t V_{t+1} \uparrow$), as shown in the middle right panel of figure 12, which is an offsetting force that lowers ROW utility.

Notice that as the preference for early resolution of uncertainty becomes stronger ($1 - \theta \to \infty$), wealth volatility ($var_t V^i_{t+1}$) dominates the utility function and the long-run risk channel dominates. Thus the long-lasting insurance that the US provides becomes an overall source of risk for each country i and global equity risk premia rises in response to the US fiscal deterioration, as in the data. This phenomenon is depicted in the bottom left panel of figure 12 which shows that equity risk premia across the world rises in response to the US fiscal deterioration: all equity prices fall on impact before subsequently rising to deliver higher expected returns moving forward.

C.7 Calibration Choices

Consumption Home Bias: I follow Colacito et al (2018) and set $\alpha_{i,i} = \alpha > \frac{1}{2}$ and $\alpha_{i,j} = \frac{1-\alpha}{N}$. Thus each agent i's preferences over foreign goods are symmetric. My chosen value of α is 0.98: this is in line with standard calibration choices for home bias used in the open economy macro literature (Lewis, 2011).

Elasticity of Substitution: I choose a low elasticity of substitution across goods ϕ of 0.2. This choice is motivated by empirical evidence documenting a low elasticity of substitution across consumption goods (Couerdacier and Rey, 2013).

IES: I choose a high IES value of $\psi = 2$. This choice is motivated by standard calibration choices made in the international asset pricing literature using recursive preferences (Colacito and Croce, 2013; Colacito et al, 2018).

Cointegration: I calibrate the cointegration parameter β to 0.01. This is larger than standard calibrations in the recursive utility literature, where β is set to a smaller number.[13] I motivate this choice due to the model asymmetry via the US fiscal exposure assumption. Thus to guarantee a well defined equilibrium where the pareto weight distribution is stable requires a higher level of cointegration. Calibrating β to 0.01, addresses this issue.

Other Parameters: I set mean endowment growth $\mu = \mu_H = \mu_F = 0.005$. Since this is a quarterly calibration, this corresponds to an annualized mean growth of 2%, as commonly assumed in conventional calibrations.

C.8 Utility Approximation

Here I use the approach of Colacito and Croce (2013). Taking the ordinal transformation of EZ utility function $V_t = \frac{U_t^{1-\frac{1}{\psi}}}{1-\frac{1}{\psi}}$. (C.3) implies that this is:

$$V_t = \frac{U_t^{1-\frac{1}{\psi}}}{1-\frac{1}{\psi}} = (1-\delta)\frac{C_t^{1-\frac{1}{\psi}}}{1-\frac{1}{\psi}} + \delta \mathbb{E}_t[V_{t+1}^{\theta}]^{\frac{1}{\theta}} \tag{C.12}$$

Now assume that V_t is approximately log-normal. Than V_t takes the form:

$$V_t = (1-\delta)\frac{C_t^{1-\frac{1}{\psi}}}{1-\frac{1}{\psi}} + \delta \mathbb{E}_t[V_{t+1}]e^{-\frac{1}{2}(1-\theta)var_t v_{t+1}} \tag{C.13}$$

Here $v_{t+1} = \log V_{t+1}$. Take a first-order expansion around $\theta = 1$ (CRRA benchmark), V_t becomes:

$$V_t = (1-\delta)\frac{C_t^{1-\frac{1}{\psi}}}{1-\frac{1}{\psi}} - \theta\frac{\delta}{2}\mathbb{E}_t V_{t+1} var_t v_{t+1} \tag{C.14}$$

Using the log-normality assumption and the approximation $e^x \approx 1 + x$ we have that $\mathbb{E}_t V_{t+1} var_t v_{t+1} \approx \frac{var_{t]} v_{t+1}}{\mathbb{E}_t V_{t+1}}$. Substituting this in yields the expression in the text.

[13] In Colacito and Croce (2013), $\beta = 0.005$. These calibration choices are also adopted by Colacito et al, 2018 and Colacito et al (2021)

C.9 Model Proofs

C.9.1 Price Level

Overview: The price level P_t^i for country 0 is the solution to the following cost minimization problem:

$$\min_{\{\{C_{j,t}^0\}_{j=0}^{N+1}\}} \sum_{j=0}^{N+1} p_{j,t} C_{j,t}^i \tag{C.15}$$

subject to the consumption aggregator:

$$C_t^0 = [\sum_{j=1}^{N+1} \alpha_{i,j}^{\frac{1}{\phi}} (C_{j,t}^0)^{1-\frac{1}{\phi}}]^{\frac{\phi}{\phi-1}} \tag{C.16}$$

