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Investigating the Drivers of International Comovement in Real Financial Asset Returns

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Abstract

There is a substantial body of theoretical and empirical research on asset price comovement and determinants. The empirical analysis in this paper differs in that it incorporates a channel for cross-country comovement in asset prices as well in a set of proposed asset price determinants, across a sample of 9 OECD countries. A Bayesian dynamic factor model is utilised to isolate common, or 'world', and country-specific shocks in stock, bond, currency, and house markets and in variables representing monetary policy, fiscal policy, productivity, demand, relative commodity prices and macroeconomic sentiment. The results are used to gauge the degree of financial and economic integration. Individual asset returns are then regressed on factors extracted from the driving variables to examine the relative importance of the common and country shocks. Stock and bond markets in particular are found to be driven largely by shocks which are common across all countries and asset markets, though a country level cycle in returns is also evident. Together the world factors in the driving variables are found to be a relatively large source of shocks for all asset markets, with shocks to fiscal policy variables, productivity and sentiment appearing to underpin international linkages in asset return volatility. The country-specific component in relative commodity price growth is a large driving force for individual returns.

Keywords

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1 Introduction

The global economy is becoming increasingly integrated through increased trade and financial flows. There is evidence of international linkages between asset prices of one or more classes and in policy and economic variables. The research effort concerned with understanding these connections and, further, the link between the real economy and financial markets within and across countries, has had even greater practical importance in the wake of the global financial crisis. The degree of global comovement in both asset prices and the variables that might impact them have important ramifications for the conduct of Government policy and the implementation of investment strategies. Enumerated, objectives of this paper are to: first, explore the extent of the international comovement in the real prices of risky assets; second, identify and investigate the role of economic, policy and other variables in driving common dynamics in the returns of risky asset prices across a set of OECD countries; and third, determine the degree to which the underlying mechanisms driving price dynamics are similar or divergent across countries, particularly when groups are divided according to a country's status as a large commodity exporting country.

The investigative framework is motivated by the theoretical model of Pavlova and Rigobon (2007), who develop a two country consumption based asset pricing model in which jointly determined real bond prices, stock prices and the exchange rate can be represented as a function of supply shocks, demand shocks and the terms of trade. The theoretical model lends itself to an empirical representation in latent factor form and Pavlova and Rigobon (2007) calibrate the parameterised model using data for the United States (US) and the United Kingdom (UK) in order to extract the underlying supply and demand factor.

The key result found by Pavlova and Rigobon (2007) is that demand shocks are approximately doubly as important as supply shocks driving movements in the asset prices. Though the theoretical model does not allow for correlation between the countries' output shocks, the results from the calibrated model suggest that shocks between countries do indeed commove.[1] This is unsurprising since evidence of a global component in productivity growth as well as the wider business cycle has been widely documented. For instance, using a dynamic factor model approach, Crucini et al. (2011) document a common cycle in real investment, consumption and output of G7

[1]The authors note that explicitly allowing for the generation of random innovations to output to commove would not change the model's implications.

countries and explore the relative contribution of common and country-specific components of variables identified as driving the countries' macroeconomic variables. The empirical approach used in this paper to examine the determinants of currency, equity, bond and house price returns is based on the methodology applied by Crucini et al. (2011).

In order to establish whether there is a world cycle in the asset prices, the variances of quarterly returns for a set of 9 OECD countries are decomposed into a component that is common across all markets and countries, a component that is specific to the asset returns within a country, and a component that is unique to each series, using a dynamic factor model estimated with Bayesian techniques. To investigate the underlying drivers of the asset price returns, a set of variables including proxies for supply, demand, the relative prices of traded goods as well as government policy and sentiment, is selected based on the model of Pavlova and Rigobon (2007) and additional literature. The two level dynamic factor model applied to the set of asset returns is estimated for each category of driving variable and regression analysis is used to explore the relative impact of the extracted common and country-specific factors on the individual return series with a view to identifying the variables generating international linkages. To investigate time variation in the determinants of asset prices the approach is repeated for rolling nine year models over the full sample period, which spans 1998Q3 to 2017Q1.

This analysis yields several findings that build upon each other. As a preliminary, as implied by Pavolva and Rigobon (2007), the results from estimating the factor model for the equity, bond, currency and house price returns support the existence of a world cycle, especially in the case of equity and bond markets. In contrast with some related studies, there is found to be a country-specific component in the variability of asset prices for many of the sample countries.[2] To varying degrees, there is evidence of cross-country, or common, components in the growth of the driving variables. The common component of a given driving variable is found to have a greater impact on asset price returns than the corresponding country-specific component in many instances. In fact, together the common, or 'world', factors in driving variables explain a larger portion of the volatility in equity, bond and even house price returns than the sum of the country-specific factors for the vast majority of countries, though the country-specific factors are relatively more important in explaining currency volatility.

The relative importance of the driving variables differ both across asset markets

[2]For instance, Ha et al. (2017) did not find a significant country level factor in asset price returns.

and between countries for a given asset markets, though some inferences can be made about the shocks in driving variables which are important and serve a role in linking asset returns both across countries and markets. Productivity shocks, used to proxy for supply shocks, are found to be a significant driver of returns, especially for the bond market, however it is the common component in productivity growth that is more important than country-specific shocks. The world factor in the fiscal policy variables is an important determinant of equity, currency and housing markets. The country-specific factor in relative commodity prices plays a large role in linking the equity and currency markets, moving returns in the opposite direction for most countries. The impact of monetary policy is largely limited to the country-specific factor's role as a driver of bond and currency returns for some countries. Divergence in world stock and bond prices appears to stem largely from changes in sentiment across countries, with world shocks that improve consumer and business confidence driving up equity returns and reducing bond price returns. This world factor in sentiment is also a significant driver for currency returns, moving them in the same direction as stock returns for all but a few countries. Unlike was the case in Pavlova and Rigobon (2007), the variable used to proxy for demand is not found to be a large driver of bond or equity returns, though it is more important in explaining currency returns and plays a relatively large role in explaining variation in house price returns.

The results are examined in the context of the Pavlova and Rigobon (2007) model and related empirical, and theoretical literature on asset price determination and have practical implications for policy formulation and the implementation of international portfolio investment strategies. The results are relevant to policy makers who must consider the responsiveness of asset prices to various policy and economic variables when formulating of monetary and fiscal policy, whether or not asset prices are explicitly targeted in efforts to achieve broader objectives related to the economy and financial stability. The existence of a global cycle in asset prices as well as the variables that drive them also has implications for investors in terms of diversification and international risk sharing.

The paper proceeds as follows. Section 2 discusses related literature, Section 3 outlines the methodological framework and Section 4 describes the data. Section 5 presents results from estimating the factor models for the asset prices and each of the driving variables. Section 6 decomposes the impact of the driving variables on the asset returns and summarises the key drivers of asset market linkages. Section 7 concludes.

2 Motivation, Related Literature and Selection of Driving Variables

There is a large empirical and theoretical literature, far too voluminous to summarise, devoted to asset prices, including research occupied with the determination of a single asset price, literature that focuses more specifically on the interaction and comovement between the asset markets, and the macro-finance research agenda which links the financial sector to the real economy. Both theoretical and empirical research can also be distinguished by the adoption of a closed economy assumption or interest in cross-border analysis. The analysis in this paper intersects with a number of approaches in the asset pricing literature and applies a methodological framework developed and applied more commonly in connection with the real business cycle literature.

The paper is primarily motivated by the theoretical model of Pavolva and Rigobon (2007), which is a two-country pricing model for bonds and stocks that is rooted in the Lucas consumption based asset pricing model tradition, but which incorporates a channel to explore the effect of the international trade in goods on asset prices.[3] Agents engage in international trade, though importantly it is assumed they possess a home bias in consumption, and invest in foreign as well as domestic stocks and bonds. The terms of trade between each country's produced good is determined by the ratio of the marginal utilities for the home and foreign good, so an increase in the relative scarcity of a country's good or a relative increase in demand lead to an improvement in the terms of trade for that country.

The terms of trade connects the international stock and bond markets to real domestic shocks occurring in each country. Shocks are disaggregated into supply and demand side shocks and the relative magnitude of these two sources of asset price variation determine the direction of the comovement between stock and bond markets within and across countries. Supply shocks in one country move stock markets in both countries in the same direction: for example, a positive output shock which raises the stock price in country A also worsens the terms of trade for that country, resulting in an increase in the value of country B's good and the stock price which is a claim to that good. It also lowers bond prices in the home country and raises them in the foreign country. Demand shocks cause divergence in stock market price movements across the countries: for instance, a demand shock in country A improves the terms of trade due

[3] In Lucas (1978) style equilibrium asset pricing models, asset returns are linked to the real economy and specifically, depend on preferences and risk aversion, endowments and technology.

to the preference for the domestic good, thereby raising the relative value of the home country good and the stock value as country B's stock value simultaneously declines. Home bonds also increase in price as a result of the improved terms of trade.

Using this theoretical model as a basis, Pavlova and Rigobon (2007) present an empirical model of stock returns and the exchange rate where the asset returns are each specified as a function of three latent factors representing foreign supply shocks, domestic supply shocks and relative demand shocks.[4] Estimating the model using daily data for the United States (US) and the United Kingdom (UK) over a period spanning 1988 to 2002 in order to calibrate the parameters and extract the factors, it is found that demand shocks dominate the supply shocks.

The Pavolva and Rigobon (2007) model offers a mechanism that can be used to reconcile the documented difference in the direction of equity and currency correlation across countries. For instance, Hau and Rey (2006) note a difference in the behaviour between currency and stock returns for Australia and Japan compared to their OECD counterparts in the course of empirically verifying the Uncovered Equity Parity condition (UEP) presented in the same paper. The UEP predicts that there will be a negative correlation between currency and stock markets within a country as capital flows aimed at resetting optimal international positions are triggered by shocks to these asset prices. Hau and Rey (2006) suggest the positive correlation between the returns for Australia may be due to its status as a large commodity exporter. Building upon this assertion, Chaban (2009) subsequently demonstrated that the currencies of Australia, Canada and New Zealand all displayed a positive relationship with domestic equity indices.

Hau and Rey (2006) assume that stock price innovations are uncorrelated across countries, however, it is more realistic to assume that shocks driving stock markets of countries are linked by trade in good and other channels. According to the Pavlova Rigobon (2007) model, if supply shocks driving asset prices are of sufficient magnitude to positively link the movements in the equity markets of the commodity exporting countries to those of their trading partners through terms of trade movements, then the imperative to rebalance the component of the portfolios devoted to the commodity country equity markets is mitigated. The methodology used in this paper is designed to directly explore the determinants of jointly determined stock, bond and currency

[4]Though the theoretical model is in real terms, the empirical model uses nominal data due to the unavailability of the daily inflation rate. However, it is assumed the inflation differential is minimal across the two sample countries.

returns as well as house price returns for a cross section of countries that includes large commodity exporters. As well as using proxies for supply, demand and relative prices as per Pavolva and Rigobon (2007), variables representing monetary policy, fiscal policy, and sentiment are chosen as candidate driving variables based on the literature related to real asset price drivers.[5]

Literature examining the impact of monetary policy on asset prices mostly focuses on the effects of short term interest rates. Empirical studies on the impact on stock and bond prices may adopt a narrow window to isolate the effect of unanticipated news. For instance, this approach is taken by Rigobon and Sack (2004) who find that an increase in the policy rate is associated with falling stock returns and rising bond yields in the US, and by Bernanke and Kuttner (2005), who find that a surprise rate cut boosts the stock market in the US. Other studies using structural models to focus on the longer term response of asset prices find the transmission of monetary policy shocks occurs with a lag; for instance, Rey (2015) and Bruno and Shin (2015) found that monetary shocks in the US affect stock prices and term premiums at multi-quarter horizons. Interest rates have featured heavily in theoretical models of exchange rate determination. Early monetary models (in the vein of Frenkel and Johnson, 1978) suggest that lower interest rates reduce domestic asset returns which subsequently causes a depreciation of the exchange rate. Models based on Uncovered Interest Parity (UIP) predict a large role for interest rate differentials in exchange rate determination, however the transmission process from monetary policy to the currency is now acknowledged to be much more nuanced, for instance Bruno and Shin (2015) demonstrate that an increase in the policy rate in the US appreciates the dollar due to its effect on international banking flows.

Related to the literature on the transmission of monetary policy to asset prices through the policy rate, there is a more ideological discussion of the extent to which Central Banks should explicitly target asset prices. Almost two decades ago, Cecchetti et al. (2000) argued that central banks can augment monetary policy by targeting equity, housing and currency markets in addition to influencing bond markets. More recently, Jordà et al. (2015) present evidence that large rises in housing and equity

[5]There is a large literature on asset price comovement and determinants, however much of this is focused on the determinants of one asset class or the determinants of the correlation between asset prices for the case of a single economy (typically the United States) and the cross country comovement of assets of a particular or multiple classes. In this sense, selecting variables which potentially drive a global cycle in the broad range of asset prices studied here has less precedent.

prices are a harbinger of financial crashes in many countries and argue that Central Banks tasked with policy execution should proactively target price bubbles.

In comparison to monetary policy, there is a relatively scarce literature on the impact of fiscal policy on asset prices, though some empircial studies have focused on the effect of revenue and expenditure shocks on stocks and bonds in an international context. Looking at the financial market response to periods identified as being characterised by large fiscal shocks, Ardagna (2009) finds that fiscal consolidation boosts stock markets while loose fiscal policy is met with plunging equity returns across OECD countries. Afonso and Sousa (2011) demonstrate that Government revenue shocks have a positive impact on stock prices and a mixed effect on house prices for a small set of OECD economies. They interpret this to be a sign that markets respond positively to the signal inherent in fiscal conservatism embedded in the reduction in government debt. There is more theoretical grounding for the effect of fiscal policy on the currency. In the twin deficits theory, Mundell (1963) linked capital inflows and currency appreciation to rising domestic interest rates as a result of bond financed fiscal expansions, though this hypothesis has little empirical support in recent times. For instance, Kim and Roubini (2008) find that an increase in the deficit depreciates the real exchange rate. Exploring the impact that the fiscal position has on asset prices is becoming more relevant with calls for a realignment in the extent to which the two key policy tools are leaned on as the conventional monetary policy arsenal becomes depleted across OECD economies.

Variables reflecting sentiment, which can be viewed as a measure of uncertainty, are chosen to reflect the increasing emphasis on the role of this variable in asset pricing. Theoretical models energised by the external habit asset pricing specification of Campbell and Cochrane (1999) demonstrate that risk aversion and economic sentiment are major drivers of asset pricing dynamics. Bekaert and Hoerova (2016) model these concepts as latent variables in an empirical asset pricing specification for the US and Germany. Using the equity variance premium as a proxy for the underlying degree of risk aversion and a set of financial variables such as the credit spread, term spread and short rate to mine information on uncertainty, they find that the measures are highly correlated between countries, implying that there is a global element. Generally it is difficult to separate out risk aversion and uncertainty and many measures encompass both concepts. Bansal and Shaliastovich (2007) build a general equilibrium model around the argument that investor uncertainty stemming from fundamental risk should affect all asset prices across markets; more formally, that the common risk channels should drive the expected excess returns across bonds, currency and equity markets and demonstrate this using a calibrated model for four G7 countries. While these studies use financial measures of uncertainty, broad macroeconomic sentiment as measured by agents' expectations as opposed to financial market measures is more consistent with the objective of linking real asset returns to real shocks.[6] More generally, Shiller (2014) argues that while asset markets are influenced by unique factors, investor sentiment related to, inter alia, future expectations of tastes, technology, government policy, and the socio and political environment affect the price levels of all assets, making them speculative.

While the conceptual approach is based on the Pavlova and Rigobon (2007) model, the econometric approach closely follows that outlined by Crucini et al. (2011). Crucini et al. (2011) use dynamic factor models to extract common and country-specific factors from business cycle variables and their determinants before using regression analysis to explore the impact of the driving variables. This paper applies an analogous framework in order to investigate the determinants of a comovement in asset prices between OECD countries.

While traditionally applied to the analysis of business cycles, there is a relatively nascent literature using dynamic factor models to establish the degree to which there is a common cycle in financial returns and other financial variables across countries and investigate the channels which establish the international linkages. For instance, Miranda-Agrippino and Rey (2015) use a latent factor model to decompose nominal commodity, equity, and bond returns, all in US dollar terms, into world, regional and country factors.[7] The results reveal evidence of a global factor common to asset prices, which is linked to the US stock market volatility index (the VIX).[8] Ha et al. (2017) use a latent factor model to jointly model the global business cycle (in output, consumption and investment) and global financial cycles (in equity prices, house prices, interest rates and credit) for the G7 countries that allows for spillovers across the business and financial factors.

[6] Apart from measures extracted from financial data, data from news coverage, google searches, the extent of divergence in professional economic forecasts, and direct surveys of economic agents reveal attitudes and can be used to construct measures of market uncertainty used in economic and financial analysis.

[7] The empirical analysis is connected to a simple theoretical model comprising fund managers and global banks which shows that international financial intermediaries link global asset markets.

[8] Rey (2015) finds evidence that this world cycle in credit expansion that moves the VIX and world asset price factor can be traced back to shocks in US monetary policy.

The approach used in this paper to evaluate the global linkages in asset prices varies in a few ways. The exchange rate market is included here as the models of Hau and Rey (2006) and Pavlova and Rigobon (2007) suggest the currency is endogenous to a set of risky asset returns, due to global investment capital flows in the former case and global trade flows in the latter case. This research also differs in that it links real asset prices to a wide set of real economic variables including the relative international traded goods' prices and, further, examines the relative impact of the nation-specific and global components of these variables.

3 The Econometric Framework

This section outlines the methodology designed to investigate the impact of monetary policy, fiscal policy, labour productivity, consumption per capita, relative commodity prices and macroeconomic sentiment on equity, bond, currency and house prices.

3.1 The Latent Factor model

Before exploring the impact of the driving variables, a dynamic factor model is used to investigate the extent of international comovement in the driving variables as well as the asset prices. To reflect evidence of cross-country comovement in the driving variables and to allow for analysis that includes multiple countries, the factor structure is chosen explicitly in order to isolate shocks which are unique to a country from shocks which are common across all countries.[9] Since asset prices possess the same multifactor structure as the variables that drive them, asset returns are parsed into world shocks affecting all asset prices across all countries, country-specific shocks affecting only the asset returns within a country, and unique shocks affecting only a given return series.

The following factor model is utilised repeatedly to extract the common and country-specific components from the asset price returns as well as from each category of the driving variables

$$\Delta x_{i,c,t} = \alpha_{i,c} + \beta_{i,c} WF_t + \varphi_{i,c} CF_{c,t} + \varepsilon_{i,c,t}, \tag{1}$$

where for an individual series, $x_{i,c,t}$, within a given category of variables, the common or 'world' factor is denoted WF_t, the country-specific factor is denoted CF and the

[9]While Pavlova and Rigobon (2007) assume supply shocks are independent in the two country model, Crucini et al (2011) found a substantial common component across productivity growth in G7 countries.

idiosyncratic factor is denoted $\varepsilon_{i,c,t}$. The variable type is indexed by i, the country is indexed by c and $t = 1, ...T$ indicates the time period of the total length of time series T. Letting N and M denote the number of countries and the number of observable time series per country, the total number of observable return series' is given by $N \, \mathrm{x} \, M$. The factor loadings on the world and country factor are represented by β and φ respectively, and α is the mean change of the specified series.

The world factor and country factors are autoregressive (AR) processes of order p

$$WF_t = \rho_{WF,1} WF_{t-1} + ... + \rho_{WF,p} WF_{t-p} + u_{WF,t}, \tag{2}$$

$$CF_{c,t} = \rho_{CF,c,1} CF_{c,t-1} + ... + \rho_{CF,c,p} CF_{c,t-p} + u_{CF,c,t}, \tag{3}$$

where $E[u_{WF,t} u_{WF,t-s}] = 1$ for $s = 0$; 0 otherwise and $E[u_{CFc,t} u_{CFj,t-s}] = 1$ for $c = j$, and $s = 0$; 0 otherwise. That is, the errors are assumed to be uncorrelated cross-sectionally at all leads and lags, with unit variance assumed for normalisation purposes.

The idiosyncratic factor is assumed to follow an AR process of order q

$$\varepsilon_{i,c,t} = \rho_{\varepsilon,i,c,1} \varepsilon_{i,c,t-1} + ... + \rho_{\varepsilon,i,c,q,} \varepsilon_{i,c,t-q} + v_{i,c,t}, \tag{4}$$

where $E[v_{i,c,t} v_{j,k,t-s}] = \sigma^2$ for $i = j$, $c = k$, and $s = 0$; 0 otherwise. The number of lags in the evolution of the factors, p, and the idiosyncratic factor, q, is set to 3.[10]

The the system outlined in equations (1) to (4) is a state space system comprising a measurement equation in the form of (1) and transition equations in the forms of (2) and (3). The system is estimated using the Gibbs sampling technique developed and described in detail by Otrok and Whiteman (1998) for the case of a single factor model and expanded by Kose et al. (2003) for the mutli-factor case. The advantage of using Bayesian techniques as opposed to classical estimation techniques is the efficiency in adding additional cross sectional series.[11] The Gibbs sampling method uses a Markov Chain Monte Carlo (MCMC) sampling procedure with each Markov Chain comprising two broad recurrent steps which: first, given initialised start values of parameters

[10]This follows Ha et al. (2017) who find that three lags sufficiently characterise a model of the financial and business cycle. Alternate specifications did not materially change the results.

[11]Nonparametric averaging methods such as principal components also have the advantage of being able to handle a larger number of series when compared to the classic approach which uses Gaussian maximum likelihood estimation and the Kalman Filter. However, Jackson et al (2016) compare two Bayesian approaches (the Kalman filter state space approach of Kim and Nelson (1998) and the Otrok Whiteman (1998) approach) to the principal components approach and demonstrate that both Bayesian estimation techniques perform better in terms of accuracy of factor estimates in a simulated multi-factor model.

and factors, sampling the unknown parameters from the complete set of posterior distributions generated conditional on the factors and the data; and second, sampling from the conditional distribution of the factors given the parameters and the data. In the multifactor case, this latter step involves additional sub steps as factors are sampled in sequence by their level.[12] At each step the updated draw is used as the conditioning variable.

For the factor model estimations the total number of draws is set at 11,000 with 1,000 of these draws discarded as burn in and the remainder used as the basis of the analysis. The priors are weakly informative barring an assumption on the autoregressive parameters of the dynamic factors to ensure stationarity of the lagged polynomials. Specifically, the prior for the autoregressive parameters of the factors and the innovations in the measurement equation are truncated normal. The prior on the constant and factor coefficients is $N(0,1)$ and the prior for the innovation variance in the observable equation is Inverted Gamma, $(0.1\text{x}T, 0.25\hat{}2)$.[13]

Once the world and country factors are extracted from asset prices and each of the driving variables, the determinants of the prices can be investigated. However, the cross-country comovement amongst the variables are of interest themselves and thus results from the estimation of factor models for both asset prices and driving variables are reported in terms of the variance attributable to each type of shock. The variance decompositions are based on factors rather than the estimated factor loadings.[14] The reported estimates are posterior means of the variance decompositions based on the full number of retained draws. At each pass of the Markov Chain the variance of the observable series is calculated as follows

$$var(\Delta x_{i,c,t}) = (\beta_{i,c})^2 var(WF_t) + (\varphi_{i,c})^2 var(CF_{c,t}) + var(\varepsilon_{i,c,t}). \tag{5}$$

The variance is then decomposed according to the percentage contribution of each factor to the total variance in the growth of the given series.

[12]Specifically, for the factor structure used here this involves sampling from the posterior distribution of the world factor given the country factor, the parameters and the data then sampling each country factor in sequence given the world factors, the other country factors and the data. Idiosyncratic factors are not explicitly estimated. The variance decompositions are extrapolated from results obtained from estimating the world and country factors.

[13]The priors are used by and described in more detail in Jackson et al. (2016).

[14]Each method takes the parameters or factors at each pass of the Markov Chain and computes the variance decomposition, however the factor based approach orthogonalised the factors at each step to eliminate any practical correlation (the model does not impose orthogonality on the factors). Jackson et al. (2016) review the two approaches to variance decompositions and demonstrate that factor based estimates are more conservative and more accurate than parametric variance estimates.

3.2 Exploring the Impact of the Driving Variables

In order to assess how asset prices respond to the six driving variables selected, each individual return series across the sample countries is individually regressed upon the complete set of common and country-specific factors extracted from the driving variables. The individual asset return regressions are conducted separately for world and country level factors such that

$$\Delta r_{i,c,t} = \lambda_{MP} WF_{MP,t} + \lambda_{FP} WF_{FP,t} + \lambda_{PR} WF_{PR,t} + \lambda_{CO} WF_{CO,t} + \lambda_{CP} WF_{CP,t} + \lambda_{SE} WF_{SE,t} + \eta_{i,c,t}, \quad (6)$$

$$\Delta r_{i,c,t} = \pi_{c,MP} CF_{c,MP,t} + \pi_{c,FP} CF_{c,FP,t} + \pi_{c,PR} CF_{c,PR,t} + \pi_{c,CO} CF_{c,CO,t} + \pi_{c,CP} CF_{c,CP,t} + \pi_{c,SE} CF_{c,SE,t} + \zeta_{i,c,t}, \quad (7)$$

where MP, FP, PR, CO, CP, SE denote monetary policy, fiscal policy, labour productivity, per capita consumption, relative commodity prices and sentiment, respectively. Before estimating each of the regression equations, factors extracted from the factor models of each of driving variable are orthogonalised according to the order they appear in equations (6) and (7). First, the fiscal policy factor is regressed on the monetary policy factor. The residuals are used as the orthogonalised factor upon which the productivity factor is the regressed on, and so on. The residuals obtained from successively projecting each factor on to the next are saved for use in the (6) and (7). This ensures that the variance of the combined contribution to the return series of driving variables of the same hierarchy plus the component unexplained in that equation sums to 100% when the variance operator is applied to the right and left hand sides. It also deals, albeit imperfectly, with the correlation in the driving variables.

Choosing the order in which the driving variables enters the regression is based on consideration of the interaction between the variables. For instance, Crucini et al. (2011) suggest that by entering productivity after the policy variables it is uncorrupted by the noise of other impacts.[15] The monetary policy factor is included as estimated by the factor model of interest rates and the money supply, the world factors extracted from the production and consumption factor models are orthogonal to factors for policy variables. The consumption factor is orthogonalised with respect to the

[15] Although in this case, the basis for this decision is the use of the Solow residual (the use of annual frequency data rather than quarterly data enables measures additional to labour productivity) there is evidence suggesting fiscal policy impacts productivity across OECD countries (for instance, Cassou and Lansing (1999).

productivity factor to reflect that supply as well as demand shocks effect consumption in the Pavlova and Rigobon (2007) model. The component of the consumption factor that is orthogonal to the productivity factor as well as the policy factors better isolates the component reflecting a demand originated consumption shock.[16] The world factor in commodity prices is orthogonal to the supply and demand variables and the policy variables to examine the impact of price changes beyond those that are driven by productivity and consumption. Given that sentiment is expected to be impacted by the policy and economic variables, it is included last so that it is orthogonal to all the other factors. Sensitivity to different ordering is tested and while alternative specifications do not change the basic narrative of the results, any substantial shifts in the relative magnitude of impact the factors have on asset returns are noted.

The results from the regressions are reported in terms of the percentage of the variance contribution of the world and country factors. Technically this implies that the combined variance the world and country factors contribute to individual return series can sum to over 100% since the world and country level factors of different driving variable categories are not made orthogonal to each other. The list of driving variables is realistically not exhaustive and so the variance decompositions from the regressions leave room for some unexplained component. Following Crucini et al. (2011) highest and lowest sum of the total variances are interpreted to be upper and lower bounds of total variance.

4 The Data and Sample

This section details the data used for the asset prices and driving variable categories specified in Section 3, including original sources and data transformations as well as the sample countries and sample period used.

4.1 Data

Equity returns are computed using the MSCI equity index, the DataStream Benchmark Bond Indices with ten years average maturity are used to proxy for the bond market,

[16]Further, it is recognised that financial asset prices are predicted to effect consumption and investment in traditional general equilibrium asset pricing models by impacting household balance sheets. This effect has been found to be stronger in the US but more tenuous in other OECD countries. For instance, using a larger sample of OECD countries, Bayoumi and Edison (2003) find only a small lift in consumption in response to movements in stock and house returns and Catte et al. (2004) find the long run response of consumption to house price growth in negligible.

and the real effective exchange rate is from the International Monetary Fund's International Financial Statistics database (IMF IFS). House prices obtained from the OECD Analytical House Price Indices are also included in line with increasing recognition that these are increasingly comoving with the prices of traded assets.

Two series are used to proxy for each of the driving variables except for the commodity prices for which five are used. Apart from enabling the parsing of variables into world and common components using the factor models, the advantage of using multiple series is that it enables the variable of interest to be more accurately pinned down. The central bank policy rate from Oxford economics is used represent monetary policy except for in the case of Switzerland and New Zealand for which the IMF IFS rate for 90 day treasury bills is used, along with the OECD published data for the M1 money supply.[17] Government consumption expenditure and revenue from households, both from Oxford Economics, are used as the fiscal policy variables. While defined the same way, two series for each labour productivity (calculated as industrial production divided by the labour force) and per capita consumption (calculated as total consumption divided by the working age population) are based on different sources (IMF IFS and OECD Main Economic Indicators).[18] Commodity price indices for agricultural raw materials, beverages, food, metals and oil are obtained from the IMF IFS. Data obtained from the OECD Main Economic Indicators on consumer confidence and business confidence are grouped to construct the sentiment variable. The business confidence index indicator is constructed from opinion surveys on developments in production, orders and stocks of finished goods in the industry sector and the consumer confidence index is constructed from opinion surveys on the expected financial situation, sentiment about the general economic situation, prospects of unemployment and capability of savings.[19]

All data is obtained in local currency terms except for the world commodity price indices which are converted using the US dollar exchange rate.[20] After converting

[17]Since the 1980s monetary policy has typically been measured using interest rate variables rather than money aggregates, however the supply of reserves remains a key instrument in its implementation.

[18]The use of quarterly rather than annual frequency limits the availability of real economic data, for instance data on total factor productivity as well as the underlying variables themselves are not readily available at a quarterly frequency.

[19]Pavlova and Rigobon (2007) find that demand shocks are related to consumer confidence in the estimated model. Here, consumer and business confidence are reframed as a separate variable deemed to represent uncertainty. The order of the sequential orthogonalisation of variables in the regression ensures that the factor related to common and country-specific uncertainty have the effect of consumption and productivity factors removed from them.

[20]The Pavlova Rigobon (2007) model assumes equity prices are in an international currency unit, however it is noted that using domestic currencies would not change the results.

each series to real terms by deflating nominal series by the domestic consumer price index the series' in index form are converted to continuously compounded growth rates by taking the period on period change in the natural logarithm of the index. The exception is the policy interest rate , which is entered as the absolute difference over the preceding quarter.

All raw data is sourced from Thomson Reuters DataStream. Appendix A provides a full description of the data used in this paper, including definitions, source codes and transformations performed to construct the final variables used.

4.2 Sample

The sample of countries used is whittled down from a full list of OECD countries using a number of criteria. Member countries of the European Monetary Union, which share a common currency and monetary policy, are excluded from the sample. Further countries are excluded based on data availability. The final sample of 9 countries comprises Australia, Canada, Denmark, Japan, New Zealand, Sweden, Switzerland, the UK and the United States. Quarterly data is used to balance the fact that financial markets move relatively rapidly with the fact that effects from the real economy take some time to generate real impact.

The full sample period was determined by data availability and covers the period from 1998Q3 to 2017Q1, yielding 75 observations for each variable used in the analysis.[21] In order to explore the evolution in the impact of the driving variables the full empirical process outlined in Section 3 is undertaken for rolling 9 year sub-samples estimated with start dates at one year intervals.[22] The subdivision was formulated with a view to examining the effects of the global financial crisis on the impact of the driving variables. The first sub-sample ends at end of period 2007Q2 while the last begins in 2008Q3 so these largely exclude the crisis period. Since the exercise requires estimating eleven sets of factor models and regressions, reporting results for each country would be cumbersome. Instead, the time variation is summarised by averaging the variance that each driving variable contributes to the individual asset returns of the 9 sample countries.

[21] Data on monetary aggregates for Sweden was available only from 1998Q2 (meaning the first sample observation is 1998Q3 after differencing is applied). IMF IFS commodity price indices were discontinued after 2017Q1.

[22] All rolling models have time frames of 36 quarters except for the final period which runs from 2008Q3 to 2017Q1 and comprises 35 time periods.

5 Estimating the Factor Models

This section describes the results from estimating the factor models for the asset price returns and each of the driving variables in turn. The world factors are plotted to glean any insights in the movement over time before each factor model is more formally analysed. The relative magnitude of the impact of the factors in relation to each other are demonstrated by the variance decompositions specified in (5) which are calculated based on the 50% percentile of the total number of retained draws. The width of the posterior distribution about this mean is evidence of the confidence regarding the decompositions, and posterior density intervals constructed from the 16% and 84% percentile of draws, comprising one standard deviation bands of the mean, are reported in Appendix B.

The posterior mean of the draws for the parameters in the factor model can be used as point estimates for the factor loadings. Unlike the variance decompositions, which are independent of scale and sign, parameter estimates are not especially interesting on their own as there is no identifying restriction on the factors that enables absolute interpretation of the sign and the scale of the effect. However, inferences regarding the direction of causation can be made based upon the relative signs of the parameter estimates associated with a particular factor, provided that evidence suggests the factor loadings are sufficiently different from zero. By using the 5% and 95% of the percentiles calculated from the total number of retained draws, a 90% highest posterior density interval (HPDI), or credible set, for the factor loadings can be constructed and used for hypothesis testing. The hypothesis that a given factor loading is zero is rejected if the interval constructed from these percentiles does not include zero. Due to the large number of individual parameters, the posterior median along with the HPDI are tabled in Appendix C. Only the sign of the parameter estimate is reported in the main text along with the variance decomposition if it is determined to be significantly different from zero. It is worth noting that since the parameter estimates speak to the impact of the factors on the growth rates and the variance decompositions speak to the impact of the factors on the variability of growth rates in relative terms the two measures might ostensibly contradict.

Together, the posterior mean of the variance in the asset return or driving variable that is attributable to the world and country-specific factor in the relevant dynamic factor model and the direction of the effects of those factors (provided that the effect sufficiently different to zero) is sufficient to characterise the general impact of the factors.

5.1 The Factor Model for Asset Returns

5.1.1 A Look at the World Factor in Asset Returns

Figure 1 plots the world asset price return factor. The posterior mean is depicted in the bold line. The 16% and 84% posterior quartile bands are also plotted and the width of the bands can be used to gauge the precision of the factor estimate. In this case, the tightness of the quartile band around the estimated factor imply there is less uncertainty associated with the global factor estimation.

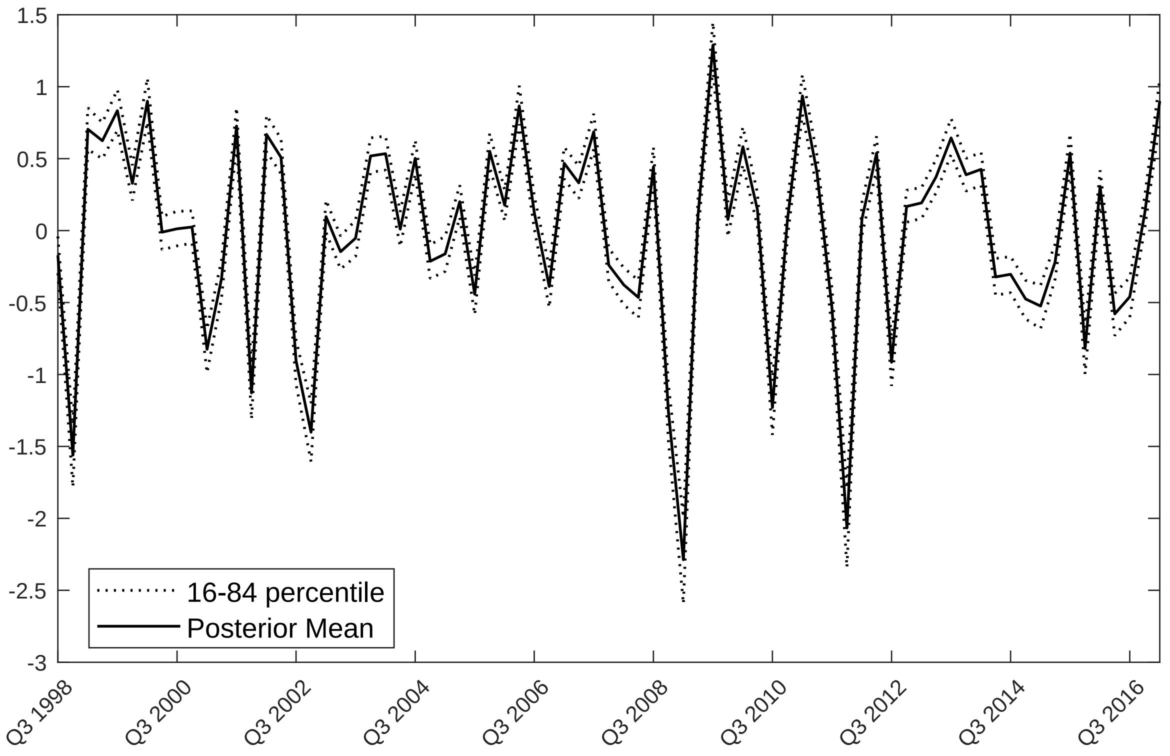
The major peaks and troughs in the asset return factor coincide with events impacting global asset markets, such as late Russian crisis of mid-1998, the 2000 to 2002 bursting of the dot com bubble and September 2002 sharp downturn, the global financial crisis that had its beginnings in the subprime mortgage crisis of 2007 and culminated in the September 2008 stock market crash, the subsequent recovery in 2009, the 2010 Europe sovereign debt crisis and May 2010 sharp crash and, more recently, sharp dips in international stock markets in August 2011 and August 2015. The factor also tracks with the subsequent recoveries.