FOCs with respect to $C_{i,t}^i$ and $C_{j,t}^i$ imply:

$$p_{0,t} = \lambda_t (\alpha \frac{C_t^0}{C_{0,t}^0})^{\frac{1}{\phi}} \tag{C.17}$$

$$p_{i,t} = \lambda_t (\alpha_{0,i} \frac{C_t^0}{C_{i,t}^0})^{\frac{1}{\phi}} \tag{C.18}$$

Finally simple algebra can confirm that the home price level P_t^H takes the form:

$$\lambda_t = P_t^0 = [\sum_{j=1}^{N+1} (\frac{1-\alpha}{N})^{\frac{1}{\phi}} (p_{j,t})^{1-\frac{1}{\phi}}]^{\frac{\phi}{\phi-1}} \tag{C.19}$$

Going through symmetric steps for the foreign country yields similar expression for foreign price levels. Thus Q_t^i: the relative price of country i's consumption in units of the global numeraire follows:

$$Q_t^i = \begin{cases} \mathcal{E}_{i,t} = [\sum_{j=1}^{N+1} (\frac{1-\alpha}{N})^{\frac{1}{\phi}} (p_{j,t})^{1-\frac{1}{\phi}}]^{\frac{\phi}{\phi-1}} & \text{if } i \neq 0 \\ 1 & \text{if } i = 0 \end{cases} \tag{C.20}$$

This is the expresssion in the main text.

C.9.2 Consumption FOCs

Overview: Since markets are dynamically complete internationally, I can rewrite the IBC in a static form for the country i's rep investor:

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \frac{\Lambda_t}{\Lambda_0} Q_t^i C_t^i \le \mathbb{E}_0 \sum_{t=0}^{\infty} \frac{\Lambda_t}{\Lambda_0} Q_t^i W_t^i \tag{C.21}$$

Notice that $Q_t^0 = 1$ since country 0 (US)'s consumption basket is the global numeraire. Λ_t is the world state price density that prices all assets in the world economy. Hence the problem for country i's rep investor can be rewritten as a time zero problem:

$$\max_{\{\{C_{j,t}^i\}_{j=0}^N, W_{t+1}^i\}_{t=0}^\infty} U_0^i \tag{C.22}$$

$$s.t.\ \mathbb{E}_0 \sum_{t=0}^{\infty} \frac{\Lambda_t}{\Lambda_0} Q_t^i C_t^i \le \mathbb{E}_0 \sum_{t=0}^{\infty} \frac{\Lambda_t}{\Lambda_0} Q_t^i W_t^i \tag{C.23}$$

$$Q_t^i C_t^i = \sum_{j=0}^{N} p_{j,t} C_{j,t}^i \tag{C.24}$$

$$C_t^i = [\sum_{i=1}^{N+1} \alpha_{i,j}^{\frac{1}{\phi}} (C_{j,t}^i)^{1-\frac{1}{\phi}}]^{\frac{\phi}{\phi-1}} \tag{C.25}$$

$$\alpha_{i,i} = \alpha \in (\frac{1}{2}, 1),\ \alpha_{i,j} = \frac{1-\alpha}{N},\ \forall i \neq j \tag{C.26}$$

First order conditions for consumption allocations: $C_{j,t}^i, \forall i, j \in \{0, 1, 2, ..., N\}$ are as follows:

$$[C_{i,t}^i]:\ [\prod_{k=0}^{t-1} V_{2,k}^i] V_{1,t}^i (\alpha \frac{C_t^i}{C_{i,t}^i})^{\frac{1}{\phi}} = \mu^H \frac{\Lambda^t}{\Lambda_0} p_t^i \tag{C.27}$$

$$[C_{j,t}^i]:\ [\prod_{k=0}^{t-1} V_{2,k}^i] V_{1,t}^i [\frac{1-\alpha}{N} \frac{C_t^i}{C_{j,t}^i}]^{\frac{1}{\phi}} = \mu^i \frac{\Lambda^t}{\Lambda_0} p_t^j,\ \forall i \neq j \tag{C.28}$$

$$[C_{i,t}^j]:\ [\prod_{k=0}^{t-1} V_{2,k}^j] V_{1,t}^j [\frac{1-\alpha}{N} \frac{C_t^j}{C_{i,t}^j}]^{\frac{1}{\phi}} = \mu^j \frac{\Lambda^t}{\Lambda_0} p_t^i,\ \forall i \neq j \tag{C.29}$$

Here $V^i_{1,t} = \frac{\partial U^i_t}{\partial C^i_t}$ and $V^i_{2,t} = \frac{\partial U^i_t}{\partial U^i_{t+1}}$. Combining (C.27) with (C.29) yields:

$$p^i_t = [\prod_{k=0}^{t-1} V^i_{2,k}]V^i_{1,t}[\frac{\alpha C^i_t}{C^i_{i,t}}]^{\frac{1}{\phi}} \frac{1}{\mu^i \frac{\Lambda_t}{\Lambda_0}} = [\prod_{k=0}^{t-1} V^j_{2,k}]V^j_{1,t}[\frac{(1-\alpha)C^j_t}{C^j_{i,t}}]^{\frac{1}{\phi}} \frac{1}{\mu^j \frac{\Lambda_t}{\Lambda_0}} \tag{C.30}$$

$\frac{\Lambda_t}{\Lambda_0}$ can be pinned down by combining (C.27) and (C.28). Multiply both sides of (C.27) by $C^i_{i,t}$ and both sides of (C.28) by $C^i_{j,t}, \forall i \neq j$ and adding the resulting products yield:

$$\mu^i \frac{\Lambda^t}{\Lambda_0}[\sum_{j=0}^{N} p^j_t C^i_{j,t}] = [\prod_{k=0}^{t-1} V^i_{2,k}]V^i_{1,t}(C^i_t)^{\frac{1}{\phi}}[\underbrace{\alpha^{\frac{1}{\phi}}(C^i_{i,t})^{\frac{\phi-1}{\phi}} + (1-\alpha)^{\frac{1}{\phi}}(C^i_{j,t})^{\frac{\phi-1}{\phi}}}_{(C^i_t)^{\frac{\phi-1}{\phi}}}]$$

Note by construction $\sum_{j=0}^{N} p^j_t C^i_{j,t} = Q^i_t C^i_t$. Also note that since Country 0's consumption basket is the global numeraire: $\sum_{j=0}^{N} p^j_t C^0_{j,t} = C^0_t$. This fact pins down $\frac{\Lambda_t}{\Lambda_0}$:

$$\frac{\Lambda^t}{\Lambda_0} = \frac{[\prod_{j=0}^{t-1} V^0_{2,j}]V^0_{1,t}}{\mu^0} \tag{C.31}$$

As in Colacito et al (2018), I write FOCs in terms of country 0 (US)'s pseudo-pareto weight vis-*á*-vi country i: $S_{i,t}$. I define $S_{i,t}$ as:

$$S_{i,t} = [\frac{(\prod_{k=0}^{t-1} V^0_{2,k})V^0_{1,t}}{(\prod_{k=0}^{t-1} V^i_{2,k})V^i_{1,t}} \frac{\mu^i}{\mu^0}]^{\phi}[\frac{C^0_t/C^0_{t-1}}{C^i_t/C^i_{t-1}}] \tag{C.32}$$

Recursively solving backwards yields the following law of motion for S_t:

$$S_{i,t} = S_{i,t-1}(\frac{M^0_t}{M^i_t})^{\phi}[\frac{C^0_t/C^0_{t-1}}{C^i_t/C^i_{t-1}}] \tag{C.33}$$

Combine (C.32) with (C.27), (C.28) and (C.29). This yields:

$$S_{i,t}\frac{\alpha}{(1-\alpha)/N}\frac{C^0_{i,t}}{C^i_{i,t}} = 1 \tag{C.34}$$

$$\frac{S_{j,t}}{S_{i,t}}\frac{(1-\alpha)/N}{\alpha}\frac{C^F_{F,t}}{C^H_{F,t}} = 1 \tag{C.35}$$

Combining (C.34) and (C.35) with the consumption market clearing conditions yields the presentation of the first order conditions described in the text:

$$C^i_{i,t} = X^i_t[1 + \frac{1-\alpha}{\alpha(N-1)} \sum_{j \neq i} \frac{S_{j,t}}{S_{0,t}}]^{-1}, \ \forall i \tag{C.36}$$

$$C^i_{j,t} = \frac{1-\alpha}{\alpha} \frac{1}{N-1} \frac{S_{j,t}}{S_{i,t}} C^i_{i,t}, \ \forall i \neq j \tag{C.37}$$

C.10 Other Equilibrium Equations

Aggregate Consumption: Plug the consumption FOCs into the consumption aggregators ((C.25)) yields (A7) in the equilibrium system:

$$C^i_t = [\sum_{j=1}^{N+1} \alpha_{i,j}^{\frac{1}{\phi}} (C^i_{j,t})^{1-\frac{1}{\phi}}]^{\frac{\phi}{\phi-1}}, \ \forall i \tag{C.38}$$

Net Exports: By construction each country i's exports to the US $NX^i_t = X^i_t - C^0_{i,t} - \sum_{j=1}^{N+1} C^j_{i,t}$. The consumption FOCS ((C.27)- (C.29)) imply the result in lemma C.1 the main text:

$$NX^i_t = A_2 X^0_t \frac{S_{i,t} + \sum_{j \neq i} S_{j,t}}{\sum_{j \neq i} S_{j,t}} S_{i,t} \tag{C.39}$$