5.1.2 Analysing the Factor Model of Asset Prices

Table 1 displays the portion of the variance in asset returns attributable to each factor and the sign of the factor loading if it is significantly different from zero by the defined criteria.[23] The factor model of asset prices provides evidence of a world cycle in asset markets that is particularly pronounced for stocks and bonds. On average across countries, the world factor accounts for 45.5% of the variance in equity returns (ranging between 17.6% for New Zealand to 60.0% for Canada) and and 64.8% of the variance in bond returns (ranging from 30.7% in the case of Japan and up to 86.2% for the

[23]There is little difference in the estimated global factor and the degree to which asset prices load on to the global factor if the returns are nominal rather than real. The results are also very similar if only three asset classes are included and house price returns are excluded from the analysis.

Figure 1: Estimate of the World Asset Return Factor



Notes: The solid line depicts the posterior mean of the world asset returns factor. The dashed lines represent the 16% and 84% posterior quartile bands.

Table 1: Summary of Results for Factor Model of Asset Returns

	Equity Returns					**Bond Returns**					**Currency Returns**					**House Returns**				
	WF		CF		IF	WF		CF		IF	WF		CF		IF	WF		CF		IF
	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD
Australia	46.5	+	29.8	+	23.7	74.9	-	9.1	+	16.0	3.9	+	1.4		94.8	7.9	+	2.1		89.9
Canada	60.0	+	25.1	+	15.0	70.3	-	16.0	+	13.8	10.3	+	1.3		88.4	8.7	+	0.2		91.1
Denmark	46.2	+	30.4	+	23.4	64.0	-	17.4	+	18.7	1.9		15.5		82.7	5.2	+	5.7		89.0
Japan	55.4	+	0.4	+	44.2	30.7	-	3.0	-	66.3	9.0	-	1.9		89.1	2.0	+	57.4		40.6
New Zealand	17.6	+	18.3	+	64.1	62.9	-	1.2	+	35.9	2.3		19.5		78.2	1.4	+	30.4		68.2
Sweden	44.8	+	36.1	+	19.1	61.7	-	25.4	+	12.9	10.6	+	1.1		88.3	4.0	+	5.8		90.2
Switzerland	40.2	+	45.9	+	13.9	62.2	-	10.8	+	27.0	1.3		1.2		97.5	1.4	+	4.9		93.7
United Kingdom	45.7	+	47.4	+	6.9	70.5	-	11.7	+	17.8	10.7	+	9.2		80.1	6.9	+	0.4		92.7
United States	53.4	+	29.1	+	17.5	86.2	-	4.2	+	9.6	4.5		0.9		94.6	0.1	+	1.5		98.5
Average VD	45.5		29.2		25.3	64.8		11.0		24.2	6.1		5.8		88.2	4.2		16.2		79.6

Notes: The variance (VD) in percentage terms that is attributable to a World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) is reported for each of the 9 sample countries for the two Monetary Policy variables. The sign attached to the factor loading (FL) for the WF and CF is reported if the 90% posterior coverage interval does not includes zero.

United States). Though smaller in magnitude, the country-specific asset price shocks are significant for all countries, accounting for 29.2% and 11.0% of stock and bond return variability, respectively. While the world shock causes prices between the two markets to diverge, the country-specific shock moves stock and bond prices in tandem for all countries but Japan.

There is no definitive prescription regarding the direction of the stock-bond price correlation. In fact, for many countries the relationship was positive for much of the 1900s but has shifted to be negative in the 2000s and more recent general equilibrium consumption based asset pricing models have attempted to account for this dichotomy.[24,25] The correlation predicted by the Pavolva and Rigobon (2007) is contingent on the source of shocks; since an improvement in the terms of trade increases the price of the home bond, a domestic demand shock generates positive comovement in stock-bond returns whereas a domestic supply shock worsens the terms of trade and results in negative comovement.

The world factor accounts for much less of the variation in the other asset price returns - the average contribution across countries is 6.0% and 4.2% for currency and house price returns, respectively. The world factor has the largest relative impact on the currency returns of Australia, Canada, Japan, Sweden and the UK. The effect on the Japanese currency is anomalous in that the world shock moves it in tandem with bonds, not stocks. House price returns move in the same direction as the equity market in response to a world shock. This confirms that houses are becoming like other asset prices in terms of being subject to international synchronisation despite not being traded. The majority of currency and house returns do not appear to be subject to a strong country-specific cycle.

[24]Examining the correlation through the 1900s on, Baele et al. (2010) report that the not only does the sign of correlation switch in 1997, but the magnitude of the correlation changes over the decades, peaking at 60% in the 1990s and dipping as low as -60% in the 2000s.

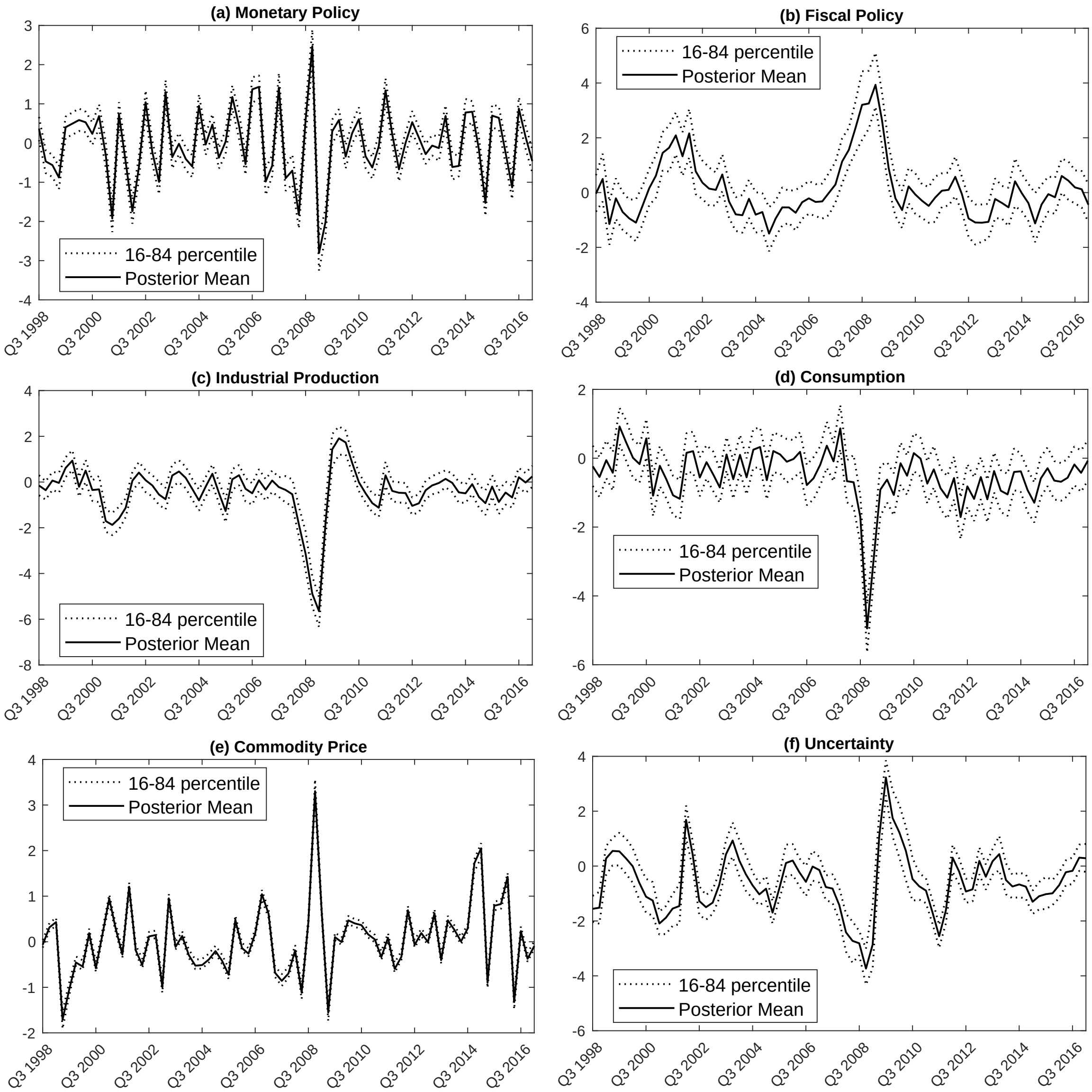
[25]For example, using a new Keynesian model, Campbell et al. (2019) outline a model in which the direction of co-movement is contingent on the correlation between inflation and output since high inflation lowers real long-term bond returns and strong growth drives stock returns. The reverse in direction of correlation in this setting can be explained in turn by the correlation between the output gap and inflation becoming positive in 2001.

5.2 The Factor Models for Driving Variables

5.2.1 A Look at the World Factor in the Driving Variables

Figure 2 plots the world factor obtained from the latent factor models that were estimated for each of the driving variables.

Figure 2: Estimate of the World Driving Variable Factors



Notes: The solid lines depict the posterior means of the world factors estimated by the latent factor model for each of the driving variables. The dashed lines represent the 16% and 84% posterior quartile bands.

The tightness of the 16% and 84% posterior quartile bands suggest they are estimated quite precisely in most cases, however bands for the fiscal policy and consumption world factors are less narrow, connoting less world synchronisation in these variables. The variance decomposition and parameter estimates for the factor model are discussed for each driving variable in turn.

5.2.2 Factor Model of Monetary Policy

The summary of results from estimating the factor model of monetary policy is reported in Table 2. The volatility in the policy rate of the sample countries typically has a large common component, with the world factor explaining on average 34.3% across the countries, ranging from 13.0% for Japan and 10.9% Switzerland, to 78.0% for the US and 74.6% for Canada. In contrast, the world factor accounts for only 3.6% of the volatility in money supply growth on average. A shock to the world factor drives the policy rate of the countries in the same (positive direction) and coincides with an increase in the real money supply for some countries.

The country factor accounts for 20.7% of the variation in the policy rate change on average, but the impact varies significantly by country; being either large (as for Australia, Denmark, Japan and the UK), or else, minor. The country factor explains a relatively large component of the growth in the money supply, accounting for 43.9% on average. A shock to the country factor moves interest rates and money supply in the same direction for all but a few countries.

The results are very similar to those obtained for an analogous model of monetary policy estimated in Crucini et al. (2011) where the small impact of the world factor and the larger impact of the country factor on the money supply is attributed to inflation differentials between countries. While this rationale could be expected to apply for interest rates, countries are arguably somewhat more beholden to move interest rates in line with other countries to avoid currency fluctuations even if this objective is not reflected in officially adopted policy reaction functions.

The results suggesting that both world and country shocks move the variables in the same direction are against conventional wisdom which is that open market operations result in a negative relationship between the policy rate and the narrow money supply (in nominal and real terms) but could possibly be a consequence of expansionary monetary policy not producing large inflationary expectations.[26]

[26] As the nominal money supply increases the real supply increases if prices don't fully adjust and the short term nominal interest rate falls. If inflationary expectations increase then the real interest rate also falls.

Table 2: Summary of Results for Factor Model of Monetary Policy

	Interest Rate					Money Supply				
	WF		CF		IF	WF		CF		IF
	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD
Australia	16.3	+	59.9	+	23.8	0.2		20.9	+	78.9
Canada	74.6	+	1.0	+	24.4	10.1	+	72.1	-	17.8
Denmark	41.8	+	27.4	+	30.8	2.8	+	9.0		88.2
Japan	13.0	+	47.2	+	39.9	2.4		20.2	+	77.5
New Zealand	26.6	+	0.2	+	73.3	0.2		87.1	+	12.7
Sweden	21.8	+	5.3	+	72.9	4.3	+	68.2	+	27.5
Switzerland	10.9	+	0.2	+	89.0	0.6		84.6	-	14.8
United Kingdom	25.6	+	37.3	+	37.2	7.7		3.6		88.7
United States	78.0	+	7.6	+	14.4	4.3	+	29.1	+	66.6
Average VD	34.3		20.7		45.1	3.6		43.9		52.5

Notes: The variance (VD) in percentage terms that is attributable to a World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) is reported for each of the 9 sample countries for the two Monetary Policy variables. The sign attached to the factor loading (FL) for the WF and CF is reported if the 90% posterior coverage interval does not includes zero.

5.2.3 Factor Model of Fiscal Policy

It can be seen from the variance decompositions in Table 3 that the world factor accounts for a relatively small part, 3.3% on average across countries, of the volatility in government expenditure, with the impact being insignificant for most countries. On average, the world factor accounts for over four times as much of the volatility in government revenue growth as expenditure growth, at 15.8%. The US revenue growth is most affected by the common component, which accounts for 31.1% of volatility, while the common factor accounts for only 0.4% of revenue growth volatility in New Zealand. The factor loadings are significantly negative in all cases except for Denmark and Japan for which the credible set spans zero. The finding that there is a world cycle in revenue and much less so in expenditure could imply that comovement in automatic stabilisers is signifying comovement in underlying economic conditions rather than proactive fiscal decisions.

The country factor accounts for 47.0% of the volatility in expenditure growth on average and 33.9% of the variability in revenue growth on average, though there is a wide variation of the country component in fiscal variables between countries. The factor loadings on the country factors are positive across all variables and countries except for US revenue, implying that a shock specific to the domestic market has the

Table 3: Summary of Results for Factor Model of Fiscal Policy

	Government Expenditure					**Government Revenue**				
	WF		CF		IF	WF		CF		IF
	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD
Australia	1.2	+	41.4	+	57.4	1.5	-	32.6	+	65.9
Canada	1.7		33.4	+	64.9	19.1	-	68.5	+	12.4
Denmark	13.3		31.2	+	55.5	19.1		11.7	+	69.3
Japan	3.4	+	19.6	+	77.0	9.9		9.0	+	81.2
New Zealand	3.2		43.0	+	53.8	0.4	-	2.4	+	97.3
Sweden	0.5		6.1	+	93.4	18.6	-	62.5	+	18.9
Switzerland	0.7		77.3	+	22.0	10.3	-	40.0	+	49.8
United Kingdom	1.3	+	92.8	+	5.9	23.8	-	55.9	+	20.3
United States	4.6		78.2	+	17.2	31.1	-	22.5		46.4
Average VD	3.3		47.0		49.7	18.2		33.9		50.3

Notes: The variance (VD) in percentage terms that is attributable to a World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) is reported for each of the 9 sample countries for the two Fiscal Policy variables. The sign attached to the factor loading (FL) for the WF and CF is reported if the 90% posterior coverage interval does not includes zero.

same directional effect on expenditure and revenue.

There is a large body of research on the relationship between revenues and expenditures aimed at dissecting hypotheses about the operation of fiscal policy.[27] The view that the variables are simultaneously driven by common shocks at the country level is most consistent with the fiscal synchronisation hypothesis that argues government revenue and expenditure decisions are made jointly.

5.2.4 Factor Model of Productivity

The variance decompositions for the factor model of the productivity variables are reported in Table 4. Given that the two productivity proxy variables have the same definition but different sources, it is unsurprising that the world and country level factors account for similar levels of volatility across the two productivity growth measures. The idiosyncratic component can be considered to be measurement error or variations in the data used to construct the variables.

[27] There are four theoretical hypotheses on the relationship between Government expenditures and revenues: the spend and tax hypothesis (increased expenditures and debt will necessitate higher taxes); the tax and spend hypothesis (an increase in revenues leads to an increase in expenditure of additional funds raised); the fiscal synchronisation hypothesis (expenditures and revenues are decided simultaneously and move together); and the institutional separation hypothesis (decisions are independent, suggesting no relationship between the two).

Table 4: Summary of Results for Factor Model of Productivity

	Labour Productivity (1)					**Labour Productivity (2)**				
	WF		CF		IF	WF		CF		IF
	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD
Australia	6.1	+	58.3	+	35.6	5.3	+	61.0	+	33.7
Canada	27.8	+	48.4	+	23.8	23.8	+	60.1	+	16.1
Denmark	7.0	+	84.7	+	8.3	6.9	+	82.3	+	10.8
Japan	49.0	+	34.9	+	16.1	48.9	+	35.1	+	16.0
New Zealand	16.1	+	68.4	+	15.5	15.0	+	67.1	+	17.9
Sweden	35.0	+	42.9	+	22.2	33.9	+	46.1	+	20.0
Switzerland	12.3	+	74.0	+	13.7	18.5	+	67.1	+	14.5
United Kingdom	33.1	+	37.1	+	29.9	29.5	+	48.5	+	22.1
United States	41.0	+	20.0	+	39.0	52.0	+	18.1	+	29.9
Average VD	25.3		52.1		22.7	26.0		53.9		20.1

Notes: The variance (VD) in percentage terms that is attributable to a World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) is reported for each of the 9 sample countries for the two Productivity variables. The sign attached to the factor loading (FL) for the WF and CF is reported if the 90% posterior coverage interval does not includes zero.

The world factor accounts for around a quarter of productivity growth variability on average. The common component of productivity accounts for the lowest productivity growth variability for Australia (5.3%) and the highest for Japan (49.0%). The factor loadings show that a shock to growth originating in the world factor drives all measures of productivity across all countries in the same direction. The country-specific factor dominates the world factor for all countries but Japan and the United States, accounting for just over half of the productivity growth variability on average and ranging from 18.1% for the US to 84.7% for Denmark. Unsurprisingly, a country level shock drives both measures in the same direction for all countries.

5.2.5 Factor Model of Consumption

The variance decompositions for the factor model of consumption contained in Table 5 show that the world factor is less important in a relative sense in accounting for per capita consumption than it is for productivity. The world component of consumption is generally smaller than that in productivity, which is consistent with the 'quantity anomaly' demonstrated by Backus et al. (1992) (so named since the finding is against predictions of the Real Business Cycle models). On average, the world factor accounts for 4.2% and 10.4% of the variability in consumption measures 1 and 2, respectively. The factor loadings on the world factor are significant for most countries and where

Table 5: Summary of Results for Factor Model of Consumption

	Consumption (1)					**Consumption (2)**				
	WF		CF		IF	WF		CF		IF
	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD
Australia	1.6	+	15.5	+	82.9	10.9	+	68.0	+	21.2
Canada	7.3	+	46.9	+	45.9	28.2	+	44.2	+	27.6
Denmark	16.0	+	28.4	+	55.6	15.1	+	62.6	+	22.3
Japan	1.0		13.1	+	85.9	1.1		93.8	+	5.2
New Zealand	0.3		9.6	+	90.1	3.2		82.9	+	14.0
Sweden	2.9	+	29.0	+	68.1	13.5	+	54.5	+	32.0
Switzerland	0.5		59.2	+	40.3	1.9	+	74.1	+	24.0
United Kingdom	6.3	+	40.3	+	53.4	7.1	+	69.3	+	23.6
United States	1.7	+	46.6	+	51.7	12.5	+	65.6	+	22.0
Average VD	4.2		32.1		63.8	10.4		68.3		21.3

Notes: The variance (VD) in percentage terms that is attributable to a World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) is reported for each of the 9 sample countries for the two Consumption variables. The sign attached to the factor loading (FL) for the WF and CF is reported if the 90% posterior coverage interval does not includes zero.

so demonstrate that a common shock drives consumption in the same direction. The country factor is significant across all countries and affects the two measures in the same direction, however the variance accounted for by the country-specific factor varies across countries and within a country in some cases. The country factor accounts for an average of 32.1% and 68.3% of the volatility in consumption growth measures 1 and 2 respectively. There is disagreement between the impact of the factors on the two measures, which could reflect some difference in measurement as well as the aforementioned relative difficult in pinning down the common factor for this variable.

5.2.6 Factor Model of Relative Commodity Prices

The results from the estimation of the factor model of relative commodity prices are presented in Table 6. The world factor explains 81.9% of the variability in relative oil price growth across countries on average and the contribution is very similar across countries. Of the remaining commodity categories, the world factor explains the highest portion of the variability in relative metals prices at 11%. The factor loadings demonstrate that a world shock drives all relative oil and metals prices in the same direction. The world factor plays a smaller role in accounting for volatility in the relative prices of agriculture, beverages and food categories, explaining 3.1%, 2.0% and 5.5%, of return volatility respectively.

On average, the country factor accounts for 12.5%, 18.4%, 30.6% and 14.4% of

Table 6: Summary of Results for Factor Model of Commodity Prices

	Agriculture					**Beverages**					**Food**					**Metals**					**Oil**				
	WF		CF		IF	WF		CF		IF	WF		CF		IF	WF		CF		IF	WF		CF		IF
	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD
Australia	9.4	+	85.7	+	5.0	6.4	+	9.8	+	83.8	0.3		16.6	+	83.0	3.4	-	23.2	+	73.4	79.3	-	17.0	+	3.6
Canada	6.0	+	91.0	+	2.9	2.7	+	11.0	+	86.3	0.2		12.0	+	87.8	5.9	-	25.8	+	68.2	84.1	-	12.4	+	3.5
Denmark	0.1		93.0	+	6.9	0.1		11.1	+	88.8	5.3	-	19.1	+	75.6	11.8	-	31.4	+	56.8	80.8	-	14.7	+	4.5
Japan	2.9		91.2	+	6.0	2.5	+	30.0	+	67.5	12.4	-	36.6	+	51.0	16.1	-	47.2	+	36.7	78.3	-	18.0	+	3.6
New Zealand	2.2		93.4	+	4.4	1.4		12.4	+	86.2	1.0		23.9	+	75.1	8.3	-	27.8	+	63.9	80.7	-	15.5	+	3.8
Sweden	2.7		92.9	+	4.4	1.6		6.5	+	91.9	1.4		11.6	+	87.0	8.2	-	26.6	+	65.2	82.9	-	13.9	+	3.3
Switzerland	0.6		94.4	+	5.0	0.6		11.0	+	88.4	11.2	-	17.9	+	70.9	16.4	-	31.5	+	52.1	82.4	-	13.9	+	3.7
United Kingdom	1.0		93.5	+	5.5	0.6		8.6	+	90.9	2.9	-	14.2	+	82.9	9.6	-	30.1	+	60.3	82.9	-	13.1	+	3.9
United States	2.7		94.1	+	3.2	1.7		11.7	+	86.6	15.1	-	13.3	+	71.6	19.1	-	31.5	+	49.3	85.7	-	11.1	+	3.2
Average VD	3.1		92.1		4.8	2.0		12.5		85.6	5.5		18.4		76.1	11.0		30.6		58.4	81.9		14.4		3.7

Notes: The variance (VD) in percentage terms that is attributable to a World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) is reported for each of the 9 sample countries for the five Commodity Prices variables. The sign attached to the factor loading (FL) for the WF and CF is reported if the 90% posterior coverage interval does not includes zero.

the volatility in the growth in the relative price of beverage, food, metals and oil, respectively and as high as 92.1% for relative agricultural prices. For all countries a shock specific to the country affects the relative price of all commodities in the same direction.

5.2.7 Factor Model of Sentiment

The summary of the results from estimating the factor model for the consumer and business confidence variables are contained in Table 7. There is a strong world cycle and country cycle in the sentiment variables, although the relative importance of the factors vary between countries. The world factor accounts for 15.7% of the variability in consumer confidence growth on average and ranges between as little as 5.8% for Australia and 2.3% for New Zealand and up to 40.1% for Switzerland. On average the world factor accounts for almost a quarter of the variance in business confidence growth, again being most impactful for Switzerland at 40.7%. The world factor has the smallest relative effect on business confidence for Australia, New Zealand and Canada, accounting for 9.6%, 11.8% and 8.1% of variability respectively. With the exception of the consumer confidence variable for New Zealand, all variables respond in the same direction to a shock originating in world sentiment.

On average, the country factor explains 34.8% and 22.4% of the variability in con-

Table 7: Summary of Results for Factor Model of Sentiment

	Consumer Confidence					Producer Confidence				
	WF		CF		IF	WF		CF		IF
	VD	FL	VD	FL	VD	VD	FL	VD	FL	VD
Australia	5.8	+	80.9	+	13.3	9.6	+	10.7	+	79.7
Canada	25.4	+	3.5	+	71.1	11.8	+	66.7	+	21.5
Denmark	7.0	+	78.0	+	14.9	28.8	+	0.8		70.4
Japan	11.5	+	66.4	+	22.2	24.2	+	1.5		74.3
New Zealand	2.3		49.7	+	48.0	8.1	+	70.0	+	21.9
Sweden	30.1	+	17.1	+	52.8	29.9	+	21.6	+	48.5
Switzerland	40.1	+	17.0	+	42.9	40.7	+	22.1	+	37.2
United Kingdom	10.8	+	66.8	+	22.4	36.7	+	1.0		62.3
United States	8.5	+	66.1	+	25.3	30.1	+	6.8		63.1
Average VD	15.7		34.8		49.5	24.4		22.4		53.2

Notes: The variance (VD) in percentage terms that is attributable to a World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) is reported for each of the 9 sample countries for the two Sentiment variables. The sign attached to the factor loading (FL) for the WF and CF is reported if the 90% posterior coverage interval does not includes zero.

sumer and producer confidence, respectively. For most countries a country-specific shock causes convergence in business and consumer confidence.

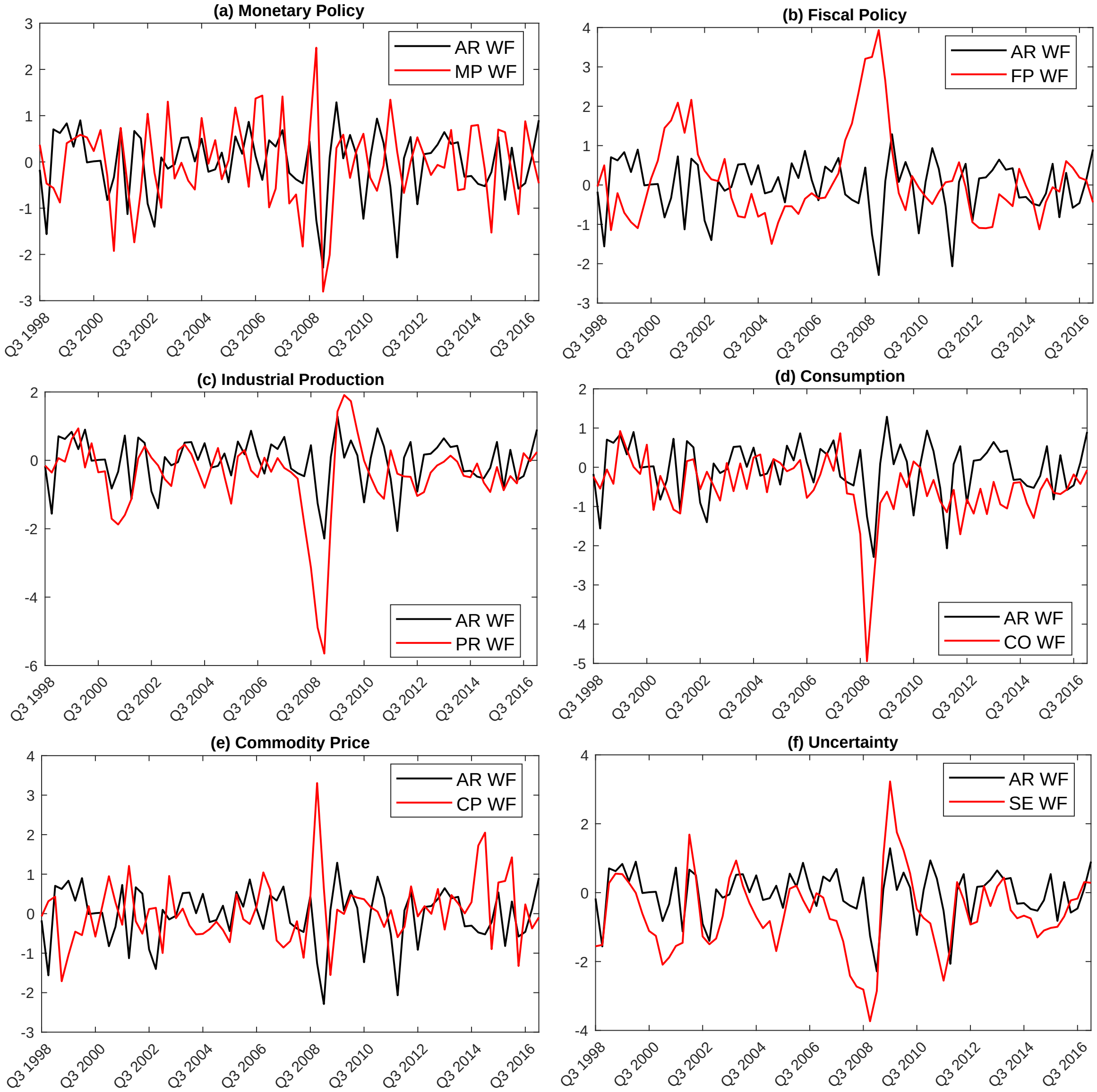
6 Exploring the Drivers of Asset Returns

This section explores the impact that driving variables have on the individual asset return series using the factors extracted in the previous section. As a first step, the world factors extracted from the estimated latent factor models of the driving variables are plotted alongside the world asset price factors to visually inspect comovement. The relative impact of the world and county factors in the driving variables on the individual asset prices is then investigated.

6.1 A Comparison of the World Factors

Plots of the world factors for driving variables are plotted against the world asset return factor in Figure 3. Figure 3a displays the world monetary policy factor against the world asset return factor. The monetary policy factor is very volatile and moves within a larger range than the real asset factor. The comovement between the two factors appears to be negative for the most part. Figure 3b displays the fiscal policy world factor. Unsurprisingly the fiscal policy factor does not undergo such rapid changes as the other factors. There are periods, notably between 2004 and 2007, where the fiscal

Figure 3: A Comparison of the World Factor in Asset Returns with the World Factors in the Driving Variables



Notes: The black line depicts the asset return world factor (AR WF) and the red line represents the world factors in monetary policy (MP WF), fiscal policy (FP WF), productivity (PR WF), per capita consumption (CO WF), commodity prices (CP WF), and sentiment (SE WF).

policy factor appears to lead the asset return factor quite clearly. Government revenue decreases significantly over the period preceding the crisis and throughout. Figure 3c provides evidence that oscillations in the world productivity factor lead swings in the asset returns world factor. Overall there appears to be close comovement, especially since the end of 2004. This pattern is emphasised in the period beginning immediately prior to the financial crisis through the recovery. Figure 3d shows that the world consumption factor is highly volatile, but there appears to be comovement with the asset factor in terms of the broader trends. Figure 3e plots the factor driving world comovement in relative commodity prices against the asset return factor. Generally the comovement between the factors appears to be negative. From figure 3f, it appears that in times at which there is a peak in the factor and a subsequent inflection pointing driving falling confidence, there follows a period of falling asset prices. Conversely, troughs in the factor followed by period of rising confidence precede rises in the asset return factor. This phenomenon is especially apparent over the period that encompasses the global financial crisis.

The plots imply that for many of the world driving factors, the bivariate relationship with the world asset return factor varies over time. This time variation in the comovement can be explored using the factor models estimated based on a rolling sample period.

6.2 Decomposing the Asset Returns

Table 8 displays the variance decompositions from the regression of each asset return series upon each of the world and country level driving variables. The results for the equity returns, bond returns, currency returns and house returns are in panels A, B, C and D respectively. The signs attached to the parameter estimates are reported if the p-values imply the loadings are significantly different from zero using a 10% level. The parameter estimates on the factors are contained in Appendix D along with the p-values. In order to surmise the impact of the driving variables on asset prices, the factor models must be considered alongside the regression analysis. Salient results regarding the magnitude and direction of impact are presented in the context of the Pavlova and Rigobon (2007) model and literature on asset price comovement and links to the real economy.

On average, the world factors play a larger role in explaining return variance for equity, bond and house returns, accounting for 37.0%, 20.9% and 31.8%, respectively. The country factors are on average more important for currency returns, accounting for 31.6% of volatility on average.

Table 8: Results From Regression of Asset Return Series on World and Country Factors of the Driving Variables