Relative Prices: To characterise relative prices p^i_t, combine (C.30) and (C.31) yields the following expressions:

$$p_{i,t} = (\alpha_{0,i} \frac{C^0_t}{C^0_{i,t}})^{\frac{1}{\phi}}, \forall i \tag{C.40}$$

C.11 $S_{i,t}$ Decomposition

In this section I analytically tie $S_{i,t}$ directly to two components: $\Delta y_{i,t}$ and $\mathcal{N}_{i,t}$ as shown in lemma ?? in the main text. $\Delta y_{i,t} = \Delta c^0_t - \Delta c^i_t$ captures relative changes in consumption growths between country i and the US. Finally $\mathcal{N}_{i,j} = \mathbb{E}^0_{CF,j} - \mathbb{E}^i_{CF,j}$ captures relative changes in time j expected future consumption growths between US and country i where $\mathbb{E}^i_{CF,j} = \mathbb{E}_j \sum_{s=0}^{\infty} \rho^s \Delta c^i_{j+s}$. I start by noticing that (C.31) is simply the product of past pricing kernels for the home investor up to a proportionality constant (μ^H). To see this note by definition that the home IMRS M^H_{t+1} is:

$$M^i_t = \frac{V^i_{2,t} V^i_{2,t-1}}{V^i_{1,t-1}} \tag{C.41}$$

Hence (C.31) can be rewritten as:

$$\frac{\Lambda^t}{\Lambda_0} = \frac{\prod_{k=0}^t M^i_k}{\mu^H} \tag{C.42}$$

Epstein and Zin (1989, 1991) have shown that $V^i_{2,t}$ and $V^i_{1,t}$ can be substituted out of M^i_t in terms of the aggregate wealth return $R^i_{m,t}$. They show that M^i_{t+1} takes the form:

$$M^i_t = \beta^\theta \left(\frac{C^i_t}{C^i_{t-1}}\right)^{-\frac{\theta}{\psi}} R^{\theta-1}_{m,t} \tag{C.43}$$

Hence (C.31) can be written as:

$$\frac{\Lambda^t}{\Lambda_0} = \beta^{t\theta} \left(\frac{C^i_t}{C^i_0}\right)^{-\frac{\theta}{\psi}} \left(\prod_{k=0}^t R_{m,k}\right)^{\theta-1} \tag{C.44}$$

Hence *the past history of consumption and wealth shocks to the home investor drive the world SDF*. (C.44) can be used to rewrite $S_{i,t}$ as:

$$S_{i,t} = (Y_{i,t})^{1-\frac{\theta}{\psi}} \left(\frac{Y_{i,t-1}}{Y_{i,0}}\right)^{-\frac{\theta}{\psi}} \prod_{k=0}^t R^{\theta-1}_{w,k} \tag{C.45}$$

Where:

$$Y_{i,t} = \frac{C_t^0}{C_t^i}$$
$$R_{w,t} = \frac{R_{w,t}^0}{R_{w,t}^i} \tag{C.46}$$

In log terms $s_{i,t}$ is:

$$s_{i,t} = (1 - \frac{\theta}{\psi})y_{i,t} - \frac{\theta}{\psi}(y_{i,t-1} - y_{i,0}) + (\theta - 1)\sum_{k=0}^{t} r_{w,k} \tag{C.47}$$

Applying the Campbell-Shiller approximation implies:

$$s_{i,t} \approx (1 - \gamma)\sum_{j=0}^{t} \Delta y_j + \kappa_1(\theta - 1)\sum_{k=0}^{t} \omega_{w,k} \tag{C.48}$$

Here $\omega_{w,k} = wc_k^0 - wc_k^i$ is the difference in log wealth-consumption ratios between country 0 and country i.

Substitutions: We can substitute the wealth component $\omega_{w,k}$ out of (C.48) in terms of relative consumption $\mathcal{N}_{i,k}$ by using the euler equations for the aggregate wealth portfolios. Log-linearizing these euler equations to first order yields the following expression for $\mathcal{W}_{t+1}$:

$$\omega_{w,k} = (1 - \frac{1}{\psi})(E_{CF,k}^0 - E_{CF,k}^i) \tag{C.49}$$

$E_{CF,t+1}^i$ represents country level future consumption growth expectations:

$$E_{CF,t+1}^i = \mathbb{E}_{t+1}\sum_{s=1}^{\infty} \rho^s \Delta c_{t+1+s}^i,\;\; i \in \{1, 2, 3, ..., N\} \tag{C.50}$$

Substituting (C.50) back into (C.48) yields the result in the main text:

$$s_{i,t} = log(S_{i,t}) \approx \phi(1-\gamma)\sum_{j=0}^{t}\Delta y_{i,j} - \kappa_1\phi(\gamma - \frac{1}{\psi})\sum_{j=0}^{t}\mathcal{N}_{i,j} \tag{C.51}$$