	World Factor							Country-Specific Factor						
	MP	FP	PR	CO	CP	SE	TOT	MP	FP	PR	CO	CP	SE	TOT
	VDFL	VDFL	VDFL	VDFL	VDFL	VDFL	VD	VDFL	VDFL	VDFL	VDFL	VDFL	VDFL	VD
	Panel A. Variance Decompositions and Sign of Factor Loading for Equity Returns													
Australia	0.9	19.5 -	5.6 +	0.6	0.0	9.1 +	35.7	4.8 +	0.2	1.0	1.4	7.7 +	1.1	16.2
Canada	0.4	18.9 -	7.4 +	0.7	1.9	12.0 +	41.3	0.5	1.3	2.2	7.9 +	12.9 +	0.2	24.9
Denmark	1.0	20.3 -	4.5 +	0.0	0.2	9.8 +	35.8	0.2	1.2	6.0 +	0.9	19.1 +	0.3	27.7
Japan	1.4	22.8 -	3.1 +	1.0	0.0	10.4 +	38.7	0.7	0.5	0.9	7.4 +	24.7 +	0.0	34.2
New Zealand	0.0	16.4 -	1.3	1.9	0.1	10.0 +	29.7	0.1	0.2	2.6	1.6	3.2	0.8	8.4
Sweden	0.0	18.5 -	1.5	0.2	1.0	21.3 +	42.5	0.6	0.4	2.2	0.3	10.2 +	2.1	15.7
Switzerland	3.7 +	17.3 -	1.3	0.9	0.5	14.1 +	37.8	1.9	0.8	4.8 +	0.4	17.0 +	1.2	26.1
United Kingdom	0.0	17.9 -	2.6	0.4	0.1	12.5 +	33.4	6.1 +	0.1	0.0	3.2 +	25.6 +	2.4	37.4
United States	1.4	21.1 -	4.8 +	1.8	0.0	9.6 +	38.8	0.0	2.7	3.6 +	0.9	15.0 +	0.8	23.0
Average	1.0	19.2 -	3.6	0.8	0.4	12.1 +	37.1	1.7	0.8	2.6	2.7	15.0	1.0	23.7
	Panel B. Variance Decompositions and Sign of Factor Loading for Bond Returns													
Australia	0.0	3.4 +	17.4 -	2.5	2.2	6.7 -	32.2	2.7	0.6	0.0	0.1	7.3 -	0.1	10.7
Canada	0.3	3.0	5.3 -	1.6	1.5	8.6 -	20.3	4.4 -	0.4	1.1	1.4	9.9 -	1.8	19.0
Denmark	0.1	1.5	4.0 -	4.4 -	0.2	4.1 -	14.2	3.2	4.4 +	0.7	0.0	1.8	0.0	10.1
Japan	0.6	3.2	0.4	0.4	0.8	6.4 -	11.9	0.2	17.3 +	4.6 -	0.1	9.1	0.0	31.4
New Zealand	0.0	1.7	6.1 -	1.1	3.1	9.2 -	21.3	4.1 +	0.2	0.0	0.0	3.5	1.5	9.4
Sweden	0.2	0.7	10.2 -	4.0 -	1.4	4.9 -	21.3	0.8	0.3	0.1	0.0	0.9 -	4.3	6.4
Switzerland	0.1	4.0 +	6.3 -	6.2 -	0.5	5.1 -	22.2	20.0 -	0.1	0.3	7.8	1.6 +	0.0	29.8
United Kingdom	0.2	2.6	7.0 -	1.9	1.7	4.6 -	18.0	5.4 -	4.6 +	1.0	0.0	3.6 -	0.5	15.1
United States	0.0	6.3 +	6.3 -	0.6	2.0	11.9 -	27.1	1.8	3.8 +	0.0	0.0	14.8 -	0.8	21.3
Average	0.2	2.9	7.0	2.5	1.5	6.8	20.9	4.7	3.5	0.9	1.1	5.8	1.0	17.0
	Panel C. Variance Decompositions and Sign of Factor Loading for Currency Returns													
Australia	16.1 -	4.3 -	13.2 +	6.3 +	2.6 -	6.9 +	49.4	0.1	0.4	0.3	0.0	14.7 -	1.9	17.4
Canada	3.9 -	4.8 -	7.7 +	11.5 +	10.9 -	10.6 +	49.5	15.0 +	3.3 +	6.5 -	3.0 +	1.3	0.1	29.1
Denmark	0.8	7.9 +	0.2	2.3	0.3	0.4	11.8	1.3	0.0	1.4	2.3 +	45.7 -	1.6	52.3
Japan	6.3 +	7.9 +	0.0	1.2	0.0	3.0	18.5	1.3	1.8 -	1.2	5.0 -	49.3 -	2.7 -	61.2
New Zealand	1.6	4.0 -	11.0 +	0.1	0.1	3.6 +	20.2	1.0	1.1	3.5 +	12.5 +	16.8 -	1.1	35.9
Sweden	2.0	11.2 -	13.8 +	2.5	0.0	3.9 +	33.5	4.1 -	0.2	3.9 +	0.0	2.5	0.0	10.7
Switzerland	0.0	2.9	0.0	1.9	3.8 +	6.7 -	15.3	4.1 -	1.0	3.0 -	4.3 -	14.2 -	2.0	28.6
United Kingdom	0.1	15.0 -	2.7	0.0	1.3	3.4 +	22.5	7.4 +	8.2 -	0.1	0.6	4.5 -	3.6 +	24.4
United States	3.1 +	2.9 +	11.8 -	7.7 -	6.8 +	0.5	32.9	9.8 +	1.6	3.7 -	0.2	9.8 -	0.1	25.2
Average	3.8	6.8	6.7	3.7	2.9	4.3	28.2	4.9	1.9	2.6	3.1	17.6	1.5	31.6
	Panel D. Variance Decompositions and Sign of Factor Loading for House Returns													
Australia	0.8	0.3	26.4 +	0.0	0.4	7.4 +	35.3	3.6 +	0.0	0.1	3.9 +	1.6	0.0	9.3
Canada	5.8 +	10.2 -	20.1 +	0.0	0.4	0.0	36.5	0.4	2.0	3.4	6.3 +	1.1	2.3	15.3
Denmark	1.5	35.1 -	0.7	8.3 +	0.9	2.0	48.5	0.1	0.0	0.0	6.2 +	4.2 +	0.0	10.5
Japan	0.3	5.2 -	5.3 +	3.7 -	0.6	0.4	15.4	0.0	0.6	0.6	2.6	6.2 +	3.4	13.4
New Zealand	0.0	18.5 -	0.9	1.0	0.6	4.2 +	25.1	1.2	0.2	0.7	17.5 +	3.0	2.3	24.8
Sweden	0.2	18.8 -	2.5	3.7 +	1.3	8.5 +	35.0	2.7	5.0 +	1.8	4.9 +	0.2	1.1	15.7
Switzerland	5.7 +	0.2	7.0 -	0.2	10.6 +	0.0	23.6	0.3	0.0	2.0	0.2	0.0	0.8	3.3
United Kingdom	0.2	17.1 -	20.1 +	3.0 +	0.0	1.7	42.1	10.4 +	0.7	0.2	17.0 +	0.5	1.3	30.1
United States	1.4	17.4 -	1.5	0.1	2.7	1.9	25.1	2.9 +	0.3	0.7	25.8 +	2.5	0.1	32.1
Average	1.8	13.6	9.4	2.2	1.9	2.9	31.8	2.4	1.0	1.1	9.4	2.1	1.3	17.2

Notes: Results from linear regressions which decompose the variance in asset returns according by percent attributable to the world factors and the respective country-specific factors for Monetary Policy (MP), Fiscal Policy (FP), Production (PR), Consumption (CO), Commodity Prices (CP) and Sentiment (SE) are reported, along with total (TOT) variance explained by world and country factors.

6.3 Are the Drivers of Asset Returns Consistent with the Asset Pricing Model?

In contrast to results in Pavlova and Rigobon (2007), neither the world nor country factor in per capita consumption has a significant impact on bond and equity prices in the vast majority of cases. The impact of consumption on the currency is significant for some countries, but the magnitude and direction of the effect varies.

The country-specific factor in productivity is not a significant driver of either stocks or bonds, however world productivity shocks have more impact, accounting for 3.6% and 7.0% of equity and bond variability respectively. A positive world productivity shock has a significant negative impact on bond price returns for all countries except Japan, and a positive effect on the equity returns of Australia, Canada, Denmark, Japan and the United States. This is consistent with the theoretical prediction regarding positive supply shocks causing gains and convergence in equity returns across countries although the difference here is that a channel for the cross-country comovement of productivity shocks is incorporated.[28] The average portion of currency variance accounted for by the world and common factors in productivity is 6.7% an 2.6%, respectively, although again the magnitude and direction of impact varies across countries.

The world factor in relative commodity prices does not have a significant impact on equity or bond returns, whereas the country factor in commodity prices, which captures relative price movements specific to a country, explains a large portion of the return volatility in equity prices, 15.0% on average. A shock which raises relative commodity prices has a positive impact on equity prices for all countries except New Zealand, and a negative impact on bond prices for the majority of countries (Australia, Canada, Japan, the UK and the United States). Unsurprisingly, the country component of relative commodity prices has a relatively large effect on the currency, accounting for 17.6% of volatility on average.

House prices were not included in the Pavlova and Rigobon (2007) model but productivity and consumption have large impacts on returns of this market. World productivity explains on average 9.4% of house price volatility, and up to 26.4% in the case of Australia. The country-specific factor in productivity accounts for 9.4% of house

[28] While Pavlova and Rigobon (2007) predict a domestic productivity shock will lower bond prices and cause a negative comovement with stock prices, the effect of a productivity shock on bond prices occurs via movement in the terms of trade so an identical shock across the two countries in the two country model would not alter the bond return under the set up used.

prce return variability, on average. The country factor in consumption also accounts for a relatively large component of house price returns and has a positive impact in most instances. This is consistent with house prices being demand driven in the short run as supply responses occur at a lag.

6.4 What Impact Do Policy Variables Have on Driving Asset Returns?

The world factor in fiscal policy accounts for 2.9% of bond return variability on average but 6.8% and 13.6% of currency and house return variability, respectively. The world factor typically reduces house price returns, increases bond returns in a few cases and has a mixed impact on currency returns.

In comparison, the most important driver for equity returns is the world fiscal policy factor, which accounts for 19.2% of return volatility on average and has a similar relative impact across the series'. A world fiscal shock that reduces tax revenue also reduces equity returns for all countries. It is difficult to disentangle the degree to which this effect is driven by the indexation of tax revenue to global economic conditions rather than deliberate fiscal stances.

Further, when the ordering of the world productivity and world fiscal policy factor are reversed in equation (6) along with the order of orthogonalisation, the variance in individual equity returns accounted for by each approximately switches, with productivity accounting for the larger portion of equity return variance. The world fiscal policy factor explains a significant amount of variation in the world productivity factor and so subsumes this effect when it is included first. The regression shows that a reduction in the world factor that in turn drives up tax revenue across countries has a significant positive effect on world productivity, which again suggests that the fiscal factor is a proxy for economic output to some degree.

However, even in the case that the fiscal policy factor is orthogonalised with respect to productivity, the significance and direction of the effect on equity prices remains unchanged. This is consistent with aforementioned findings of Ardagna (2009) and Afonso and Souso (2011) regarding the positive effect of fiscal consolidation on equity prices across OECD countries. Overall the country-specific factor in fiscal policy has a small to negligible impact on asset returns, except in the case of bond returns for some countries.

A world shock to monetary policy is not found to have a significant impact on the equity or bond market and is only a significant driver of house returns in a few countries. The world monetary policy factor has a relatively large impact for the currency returns of Australia and Japan, accounting for 16.1% and 6.3% of return variability respectively. A rise in world interest rates drives the Australian dollar up and the Japanese yen down. The degree of impact is interesting when considering that the a world monetary policy shock has the smallest relative impact on the interest rate of these countries. This seems to suggest that currencies are more effected by world interest rate movements if the volatility in the country's interest rate growth is relatively independent of common shocks.

A country level shock that increases the policy rate and the real money supply has a significant negative impact on bond prices for a few of the countries.[29] As with the world factor, the country-specific factor in monetary policy typically has a greater impact for currency returns generally, though the size and direction of impact is mixed across the countries. Overall these results are consistent with evidence that exchange rates more than other asset classes tend to respond to shocks that drive up interest rates, suggesting they act as a transmission mechanism for monetary policy changes, which is consistent with predictions of theoretical models examining small open economies.

6.5 What Impact Does Sentiment Have on Asset Returns?

World sentiment on average has a larger impact than country-specific sentiment across all asset markets, explaining 12.1%, 6.8%, 4.3% and 2.9% of equity, bond, currency and house return volatility, respectively. The impact for stocks and bonds is more consistent than the varied effect of many other variables. A world shock to sentiment that increases consumer and producer confidence drives up equity prices and drives down bond prices in all countries. An increase in the common component of confidence drives the returns of currencies of Australia, Canada, New Zealand, Sweden and the UK up and drives down the Swiss franc, which is consistent with the concept of commodity countries being investment currencies in times of improved confidence and the Swiss

[29] This is consistent with general findings in Estrella and and Mishkin (1997), who examined the impact of the policy rate on the long end of the yield curve and found varied impact across countries and that many other factors were important, particularly expectations of inflation and real activity. While Shiller and Beltratti (1992) and Andersson et al. (2008) demonstrate that changes in the risk-free interest rate generate the positive correlation between stock and bond returns, D'Arcy and Poole (2010) find that the interest rate channel has become less important since 2001 (using data for the US and Australia).

Franc's role as a safe haven currency. The loading on the world sentiment factor for Japan and the US currency returns is also negative but the credible sets contain zero. A positive shock to world sentiment has a relatively large positive impact on house returns in Australia, New Zealand and Sweden, accounting for 7.4%, 4.2% and 8.5%, respectively.

6.6 What Are the Factors Underpinning Asset Market Linkages?

Country-specific shocks to relative commodity prices play an important role in linking equity, bond and currency markets within countries, while world shocks to fiscal policy variables, productivity and sentiment are the major factors generating international cross-market linkages across all four asset markets. World sentiment appears to play an important role in linking equity and bond markets; it is the third largest contributor to equity return volatility and the second largest contributor to bond return volatility by variance decomposition. Moreover though, it is the only factor which has a significant impact across all bond and equity return series; a shock which improves consumer and producer confidence increases equity prices and reduce bond prices, which is consistent with bonds being treated as a safe asset. Though the flight in and out of quality implies directional impact between stocks and bonds in response to uncertainty measured by financial or macroeconomic indicators, the negative comovement induced by changes in sentiment is consistent with this phenomenon and the results suggest there is a global risk-on, risk-off effect.[30]

6.7 Are the Drivers of Returns Different Between Countries?

The results demonstrate the heterogeneity of return determinants across countries broadly, though there are some more extreme effects evident in both the individual factor models and the regression results in the case of the commodity countries, particularly for Australia and Canada. A general world asset market shock has a relatively

[30]Research into the flight to safety phenomenon typically use high frequency financial data and focus on how financial market measures of uncertainty change the both the direction and degree of correlation. For instance, using daily data for the US and other major countries, Connelly et al. (2005), Connelly et. al (2007) and Kim et al. (2006), Stivers and Sun (2002) find that increasing stock market uncertainty coincident with falling stock markets incites flight to quality behaviour, driving bond prices up and demonstrate that this effect has been pronounced in recessions. Asgharian et al. (2015a) find flight to quality in times of high uncertainty evidence using a macroeconomic uncertainty measure based on news forecasts that was developed by Bali et al. (2014).

large impact on the equity, bond and house returns of Australia and Canada. In contrast, while the world component typically has a significant impact on the driving variables of Australia and New Zealand, the degree of impact is usually well below average. This is true in the case of Government revenue, productivity growth and both consumer confidence and producer confidence growth. Despite this, the impact of world shocks to driving variables typically have a comparatively large effect on the asset returns of the commodity countries. The equity returns of Australia and Canada are most impacted by world productivity shocks, although the directional effect is the same for all countries. The country-specific factor in relative commodity price returns has the lowest impact on the equity returns of Australia and New Zealand but is quite important for the other countries. This factor is important in explaining bond price returns for Australia and Canada and is only significant for the US and Japan otherwise.

In regards to the currency returns, those of Australia and Canada are the only countries for which every world factor (except that in monetary policy which is not significant for any country) has a significant impact on returns. In sum, the world factors for Australia and Canada explain 49.4% and 49.5% respectively, which is over double the average of the remaining countries. The effects of world sentiment are the largest for the currencies of Australia and Canada. The world factor in productivity has a much larger effect for the commodity currencies, and Sweden, and is only significantly positive for these countries. The only other country for which there is a large impact is the US, for which a productivity increase causes a depreciation. In contrast to the Balassa-Samuelson channel (proposed by Balassa, 1964, and Samuelson, 1964) this suggests it may be world productivity growth, as opposed to country-level productivity differentials, which is an important driver of the currencies, at least for export dependent countries. These currencies are also the only ones for which the world factor in consumption has a significant positive impact; the only other significant impact made by this factor is a negative one in the case of the US currency returns. The findings suggest that a possible reason the currency-equity return correlation seems to be different for the commodity countries is that the currencies are more susceptible to demand and supply shocks, though world shocks rather than country level differences are the relevant component.

Apart from the commodity countries, the results obtained from estimating the asset price and driving variable factor models cast Japan as an anomaly in many cases.

While the world shock effects the equity market in a similar way to that of other countries, the relative effect on the volatility of bond price returns is less than half the average impact. Japan is the only country for which the country-specific factor drives divergence in stock and bond prices. The world asset return factor has a significant impact on the direction of the currency returns of four countries, with Japan being the only country for which the effect causes the currency to move in the same direction of the bond price. Overall, country-specific factors are much more important for Japan than the world factor in explaining both equity and bond returns compared to the other countries.

6.8 Time Variation in the Determinants of Asset Returns

The results of the regressions of the individual asset return series on the factors 9 year rolling factor models are presented in Table 9. The figures are the average variation in the asset returns attributable to each driving variable across the sample countries and are reviewed in regards to the relative importance of world and country-specific factors over time and trends in the contribution of specific driving variables. Interestingly, there is not a huge variation in the average portion of equity and bond volatility owing to the common factors of driving variables between the first and last sub-sample, suggesting that even the period starting in 1998 and running to 2007 picked up significant world linkages. There is an increase in the average combined impact of world factors during the samples that more comprehensively include the crisis period. Specifically, the world factor explains up to 49.9% of equity return variability in the sample running from 2002-2011 and 38.6% of bond return variability over 2000-2009. In contrast to the impact of the world factors on the stock and bond returns throughout time, there is a clear upward trend in the importance of the world factors as drivers of currency returns, with the total average contributions increasing from a low of 21.6% in the first sub-sample to 46.5% in the most recent period, which was chiefly driven by a large increase in the impact of the world productivity factor. The impact of the world factors in totality on the house price returns has a similar time trajectory as for currency returns; there is an increases over time which is caused by a sharp upward tick in the third sub-sample period to 47.8%, again driven by the increase impact of a world productivity shock.

World productivity shocks stand out for being an increasing source of return volatility over time in every asset market, with the impact increasingly sharply in the sample

Table 9: Variance Decompositions From Regression of Asset Return Series on World and Country Factors of the Driving Variables

	World Factor							Country-Specific Factor						
	MP	**FP**	**PR**	**CO**	**CP**	**SE**	**TOT**	**MP**	**FP**	**PR**	**CO**	**CP**	**SE**	**TOT**
Panel A. Variance Decompositions for Equity Returns														
1998Q3 - 2007Q2	1.9	1.1	10.4	5.6	4.2	18.6	41.9	2.6	4.0	5.3	4.3	3.8	3.5	23.5
1999Q3 - 2008Q2	2.1	4.3	9.2	6.7	7.2	15.3	44.9	3.3	2.1	6.8	5.7	1.0	3.4	22.4
2000Q3 - 2009Q2	6.2	10.1	15.8	0.6	3.1	10.8	46.7	7.5	2.4	4.6	7.8	0.7	5.1	28.1
2001Q3 - 2010Q2	7.9	10.7	20.3	0.3	1.4	8.1	48.7	4.4	2.9	1.8	3.5	11.6	2.6	26.7
2002Q3 - 2011Q2	4.6	19.0	13.1	0.1	10.6	2.3	49.9	3.4	3.4	2.4	2.2	2.9	3.8	18.0
2003Q3 - 2012Q2	5.1	10.2	23.2	0.6	0.9	9.7	49.6	6.0	2.0	2.4	2.1	2.3	4.9	19.5
2004Q3 - 2013Q2	6.3	7.3	23.6	0.5	1.0	8.8	47.4	7.9	2.8	0.7	2.0	2.9	4.4	20.8
2005Q3 - 2014Q2	5.1	7.2	22.7	0.6	0.6	9.0	45.4	5.1	3.6	1.3	4.1	3.1	4.8	21.8
2006Q3 - 2015Q2	4.3	9.9	18.3	0.8	3.7	8.6	45.5	6.0	2.8	2.2	3.6	3.1	3.2	20.9
2007Q3 - 2016Q2	7.2	5.1	21.9	2.9	1.2	8.2	46.5	5.8	3.0	1.7	4.8	3.8	5.5	24.6
2008Q2 - 2017Q1	1.4	7.8	23.6	4.5	4.7	1.7	43.7	9.5	2.4	1.7	3.7	6.8	5.1	29.1
Panel B. Variance Decompositions for Bond Returns														
1998Q3 - 2007Q2	0.6	0.7	4.8	8.7	7.5	6.2	28.5	6.8	3.8	3.8	1.8	0.9	3.0	20.0
1999Q3 - 2008Q2	2.4	1.2	0.8	7.0	7.2	7.8	26.3	5.6	3.2	4.2	1.9	0.6	2.8	18.3
2000Q3 - 2009Q2	4.8	2.6	9.7	1.8	14.3	5.4	38.6	10.7	3.0	4.0	2.7	1.9	4.2	26.3
2001Q3 - 2010Q2	6.1	2.6	7.2	0.4	11.8	8.8	37.1	5.5	3.7	2.5	1.8	3.5	1.9	18.9
2002Q3 - 2011Q2	2.5	6.4	2.7	0.5	10.8	3.0	25.9	9.7	3.6	1.6	2.4	0.9	3.4	21.6
2003Q3 - 2012Q2	2.1	8.2	2.3	0.8	7.7	9.4	30.4	6.1	3.5	0.6	2.7	2.0	1.2	16.1
2004Q3 - 2013Q2	1.5	1.7	7.4	1.5	10.7	8.8	31.7	9.7	3.1	1.5	3.3	1.9	0.8	20.4
2005Q3 - 2014Q2	0.5	4.2	6.3	1.0	7.0	11.2	30.1	9.3	3.6	2.4	2.9	2.0	1.4	21.7
2006Q3 - 2015Q2	0.4	1.7	5.8	2.1	5.2	11.9	27.2	7.6	4.0	2.4	3.9	2.2	1.2	21.3
2007Q3 - 2016Q2	0.6	1.9	7.8	1.5	2.4	7.5	21.7	8.8	4.1	2.2	2.3	2.7	2.1	22.2
2008Q2 - 2017Q1	0.3	5.3	9.7	0.5	3.9	5.4	25.2	7.9	2.3	1.7	3.0	5.0	1.3	21.3
Panel C. Variance Decompositions for Currency Returns														
1998Q3 - 2007Q2	1.8	2.6	5.4	3.7	2.9	5.4	21.6	3.3	1.7	3.9	4.1	29.4	2.5	44.9
1999Q3 - 2008Q2	1.8	3.1	3.5	1.8	4.2	7.5	21.9	4.2	0.4	3.2	7.9	25.1	4.7	45.4
2000Q3 - 2009Q2	3.4	6.0	21.9	9.2	2.0	2.8	45.3	11.7	1.0	2.1	7.7	13.1	2.3	37.8
2001Q3 - 2010Q2	2.8	6.6	18.8	6.7	6.9	2.4	44.2	8.8	1.7	3.9	4.7	14.2	2.3	35.7
2002Q3 - 2011Q2	3.8	10.4	14.0	6.6	2.8	2.1	39.6	14.1	2.7	1.8	2.1	12.3	2.5	35.6
2003Q3 - 2012Q2	4.6	6.3	16.5	8.3	6.4	4.6	46.7	8.7	3.7	2.0	3.9	10.0	1.4	29.6
2004Q3 - 2013Q2	5.4	6.0	19.4	6.8	4.6	4.3	46.5	12.0	1.2	4.4	3.4	10.7	0.4	32.2
2005Q3 - 2014Q2	6.7	8.9	15.7	6.0	3.9	2.7	43.9	9.7	1.7	8.4	5.2	8.2	1.2	34.4
2006Q3 - 2015Q2	6.5	4.8	19.9	9.4	3.1	2.2	45.9	8.2	3.4	8.7	3.4	8.0	1.2	32.8
2007Q3 - 2016Q2	8.5	5.5	20.3	4.4	5.4	4.0	48.1	8.6	3.6	8.5	4.3	7.4	0.4	32.9
2008Q2 - 2017Q1	8.4	6.2	19.3	5.4	3.0	4.1	46.5	4.8	3.0	5.7	3.4	14.5	1.2	32.8
Panel D. Variance Decompositions for House Returns														
1998Q3 - 2007Q2	3.2	5.4	3.2	3.8	3.1	3.2	21.9	3.8	3.0	2.9	6.9	4.7	2.3	23.7
1999Q3 - 2008Q2	6.6	1.5	6.4	3.5	2.1	7.2	27.3	2.5	5.0	0.9	8.7	4.0	5.4	26.5
2000Q3 - 2009Q2	5.2	8.2	22.2	4.1	4.3	3.8	47.8	6.5	1.3	2.3	20.4	3.0	3.6	37.1
2001Q3 - 2010Q2	5.2	8.0	20.2	7.4	2.7	1.0	44.5	3.5	1.1	1.8	9.6	4.3	2.3	22.5
2002Q3 - 2011Q2	4.4	10.0	16.4	8.9	2.9	2.0	44.5	4.9	2.2	1.1	7.6	3.5	3.3	22.6
2003Q3 - 2012Q2	4.0	5.6	19.6	10.8	1.8	6.3	48.1	7.6	1.9	1.7	5.4	3.5	3.6	23.8
2004Q3 - 2013Q2	5.5	6.4	18.9	9.2	1.8	6.7	48.6	7.4	0.9	3.0	4.6	2.7	5.1	23.7
2005Q3 - 2014Q2	4.1	6.0	19.4	4.6	1.6	4.7	40.4	5.9	1.3	4.2	7.7	3.1	5.5	27.8
2006Q3 - 2015Q2	4.2	6.9	19.0	5.0	0.7	4.1	39.8	7.6	2.5	3.9	6.0	2.6	4.3	26.8
2007Q3 - 2016Q2	4.0	6.4	20.1	1.4	4.3	9.7	45.8	7.9	1.6	2.5	11.0	3.2	2.7	28.8
2008Q2 - 2017Q1	3.9	9.3	23.1	2.6	1.7	5.1	45.7	5.1	2.3	2.3	8.7	5.5	3.0	27.0

Notes: Results from linear regressions, based on rolling 9 year factor models, which decompose the cross-country average variance in asset returns according to the the percent attributable to the world factors and the country-specific factors for Monetary Policy (MP), Fiscal Policy (FP), Production (PR), Consumption (CO), Commodity Prices (CP) and Sentiment (SE) are reported, along with Total (TOT) variance explained by world and country factors.

beginning in 2000. In contrast to the longer sample period, the fiscal policy factor is not found to have a significant effect on the productivity factor over the shorter subsamples, and so the effect of the productivity factor appears to be much greater. Many of the driving variables appear to have a greater impact on various returns in sub samples with the crisis period at the heart. This is true for the world fiscal policy factor and the country monetary policy factor. The world monetary policy factor increases in importance over samples containing the crisis for bond and equity returns, and increases steadily over time for currency returns. The world consumption factor becomes more important for currency and house returns in the crisis samples but less important for equity and bond returns. The impact of world sentiment decreases in importance for equity returns over time, but the quantified impact for all asset markets is prone to large fluctuations.

6.9 Possible Omitted Variables

While the variables selected do a relatively comprehensive job in accounting for the variability in equity returns, particularly in the shorter samples used for the rolling regressions, there remains a component of returns that is unexplained by the world and country factors in the driving variables. Though it is important driver of nominal stock-bond comovement within the US and other markets (for instance, Ilmanen, 2003; Yang et al., 2009), inflation was not included here as a driver of real returns. However, there is quite a lot of empirical evidence that inflation is not 'neutral' and even theoretical channels through which inflation is predicted to influence real returns.[31] It may improve the joint explanatory power to include a variable capturing inflation expectations explicitly, though consumer and business sentiment would be implicitly capturing some element of this in amongst a host of other factors. The omission of inflation is likely the reason that the overall variance explained by the driving variables is lowest for bond returns. Including alternate measures of uncertainty based on financial market measures such as illiquidity, which is found to be an important driver of stock-bond comovement in the US (see for instance, Asgharian et al., 2015b; Baele

[31] Summers (1981) and Poterba (1991) demonstrate that inflation effects real cash flows streams by impacting deprecation allowances and leads to reallocation between asset classes. Bakshi and Chen (1996) note that a negative correlation between real stock prices and inflation has become an accepted empirical fact and is believed to work through inflationary supply shocks resulting in diminishing real returns to capital. Brandt and Wang (2003) argue that unexpected inflation increases risk aversion and lowers stock prices. Uncertainty surrounding inflation is found to be large driver of real stock-bond correlations (in the case of the US, for instance, Li, 2002; Bekaert and Engstrom, 2010

et al., 2010; Goyenko and Ukhov, 2009), may add to the total explained variance.

7 Conclusion

The results demonstrating the common cycle in financial asset returns as well as their drivers are of interest to policy makers and investors. The extent to which asset prices as well as policy, economic and sentiment variables comove across countries effects both the autonomy in setting independent domestic policy and the strength of the transmission of policy to domestic asset prices.

The evidence that there is a world element to sentiment and that this is an important determinant of international asset prices even after removing the effects of concurrent policy and economic variables is consistent with the relatively new focus on the impact of investor sentiment on asset prices and has important implications for policy makers. If speculation leads asset prices to diverge from true values, potentially leading to price bubbles, this can exacerbate economic cycles. This rationale has led to some academic discussion regarding desirability of applying monetary policy to lean in to or against asset rallies and busts in order to manage general economic condition. However, this discussion is predicated on the assumption that asset prices do respond to monetary policy. The results in this paper do not suggest that monetary policy has an effect on contemporaneous real asset prices in comparison with other drivers, although this is consistent with findings that monetary policy operates at a lag.

Financial market participants are similarly invested in understanding the impact of policy and economic variables on individual assets and in the cross market and country correlations that driving variables can induce. The comovement between bond and stock returns is of particular interest in determining the benefits to international portfolio asset diversification. A substantial common component, as found here, reduces diversification benefits stemming from the independence of returns, but the negative comovement provide evidence that bonds play an important role in hedging equity returns. The effects on prices that results from shifts in world sentiment appears to play an important role in establishing this channel.

Studies that have applied dynamic factor models to identify an international financial cycle in asset prices and credit largely abstract from linkages forged by trade flows and that occur as a result of comovement in real underlying shocks. Linking financial measures of the global cycle to comovement in real variables with an view to distinguishing comovement due to shared global conditions compared to the component owing to transmission from the US in its role as a centre country would be interesting to explore. This question is important in understanding the extent of US hegemony and as a corollary to this, the degree to which policy decisions of individual countries are circumscribed to some extent by US policy. In any case, the evidence for strong comovement in conditions and policy are supportive of initiatives that foster dialogue and cooperation across nations.

While this paper focuses on the response of asset prices to real variables, financial market linkages with the real economy, sentiment and policy are bidirectional, with asset prices conveying information on future conditions, impacting household and firm decisions, and potentially playing a more active role in accelerating economic cycles. Incorporating a channel that reflects this endogeneity would provide a more holistic representation of the real world spillovers.

Overall, the variation in the drivers of asset returns across time and countries speak to the difficulty in ascribing generalisations about asset price determinants and illustrate the complexity involved with building a theoretical model of asset pricing, designing policy interventions and making diversified investment decisions.

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Appendix A Data Definitions and Sources

Table A1: Data Definitions for Asset Prices and Driving Variables

Variable Name	Code	Data source	Definition
			Panel A. Asset prices
Real Bond Price Index	RBPI	own calculations	The DataStream Benchmark nominal bond price index in domestic currency terms, deflated by the Consumer Price Index (CPI)
Real Effective Exchange Rate	RERI	IMF IFS	The CPI based real effective exchange rate index of a country relative to its international trade partners
Real Equity Price Index	RSPI	own calculations	The MSCI nominal equity index in domestic currency terms, deflated by the CPI
Real House Price Index	RHPI	OECD	The Real house price index in domestic currency terms from OECD Analytical House Prices Indicators
			Panel B. Driving variables
Monetary policy			
Real Interest rate	RIR	own calculations	The Central bank policy rate from Oxford Economics or the 90 Treasury Bill Rate from IMF IFS adjusted using the CPI
Real Money Supply	RMS	own calculations	The M1 Monetary aggregate from the OECD Main Economic Indicators in nominal terms, deflated by the CPI
Fiscal policy			
Real Government Expenditure	RGE	Oxford economics	Real Government consumption expenditure
Real Government Revenue	RGR	Oxford economics	Real Government tax revenue from households
Productivity			
Real Production Per Employee (1)	LP1	own calculations	The Real Industrial Production index OECD Main Economic Indicators divided by the size of the labour force
Real Production Per Employee (2)	LP2	own calculations	The Real Industrial Production index OECD Main Economic Indicators divided by the size of the labour force
Consumption		own calculations	
Real Private Consumption (2)	RC2	own calculations	Real Private Final Consumption Expenditure Index form the IMF IFS divided by the working age population (15 years +)
Real Private Consumption (2)	PC2	own calculations	Real Private Final Consumption Expenditure Index from the OECD Main Economic Indicators divided by the working age population (15 years +)
Commodity Prices			
Real Commodity Price Indices	RCP	own calculations	The nominal commodity price indices in USD terms from the IMF IFS converted to domestic currency terms using the bilateral USD nominal exchange rate, and deflated by the domestic CPI
Uncertainty			
Consumer Confidence	CC	OCED	The consumer confidence index indicator from the OECD Main Economic Indicators
Producer Confidence	PC	OCED, Konjunkturinstitutet	The business confidence index indicator from the OECD Main Economic Indicators. Data from the Swedish National Institute of Economic Research (Konjunkturinstitutet) is substituted until Q1 1996.
			Panel C. Additional data used to construct the final Variables
Nominal Bond Price Index	NBPI	DataStream	The DataStream Benchmark nominal bond price index in domestic currency terms
Nominal Equity Price Index	NSPI	MSCI	The MSCI nominal equity index in domestic currency terms
Nominal Commodity Price Indices	NCP	IMF IFS	The nominal commodity price indices from IMF IFS for Agricultural raw materials (Agr), Beverages (Bev), Food (Foo), Metals (Met) and Oil, in USD terms
Nominal Interest rate	NIR	Oxford Economics, IMF IFS	The Central Bank Policy Rate from oxford economics except for NZ and Switzerland where the IMF IFS 90 day Treasury bill rate is used
Nominal Money Supply	NMS	OCED	The M1 monetary aggregate from OECD Main Economic Indicators, in nominal terms
Real Industrial Production (1)	IP1	OCED	The Real Industrial Production Index from OECD Main Economic Indicators
Real Industrial Production (2)	IP2	IMF IFS	The IMF IFS Real Industrial Production
Real Private Consumption (1)	RC1	OCED	The Real Private Final Consumption Expenditure Index from the OECD Main Economic Indicators
Real Private Consumption (2)	RC2	IMF IFS	the Real Private Final Consumption Expenditure Index from the IMF IFS
Consumer Price Index	CPI	IMF IFS	The Consumer Price Index (CPI) from the IMF IFS
Labour Force	EMP	OECD	The total number of persons in the labour force from the OECD. This is only available annually for Sweden until 2010. Quarterly data is linearly interpolated form the annual series until that point.
Nominal USD Exchange Rate	NER	IMF IFS	The bilateral nominal exchange rate in domestic currency per USD from the IMF IFS, quarterly average
Population of Working Age	POP	Oxford Economics	Population of Working Age, thousands. Not seasonally adjusted

Table A2: DataStream source codes for the data used to construct the variables

	Australia	Canada	Denmark	Japan	New Zealand	Sweden	Switzerland	United Kingdom	United States
NBPI	BMAU10Y	BMCN10Y	BMDK10Y	BMJP10Y	BMNZ10Y	BMSD10Y	BMSW10Y	BMUK10Y	BMUS10Y
NSPI	MSAUSTL	MSCNDAL	MSDNMKL	MSJPANL	MSNZEAL	MSSWDNL	MSSWITL	MSUTDKL	MSUSAML
RERI	AUQ..RECE	CNQ..RECE	DKQ..RECE	JPQ..RECE	NZQ..RECE	SDQ..RECE	SWQ..RECE	UKQ..RECE	USQ..RECE
RHPI	AUOHREALG	CNOHREALG	DKOHREALG	JPOHREALG	NZOHREALG	SDOHREALG	SWOHREALG	UKOHREALG	USOHREALG
CC	AUOCS005Q	CNOCS005Q	DKOCS005Q	JPOCS005Q	NZOCS005Q	SDOCS005Q	SWOCS005Q	UKOCS005Q	USOCS005Q
NIR	AUXRCB..R	CNXRCB..R	DKXRCB..R	JPXRCB..R	NZQ60C..	SDXRCB..R	SWQ60C..	USXRCB..R	UKXRCB..R
NMS	AUQMA027Q	CNQMA027Q	DKQMA027Q	JPQMA027Q	NZQMA027Q	SDQMA027Q	SWQMA027Q	UKQMA027Q	USQMA027Q
PC	OEOBS085Q	CNOBS085Q	DKOBS085Q	JPOBS085Q	NWOBS085Q	SDOBS085Q	SWOBS085Q	UKOBS085Q	USOBS085Q
RGE	AUOCMP02G	CNOCMP02G	DKOCMP02G	JPOCMP02G	NZOCMP02G	SDOCMP02G	SWOCMP02G	UKOCMP02G	USOCMP02G
RGR	AUXTXY..A	CNXTXY..B	DKXTXY..A	JPXTXY..A	NZXTXY..A	SDXTXY..A	SWXTXY..A	UKXTXY..B	USXTXY..B
RIP	AUOPRI35G	CNQPRI35G	DKQPRI35G	JPQPRI35G	NZOPRI35G	SDQPRI35G	SWOPRI35G	UKQPRI35G	USQPRI35G
RIP2	AUI66...F	CNI66...F	DKI66...F	JPI66...F	NZI66...F	SDI66...F	SWI66...F	UKI66...F	USI66...F
RC1	AUOEX002D	CNOEX002D	DKOEX002D	NZOEX002D	JPOEX002D	SDOEX002D	SWOEX002D	UKOEX002D	USOEX002D
RC2	AUI96F.CB	CNI96F.CB	DKI96F.CB	JPI96F.CB	NZI96F.CB	SDI96F.CB	SWI96F.CB	USI96F.CB	UKI96F.CB
CPI	AUI64...F	CNQ64...F	DKQ64...F	JPQ64...F	NZI64...F	SDQ64...F	SWQ64...F	UKQ64...F	USQ64...F
EMP	AUXEMPT%Q	CNXEMPT%Q	DKXEMPT%Q	JPXEMPT%Q	NZXEMPT%Q	SDXEMPT%Q	SWXEMPT%Q	UKXEMPT%Q	USXEMPT%Q
POP	AUXPOPW.P	CNXPOPW.P	DKXPOPW.P	JPXPOPW.P	NZXPOPW.P	SDXPOPW.P	SWXPOPW.P	UKXPOPW.P	USXPOPW.P
NER	AUQ..RF.	CNQ..RF.	DKQ..RF.	JPQ..RF.	NZQ..RF.	SDQ..RF.	SWQ..RF.	UKQ..RF.	USQ..RF.
NCP (AGRI)	WDQ76BXDF	WDQ76BXDF	WDQ76BXDF	WDQ76BXDF	WDQ76BXDF	WDQ76BXDF	WDQ76BXDF	WDQ76BXDF	WDQ76BXDF
NCP (BEV)	WDQ76DWDF	WDQ76DWDF	WDQ76DWDF	WDQ76DWDF	WDQ76DWDF	WDQ76DWDF	WDQ76DWDF	WDQ76DWDF	WDQ76DWDF
NCP (FOO)	WDQ76EXDF	WDQ76EXDF	WDQ76EXDF	WDQ76EXDF	WDQ76EXDF	WDQ76EXDF	WDQ76EXDF	WDQ76EXDF	WDQ76EXDF
NCP (MET)	WDQ76AYDF	WDQ76AYDF	WDQ76AYDF	WDQ76AYDF	WDQ76AYDF	WDQ76AYDF	WDQ76AYDF	WDQ76AYDF	WDQ76AYDF
NCP (OIL)	USI76AADF	USI76AADF	USI76AADF	USI76AADF	USI76AADF	USI76AADF	USI76AADF	USI76AADF	USI76AADF

Appendix B Median Posterior Variance Decomposition and 68% Posterior Coverage Interval for Factor Models

Table B1: Variance Decomposition Intervals for Asset Return Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%
Panel A. Equity Returns																											
WF	43.8	46.6	49.3	56.9	60.3	63.0	43.6	46.4	48.9	53.1	55.6	57.8	16.0	17.5	19.2	41.8	44.9	47.9	37.1	40.2	43.3	42.4	45.8	48.9	50.0	53.6	56.8
CF	7.7	38.0	47.4	21.2	25.0	28.9	14.6	29.4	47.3	0.0	0.2	0.8	13.6	18.7	22.9	26.3	34.0	47.6	36.3	50.1	56.1	43.2	47.8	52.1	12.4	32.5	41.0
IF	6.1	15.8	45.7	10.7	14.6	19.0	6.4	22.9	39.5	41.7	44.0	46.6	59.3	63.7	69.1	8.1	20.6	28.6	4.0	9.6	23.7	2.9	5.9	10.7	6.3	13.9	31.9
Panel B. Bond Returns																											
WF	72.3	75.5	77.7	67.2	70.7	73.5	60.9	64.3	67.2	29.2	30.9	32.3	60.4	63.3	65.6	58.6	62.0	64.9	59.7	62.6	64.9	67.7	71.0	73.6	83.7	86.9	89.1
CF	2.9	4.7	18.7	13.5	15.8	18.5	8.4	13.3	28.6	1.8	2.8	4.1	0.5	1.2	2.0	17.4	25.2	33.4	6.5	8.4	12.0	9.6	11.6	13.7	1.5	3.0	8.2
IF	5.7	18.7	23.2	10.2	13.3	17.3	7.1	21.7	28.1	64.2	66.3	68.3	33.1	35.5	38.4	4.5	13.2	20.7	25.1	28.8	31.9	14.9	17.3	20.5	5.4	9.3	12.8
Panel C. Currency Returns																											
WF	3.2	3.8	4.5	9.4	10.3	11.3	1.4	1.8	2.3	8.1	9.0	9.9	1.8	2.3	2.8	9.6	10.6	11.6	1.0	1.3	1.6	9.8	10.7	11.7	3.8	4.4	5.2
CF	0.1	0.8	2.6	0.5	1.1	2.0	10.8	14.7	20.2	0.5	1.4	3.0	14.1	19.5	25.1	0.1	0.7	2.4	0.4	1.0	1.9	7.2	8.9	11.2	0.1	0.5	1.7
IF	93.7	95.1	96.0	87.2	88.5	89.6	77.9	83.6	87.4	87.7	89.5	90.7	72.5	78.2	83.6	86.7	88.3	89.8	96.8	97.7	98.3	77.7	80.3	82.4	93.4	94.9	95.8
Panel D. House Returns																											
WF	7.1	7.9	8.8	7.8	8.7	9.6	4.5	5.2	5.9	1.6	2.0	2.4	1.0	1.4	1.8	3.4	4.0	4.7	1.0	1.4	1.7	6.2	6.9	7.7	0.0	0.0	0.1
CF	0.2	1.9	4.0	0.0	0.1	0.4	3.2	5.6	8.2	41.6	56.8	73.4	51.6	70.5	85.6	3.5	5.5	8.1	2.9	4.9	6.8	0.1	0.3	0.7	0.2	1.2	2.6
IF	88.1	90.1	91.7	90.2	91.1	92.0	86.6	89.0	91.8	24.7	41.1	56.3	13.1	28.1	47.0	88.0	90.3	92.5	91.7	93.7	95.8	91.8	92.7	93.6	97.3	98.8	99.8

Notes: Posterior 16%, median and 84% of the variance decompositions by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of asset returns.

Table B2: Variance Decomposition Intervals for Monetary Policy Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%
Panel A. Policy Rate																											
WF	13.0	16.1	19.5	67.4	75.4	81.2	36.8	42.1	46.7	10.6	13.0	15.3	23.1	26.1	30.1	18.2	21.3	25.3	8.7	10.7	13.1	22.3	25.3	28.8	71.4	78.9	84.5
CF	1.4	76.2	82.3	0.2	0.8	1.8	11.4	31.5	38.7	2.3	52.3	81.6	0.0	0.1	0.3	0.4	1.3	3.2	0.0	0.1	0.3	16.7	27.8	67.8	0.4	5.8	15.7
IF	2.8	6.9	79.7	17.6	23.6	31.8	18.9	27.7	47.0	5.3	34.3	84.3	69.8	73.8	76.8	70.6	76.5	79.9	86.8	89.2	91.2	6.4	46.2	57.9	5.6	14.1	22.2
Panel B. Money Supply																											
WF	0.0	0.1	0.4	7.4	10.0	12.9	1.7	2.7	3.8	1.5	2.3	3.2	0.0	0.1	0.4	2.9	4.1	5.7	0.1	0.4	1.2	5.2	7.2	10.3	2.6	4.2	6.0
CF	1.0	1.8	86.1	57.6	78.0	85.8	0.1	0.4	3.8	1.7	2.7	72.4	77.7	89.7	95.8	19.1	81.7	90.7	75.9	89.2	95.3	0.9	3.2	5.8	1.2	12.7	73.9
IF	13.7	98.0	98.8	4.2	11.6	31.9	91.9	96.8	97.7	25.1	94.7	96.4	4.0	10.1	22.1	5.1	14.0	75.8	4.2	10.2	23.2	86.0	89.1	91.6	21.8	83.9	93.2

Notes: Posterior 16%, median and 84% of the variance decompositions by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of monetary policy.

Table B3: Variance Decomposition Intervals for Fiscal Policy Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**
Panel A.Government Expenditure																											
WF	0.2	0.8	2.3	0.0	0.2	1.6	6.3	11.7	19.3	0.9	2.7	5.8	1.2	2.8	5.0	0.0	0.1	0.8	0.0	0.3	1.4	0.0	0.4	1.8	1.9	4.1	7.3
CF	14.9	31.4	91.0	0.1	0.6	2.6	27.7	31.5	34.8	5.9	19.8	30.7	12.7	37.7	79.1	3.7	5.8	8.4	46.7	84.4	93.8	89.2	94.1	96.3	66.4	81.1	89.5
IF	8.2	67.1	83.8	96.2	99.1	99.7	48.9	55.9	62.6	65.7	77.0	90.5	17.5	59.0	84.8	91.1	93.8	95.8	5.6	14.8	51.8	3.2	4.9	8.3	6.0	14.2	28.7
Panel B.Government Revenue																											
WF	0.0	0.3	2.3	12.9	19.5	25.2	9.7	20.5	26.1	17.9	44.0	55.8	0.0	0.2	0.7	6.2	20.6	27.2	3.5	10.8	15.6	0.7	2.0	4.0	18.2	33.2	41.0
CF	11.0	26.7	48.2	58.8	71.3	77.4	9.3	11.7	14.1	1.7	5.2	13.3	0.7	1.5	3.7	48.4	63.7	74.8	28.9	33.6	61.6	52.9	55.6	58.9	0.1	0.7	1.7
IF	51.0	72.1	87.8	3.8	8.3	22.3	62.3	67.9	78.3	29.7	49.3	77.9	95.8	98.1	99.1	6.0	15.4	32.5	26.8	55.0	63.7	39.1	42.0	44.4	58.0	65.9	80.8

Notes: Posterior 16%, median and 84% of the variance decompositions by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of fiscal policy.

Table B4: Variance Decomposition Intervals for Productivity Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**
Panel A.Labour Productivity (1)																											
WF	3.9	6.1	8.1	21.6	27.9	34.0	4.8	6.9	9.2	32.5	48.9	67.5	11.0	16.6	20.6	24.1	35.4	44.9	8.8	12.4	15.6	24.1	34.1	41.3	32.9	41.7	49.1
CF	32.1	45.1	88.1	40.5	48.6	56.7	81.0	85.0	88.4	27.4	34.9	42.4	61.7	69.3	75.0	35.0	43.3	50.8	67.6	75.7	79.3	30.9	36.8	43.4	6.8	19.3	32.4
IF	5.1	49.6	62.0	15.4	21.9	32.9	4.7	8.0	11.9	3.3	15.2	27.2	8.6	14.4	22.2	12.0	21.0	32.5	7.7	11.5	20.4	20.3	28.4	40.3	26.8	37.2	53.6
Panel B.Labour Productivity (2)																											
WF	3.0	5.1	7.5	18.2	24.1	29.4	4.8	6.8	9.1	32.3	48.5	67.8	9.2	15.3	20.0	22.5	34.4	44.6	12.6	18.9	23.9	19.8	29.4	38.5	39.5	54.7	62.4
CF	32.9	68.5	89.3	52.8	60.6	68.1	78.7	82.2	86.2	26.9	35.4	43.0	61.0	67.3	73.8	38.8	45.8	53.6	61.3	68.4	72.4	39.9	47.9	57.3	8.6	18.3	27.7
IF	6.1	26.9	60.9	6.9	14.0	25.5	6.9	10.8	14.2	3.7	14.9	27.1	11.6	16.9	24.2	9.4	18.7	29.2	7.5	12.6	21.9	11.4	21.0	32.2	15.6	28.9	42.8

Notes: Posterior 16%, median and 84% of the variance decompositions by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of productivity.

Table B5: Variance Decomposition Intervals for Consumption Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**
Panel A.Consumption (1)																											
WF	0.2	1.0	3.1	2.4	6.8	11.6	5.8	16.0	26.2	0.1	0.6	2.0	0.0	0.1	0.5	0.8	2.4	5.1	0.0	0.3	0.9	2.1	5.7	10.3	0.2	1.3	3.3
CF	75.6	84.5	91.0	36.9	45.2	55.1	45.6	56.6	65.5	83.1	87.2	89.3	85.8	90.6	94.8	61.2	68.7	75.2	35.7	40.1	45.4	43.1	54.2	63.7	43.9	53.5	59.5
IF	7.9	13.8	22.0	39.2	46.6	54.8	18.6	27.0	39.5	10.1	11.9	15.4	4.9	9.1	14.0	22.3	28.3	35.5	54.3	59.6	63.7	31.4	39.4	49.1	39.7	44.7	53.7
Panel B.Consumption (2)																											
WF	4.5	9.7	17.5	11.6	30.2	44.0	5.5	14.8	24.8	0.1	0.7	2.2	1.1	2.6	5.3	5.4	13.1	21.9	0.4	1.4	3.5	2.6	6.6	11.5	4.9	12.2	19.2
CF	59.5	68.7	76.7	34.8	43.5	53.7	53.2	64.1	72.6	90.2	95.5	97.5	77.4	83.3	88.6	46.8	55.0	62.4	65.9	75.0	81.9	55.6	72.5	81.5	51.4	68.8	78.1
IF	12.3	19.5	30.6	9.9	27.8	44.1	12.6	20.4	33.4	2.0	3.5	7.9	8.4	13.4	19.3	22.2	30.2	42.2	15.8	23.2	32.4	12.1	20.1	37.5	9.9	18.2	36.7

Notes: Posterior 16%, median and 84% of the variance decompositions by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of consumption.

Table B6: Variance Decomposition Intervals for Commodity Prices Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**
Panel A. Agricultural Raw Materials																											
WF	9.0	9.5	9.8	5.8	6.1	6.3	0.1	0.1	0.1	2.7	2.9	3.0	2.1	2.2	2.3	2.5	2.7	2.8	0.6	0.6	0.7	0.9	1.0	1.1	2.6	2.7	2.9
CF	81.5	88.6	90.0	88.7	92.3	93.3	85.6	96.7	99.2	85.4	94.2	96.6	88.5	95.8	97.3	88.6	95.4	96.8	89.8	97.3	98.8	87.8	96.4	98.4	91.8	95.8	96.8
IF	0.6	2.1	9.3	0.6	1.6	5.4	0.7	3.2	14.3	0.6	2.9	11.7	0.5	2.0	9.3	0.5	2.0	8.7	0.5	2.1	9.6	0.5	2.6	11.2	0.5	1.5	5.5
Panel B. Beverages																											
WF	6.1	6.5	6.6	2.6	2.7	2.8	0.0	0.1	0.1	2.4	2.5	2.6	1.3	1.4	1.5	1.6	1.7	1.7	0.6	0.6	0.7	0.5	0.6	0.6	1.6	1.7	1.8
CF	9.1	10.0	10.5	10.5	11.1	11.6	10.2	11.4	12.0	28.0	30.8	31.9	11.7	12.6	13.1	6.0	6.6	7.0	10.3	11.1	11.7	7.9	8.7	9.2	11.0	11.7	12.3
IF	83.0	83.6	84.5	85.7	86.3	86.9	87.9	88.5	89.8	65.6	66.7	69.5	85.5	86.0	86.9	91.4	91.8	92.4	87.6	88.2	89.1	90.2	90.7	91.5	86.0	86.6	87.3
Panel C. Food																											
WF	0.3	0.3	0.4	0.2	0.2	0.2	5.1	5.4	5.5	11.9	12.6	12.8	1.0	1.0	1.1	1.3	1.4	1.4	10.8	11.4	11.6	2.8	2.9	3.0	14.5	15.4	15.6
CF	15.7	17.0	17.7	11.4	12.1	12.6	17.3	19.9	20.7	34.1	37.7	38.9	22.5	24.4	25.2	11.0	11.7	12.2	16.7	18.3	19.0	13.1	14.6	15.3	12.6	13.4	14.0
IF	82.0	82.6	84.0	87.2	87.7	88.4	73.9	74.8	77.5	48.7	50.0	53.4	73.8	74.6	76.5	86.4	86.9	87.6	69.6	70.4	72.3	81.8	82.6	84.0	70.7	71.4	72.7
Panel D. Metals																											
WF	3.2	3.4	3.5	5.7	6.0	6.2	11.4	12.0	12.3	15.5	16.4	16.7	8.0	8.5	8.7	7.9	8.3	8.5	15.8	16.7	17.0	9.3	9.8	10.0	18.5	19.5	19.8
CF	21.9	23.8	24.6	24.8	26.2	27.0	28.3	32.7	34.0	44.1	48.7	50.2	25.9	28.5	29.4	25.4	27.1	27.9	29.5	32.4	33.4	27.7	30.9	32.1	30.4	31.9	32.8
IF	72.0	72.8	74.8	67.0	67.8	69.3	54.0	55.5	60.3	33.7	35.3	39.7	62.2	63.2	65.8	63.8	64.8	66.4	50.0	51.1	54.3	58.2	59.5	62.9	47.8	48.8	51.0
Panel E. Oil																											
WF	76.7	81.2	81.9	81.3	86.2	86.9	78.0	82.7	83.4	75.7	80.2	80.9	78.0	82.7	83.4	80.0	84.8	85.6	79.6	84.4	85.1	80.1	84.9	85.6	82.8	87.8	88.5
CF	15.3	17.6	18.3	11.7	12.8	13.3	12.3	15.7	16.5	16.3	18.7	19.5	14.0	16.1	16.8	12.8	14.1	14.7	12.5	14.5	15.1	11.4	13.7	14.5	10.4	11.2	11.7
IF	0.4	2.1	7.2	0.3	1.2	6.7	0.4	2.0	9.7	0.4	2.0	7.6	0.4	1.8	7.7	0.3	1.4	6.3	0.3	1.3	7.3	0.4	2.0	7.0	0.2	1.2	6.6

Notes: Posterior 16%, median and 84% of the variance decompositions by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of commodity prices.

Table B7: Variance Decomposition Intervals for Sentiment Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**
Panel A. Consumer Confidence																											
WF	1.6	4.3	10.8	14.1	27.3	35.2	3.3	6.4	11.5	5.7	10.9	17.2	0.6	1.8	4.4	16.6	32.9	42.1	18.6	35.7	64.6	4.8	9.8	17.3	4.2	8.3	13.0
CF	71.0	81.7	91.6	0.9	3.0	6.0	66.5	80.8	88.7	55.3	67.0	77.6	37.0	43.5	69.1	0.3	2.4	39.4	6.1	17.3	26.9	54.0	67.2	81.4	55.2	74.1	83.9
IF	5.2	11.5	21.7	61.3	69.7	82.4	5.9	12.4	24.6	13.4	20.8	31.2	28.4	54.9	59.7	29.2	56.9	75.4	10.1	48.4	70.8	10.2	21.6	33.5	8.1	16.3	35.1
Panel B. Business Confidence																											
WF	4.8	9.1	14.4	3.9	9.6	20.8	12.4	22.7	49.8	7.1	18.7	45.2	3.6	7.6	12.8	13.4	24.4	50.0	16.2	30.8	71.0	17.2	30.2	59.8	16.7	32.5	41.7
CF	5.2	11.1	15.6	48.5	70.4	82.5	0.1	0.5	1.6	0.3	1.2	2.6	49.1	75.3	85.9	0.9	28.5	42.2	0.1	6.4	51.7	0.0	0.4	2.1	0.1	0.9	3.3
IF	75.2	79.3	84.6	6.6	15.7	40.3	49.9	75.9	86.5	53.0	79.0	92.0	7.3	16.2	42.4	10.1	45.4	83.8	22.0	33.2	56.1	40.0	68.4	80.8	52.8	63.6	81.7

Notes: Posterior 16%, median and 84% of the variance decompositions by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of sentiment.

Appendix C Median Posterior Factor Loading and 90% Posterior Coverage intervals for Factor Models

Table C1: Factor Loading Intervals for Asset Return Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%
Panel A. Equity Returns																											
Con	−0.18	0.02	0.20	−0.17	0.03	0.20	−0.24	0.03	0.28	−0.19	0.04	0.27	−0.13	0.09	0.39	−0.18	0.03	0.26	−0.18	0.04	0.25	−0.17	0.03	0.23	−0.22	0.04	0.31
WF	0.74	1.01	1.32	0.87	1.15	1.46	0.73	0.96	1.25	0.84	1.08	1.37	0.40	0.62	0.87	0.66	0.91	1.21	0.62	0.88	1.18	0.73	1.00	1.31	0.81	1.08	1.41
CF	0.21	0.55	0.82	0.42	0.53	0.64	0.31	0.61	0.82	0.01	0.09	0.22	0.21	0.32	0.47	0.48	0.65	0.81	0.38	0.74	0.90	0.62	0.73	0.86	0.29	0.61	0.77
Panel B. Bond Returns																											
Con	−0.20	−0.02	0.18	−0.19	−0.02	0.16	−0.23	−0.02	0.22	−0.15	−0.01	0.14	−0.18	−0.01	0.20	−0.21	−0.02	0.21	−0.20	−0.02	0.18	−0.17	−0.03	0.15	−0.21	−0.03	0.18
WF	−1.52	−1.25	−1.01	−1.47	−1.19	−0.98	−1.43	−1.14	−0.91	−1.03	−0.76	−0.53	−1.43	−1.14	−0.91	−1.44	−1.13	−0.91	−1.45	−1.15	−0.89	−1.40	−1.15	−0.93	−1.64	−1.34	−1.13
CF	0.12	0.30	0.51	0.33	0.42	0.53	0.25	0.45	0.66	−0.40	−0.22	−0.06	0.00	0.08	0.17	0.40	0.55	0.69	0.18	0.31	0.59	0.25	0.35	0.45	0.10	0.20	0.35
Panel C. Currency Returns																											
Con	−0.19	0.02	0.22	−0.19	0.02	0.24	−0.25	0.01	0.29	−0.25	0.03	0.34	−0.20	0.08	0.47	−0.23	0.03	0.27	−0.21	0.01	0.24	−0.29	0.03	0.39	−0.23	0.03	0.31
WF	0.00	0.18	0.48	0.11	0.41	0.71	−0.41	−0.12	0.16	−0.57	−0.29	−0.04	−0.10	0.16	0.42	0.05	0.32	0.60	−0.39	−0.10	0.20	0.11	0.36	0.61	−0.42	−0.12	0.17
CF	−0.24	0.02	0.33	−0.16	0.02	0.22	−0.13	0.11	0.40	−0.20	0.05	0.37	−0.15	0.05	0.30	−0.22	0.03	0.32	−0.20	0.04	0.36	−0.23	0.03	0.35	−0.13	0.04	0.27
Panel D. House Returns																											
Con	0.15	0.37	0.66	0.25	0.43	0.63	−0.20	0.03	0.25	−0.29	−0.16	0.00	−0.07	0.17	0.38	−0.03	0.20	0.58	−0.29	−0.04	0.15	−0.07	0.15	0.35	−0.27	−0.04	0.17
WF	0.90	1.04	1.18	0.78	0.91	1.06	0.91	1.03	1.14	0.82	0.93	1.11	0.86	1.03	1.19	0.91	1.01	1.23	0.97	1.07	1.18	0.86	0.97	1.11	0.79	0.92	1.05
CF	−0.25	0.01	0.29	−0.21	0.02	0.26	−0.23	0.05	0.34	−0.24	0.05	0.36	−0.22	0.03	0.31	−0.24	0.02	0.30	−0.23	0.03	0.31	−0.24	0.03	0.31	−0.22	0.04	0.30

Notes: Posterior 16%, median and 84% of the factor loadings by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of asset returns.

Table C2: Factor Loading Intervals for Monetary Policy Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%	16%	50%	84%
Panel A. Policy Rate																											
Con	−0.18	0.02	0.20	−0.17	0.03	0.20	−0.24	0.03	0.28	−0.19	0.04	0.27	−0.13	0.09	0.39	−0.18	0.03	0.26	−0.18	0.04	0.25	−0.17	0.03	0.23	−0.22	0.04	0.31
WF	0.74	1.01	1.32	0.87	1.15	1.46	0.73	0.96	1.25	0.84	1.08	1.37	0.40	0.62	0.87	0.66	0.91	1.21	0.62	0.88	1.18	0.73	1.00	1.31	0.81	1.08	1.41
CF	0.21	0.55	0.82	0.42	0.53	0.64	0.31	0.61	0.82	0.01	0.09	0.22	0.21	0.32	0.47	0.48	0.65	0.81	0.38	0.74	0.90	0.62	0.73	0.86	0.29	0.61	0.77
Panel B. Bond Returns																											
Con	−0.20	−0.02	0.18	−0.19	−0.02	0.16	−0.23	−0.02	0.22	−0.15	−0.01	0.14	−0.18	−0.01	0.20	−0.21	−0.02	0.21	−0.20	−0.02	0.18	−0.17	−0.03	0.15	−0.21	−0.03	0.18
WF	−1.52	−1.25	−1.01	−1.47	−1.19	−0.98	−1.43	−1.14	−0.91	−1.03	−0.76	−0.53	−1.43	−1.14	−0.91	−1.44	−1.13	−0.91	−1.45	−1.15	−0.89	−1.40	−1.15	−0.93	−1.64	−1.34	−1.13
CF	0.12	0.30	0.51	0.33	0.42	0.53	0.25	0.45	0.66	−0.40	−0.22	−0.06	0.00	0.08	0.17	0.40	0.55	0.69	0.18	0.31	0.59	0.25	0.35	0.45	0.10	0.20	0.35
Panel C. Currency Returns																											
Con	−0.19	0.02	0.22	−0.19	0.02	0.24	−0.25	0.01	0.29	−0.25	0.03	0.34	−0.20	0.08	0.47	−0.23	0.03	0.27	−0.21	0.01	0.24	−0.29	0.03	0.39	−0.23	0.03	0.31
WF	0.00	0.18	0.48	0.11	0.41	0.71	−0.41	−0.12	0.16	−0.57	−0.29	−0.04	−0.10	0.16	0.42	0.05	0.32	0.60	−0.39	−0.10	0.20	0.11	0.36	0.61	−0.42	−0.12	0.17
CF	−0.24	0.02	0.33	−0.16	0.02	0.22	−0.13	0.11	0.40	−0.20	0.05	0.37	−0.15	0.05	0.30	−0.22	0.03	0.32	−0.20	0.04	0.36	−0.23	0.03	0.35	−0.13	0.04	0.27
Panel D. House Returns																											
Con	0.15	0.37	0.66	0.25	0.43	0.63	−0.20	0.03	0.25	−0.29	−0.16	0.00	−0.07	0.17	0.38	−0.03	0.20	0.58	−0.29	−0.04	0.15	−0.07	0.15	0.35	−0.27	−0.04	0.17
WF	0.90	1.04	1.18	0.78	0.91	1.06	0.91	1.03	1.14	0.82	0.93	1.11	0.86	1.03	1.19	0.91	1.01	1.23	0.97	1.07	1.18	0.86	0.97	1.11	0.79	0.92	1.05
CF	−0.25	0.01	0.29	−0.21	0.02	0.26	−0.23	0.05	0.34	−0.24	0.05	0.36	−0.22	0.03	0.31	−0.24	0.02	0.30	−0.23	0.03	0.31	−0.24	0.03	0.31	−0.22	0.04	0.30

Notes: Posterior 16%, median and 84% of the factor loadings by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of monetary policy.

Table C3: Factor Loading Intervals for Fiscal Policy Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**
Panel A.Government Expenditure																												
Con	−0.08	0.00	0.05	−0.14	−0.01	0.11	−0.30	0.01	0.36	−0.21	0.03	0.20	−0.25	0.00	0.30	−0.09	0.03	0.18	−0.19	0.01	0.22	−0.25	−0.03	0.22	−0.29	0.01	0.39
WF	0.01	0.05	0.11	−0.04	0.07	0.28	−0.21	0.05	0.54	0.00	0.19	0.38	−0.09	0.04	0.17	−0.10	0.00	0.20	−0.10	0.05	0.24	0.05	0.12	0.22	0.00	0.15	0.39
CF	0.22	0.38	0.68	0.01	0.12	0.36	0.20	0.26	0.35	0.25	0.45	0.64	0.13	0.38	0.53	0.06	0.21	0.37	0.55	0.90	1.08	0.46	0.57	0.70	0.66	0.87	1.07
Panel B.Government Revenue																												
Con	−0.02	0.02	0.05	−0.15	0.04	0.47	−0.28	0.07	0.54	−0.31	0.04	0.66	−0.02	0.02	0.08	−0.17	0.10	0.63	−0.20	0.08	0.51	−0.08	−0.01	0.09	−0.19	0.04	0.62
WF	−0.07	−0.03	0.00	−0.67	−0.40	−0.26	−0.23	−0.04	0.36	−0.66	−0.42	0.26	−0.10	−0.05	−0.01	−0.62	−0.38	−0.10	−0.54	−0.29	0.01	−0.17	−0.09	−0.02	−0.73	−0.50	−0.31
CF	0.19	0.32	0.43	0.63	0.81	0.96	0.13	0.17	0.24	0.10	0.22	0.58	0.03	0.06	0.19	0.59	0.80	0.97	0.39	0.58	0.90	0.30	0.42	0.55	−0.11	0.07	0.26

Notes: Posterior 16%, median and 84% of the factor loadings by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of fiscal policy.

Table C4: Factor Loading Intervals for Productivity Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**
Panel A.Labour Productivity (1)																												
Con	−0.07	0.10	0.31	−0.05	0.22	0.59	−0.09	0.10	0.32	−0.01	0.28	0.54	−0.07	0.20	0.52	−0.03	0.25	0.57	−0.11	0.17	0.51	−0.10	0.23	0.60	−0.03	0.30	0.70
WF	0.07	0.23	0.40	0.37	0.54	0.72	0.13	0.23	0.34	0.51	0.65	0.81	0.22	0.39	0.56	0.40	0.57	0.76	0.19	0.34	0.47	0.41	0.54	0.68	0.41	0.59	0.79
CF	0.48	0.78	1.02	0.59	0.72	0.86	0.69	0.79	0.92	0.43	0.58	0.75	0.77	0.89	1.06	0.55	0.69	0.83	0.79	0.90	1.05	0.44	0.59	0.74	0.19	0.47	0.67
Panel B.Labour Productivity (2)																												
Con	−0.10	0.10	0.34	−0.05	0.21	0.55	−0.06	0.09	0.26	−0.01	0.28	0.54	−0.07	0.18	0.49	−0.04	0.24	0.56	−0.10	0.21	0.58	−0.03	0.23	0.54	−0.08	0.33	0.79
WF	0.05	0.22	0.41	0.30	0.49	0.67	0.14	0.24	0.35	0.51	0.65	0.82	0.22	0.39	0.55	0.40	0.57	0.76	0.28	0.44	0.56	0.41	0.54	0.69	0.51	0.67	0.85
CF	0.50	0.84	1.09	0.65	0.79	0.94	0.67	0.78	0.93	0.43	0.59	0.75	0.75	0.87	1.04	0.59	0.72	0.87	0.75	0.86	1.00	0.55	0.71	0.85	0.23	0.43	0.60

Notes: Posterior 16%, median and 84% of the factor loadings by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of productivity.

Table C5: Factor Loading Intervals for Consumption Factor Model

	Australia			Canada			Denmark			Japan			New Zealand			Sweden			Switzerland			United Kingdom			United States		
	16%	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**
Panel A.Consumption (1)																												
Con	−0.14	0.18	0.49	−0.07	0.25	0.56	−0.42	0.30	0.76	−0.12	0.11	0.35	−0.20	0.09	0.52	−0.15	0.15	0.52	−0.11	0.05	0.24	−0.08	0.26	0.57	−0.22	0.14	0.54
WF	0.02	0.17	0.45	0.24	0.48	0.70	0.37	0.58	0.83	−0.07	0.14	0.29	−0.21	0.06	0.28	0.05	0.26	0.50	−0.11	0.07	0.23	0.01	0.31	0.57	0.04	0.05	0.28
CF	0.82	0.96	1.13	0.59	0.71	0.86	0.63	0.76	0.91	0.82	0.95	1.10	0.83	0.97	1.15	0.75	0.86	1.01	0.51	0.61	0.73	0.57	0.69	0.85	0.59	0.68	0.79
Panel B.Consumption (2)																												
Con	−0.11	0.33	0.70	−0.09	0.43	0.90	−0.44	0.30	0.77	−0.12	0.11	0.37	−0.16	0.16	0.53	−0.13	0.29	0.74	−0.14	0.17	0.61	−0.13	0.28	0.72	−0.15	0.30	0.82
WF	0.27	0.48	0.75	0.55	0.80	1.05	0.35	0.58	0.82	−0.11	0.12	0.28	−0.02	0.29	0.52	0.26	0.55	0.83	0.06	0.30	0.58	0.02	0.30	0.62	0.08	0.31	0.56
CF	0.74	0.88	1.05	0.56	0.69	0.85	0.68	0.82	0.98	0.88	1.03	1.18	0.80	0.93	1.09	0.64	0.78	0.95	0.81	0.98	1.16	0.67	0.82	0.98	0.66	0.77	0.90

Notes: Posterior 16%, median and 84% of the factor loadings by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of consumption.

Table C6: Factor Loading Intervals for Commodity Prices Factor Model

Panel A. Agricultural Raw Materials																											
Con	−0.24	0.02	0.33	−0.16	0.02	0.22	−0.13	0.11	0.40	−0.20	0.05	0.37	−0.15	0.05	0.30	−0.22	0.03	0.32	−0.20	0.04	0.36	−0.23	0.03	0.35	−0.13	0.04	0.27
WF	0.15	0.37	0.66	0.25	0.43	0.63	−0.20	0.03	0.25	−0.29	−0.16	0.00	−0.07	0.17	0.38	−0.03	0.20	0.58	−0.29	−0.04	0.15	−0.07	0.15	0.35	−0.27	−0.04	0.17
CF	0.90	1.04	1.18	0.78	0.91	1.06	0.91	1.03	1.14	0.82	0.93	1.11	0.86	1.03	1.19	0.91	1.01	1.23	0.97	1.07	1.18	0.86	0.97	1.11	0.79	0.92	1.05
Panel B. Beverages																											
Con	−0.25	0.01	0.29	−0.21	0.02	0.26	−0.23	0.05	0.34	−0.24	0.05	0.36	−0.22	0.03	0.31	−0.24	0.02	0.30	−0.23	0.03	0.31	−0.24	0.03	0.31	−0.22	0.04	0.30
WF	0.07	0.31	0.56	−0.01	0.24	0.50	−0.27	−0.02	0.22	−0.47	−0.25	−0.03	−0.15	0.10	0.35	−0.10	0.15	0.41	−0.39	−0.14	0.11	−0.18	0.07	0.33	−0.40	−0.14	0.12
CF	0.15	0.33	0.53	0.14	0.32	0.50	0.16	0.33	0.53	0.36	0.51	0.69	0.18	0.37	0.57	0.05	0.23	0.43	0.16	0.35	0.54	0.11	0.28	0.46	0.13	0.31	0.49
Panel C. Food																											
Con	−0.17	0.02	0.23	−0.13	0.02	0.18	−0.11	0.08	0.28	−0.15	0.06	0.29	−0.13	0.05	0.24	−0.12	0.03	0.19	−0.13	0.05	0.25	−0.16	0.04	0.25	−0.12	0.05	0.22
WF	−0.16	0.09	0.34	−0.20	0.03	0.26	−0.53	−0.28	−0.05	−0.59	−0.39	−0.19	−0.36	−0.11	0.12	−0.35	−0.12	0.13	−0.63	−0.39	−0.17	−0.45	−0.20	0.03	−0.65	−0.41	−0.18
CF	0.27	0.46	0.66	0.09	0.27	0.46	0.30	0.47	0.65	0.44	0.58	0.76	0.35	0.53	0.72	0.15	0.34	0.52	0.28	0.46	0.63	0.19	0.37	0.56	0.15	0.31	0.49
Panel D. Metals																											
Con	−0.22	0.07	0.42	−0.19	0.06	0.32	−0.17	0.11	0.41	−0.17	0.07	0.33	−0.19	0.08	0.37	−0.19	0.07	0.38	−0.18	0.07	0.37	−0.20	0.07	0.36	−0.15	0.07	0.31
WF	−0.45	−0.22	0.01	−0.47	−0.24	−0.02	−0.68	−0.44	−0.22	−0.65	−0.47	−0.29	−0.60	−0.37	−0.15	−0.58	−0.35	−0.10	−0.71	−0.48	−0.28	−0.60	−0.39	−0.17	−0.71	−0.46	−0.25
CF	0.31	0.48	0.67	0.31	0.47	0.64	0.38	0.54	0.71	0.52	0.66	0.82	0.35	0.51	0.70	0.32	0.49	0.69	0.40	0.56	0.72	0.36	0.52	0.69	0.36	0.50	0.65
Panel E. Oil																											
Con	−0.10	0.08	0.29	−0.09	0.06	0.34	−0.09	0.09	0.35	−0.10	0.08	0.28	−0.09	0.08	0.32	−0.07	0.07	0.26	−0.08	0.05	0.34	−0.11	0.09	0.34	−0.07	0.06	0.29
WF	−1.31	−1.17	−1.06	−1.29	−1.15	−1.03	−1.38	−1.19	−1.02	−1.27	−1.13	−1.02	−1.37	−1.19	−1.07	−1.36	−1.17	−1.09	−1.34	−1.16	−1.04	−1.34	−1.19	−1.05	−1.34	−1.15	−1.01
CF	0.40	0.46	0.53	0.29	0.34	0.40	0.37	0.42	0.47	0.36	0.41	0.49	0.36	0.42	0.49	0.35	0.39	0.47	0.37	0.41	0.46	0.33	0.37	0.43	0.27	0.32	0.36

Notes: Posterior 16%, median and 84% of the factor loadings by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of commodity prices.

Table C7: Factor Loading Intervals for Sentiment Factor Model

	Australia			**Canada**			**Denmark**			**Japan**			**New Zealand**			**Sweden**			**Switzerland**			**United Kingdom**			**United States**		
	16%	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**	**16%**	**50%**	**84%**
Panel A. Consumer Confidence																											
Con	−0.05	0.19	0.49	−0.02	0.32	0.68	−0.08	0.20	0.48	−0.11	0.23	0.60	−0.11	0.12	0.38	−0.04	0.36	0.82	0.00	0.43	0.87	−0.19	0.20	0.59	−0.04	0.21	0.51
WF	0.06	0.26	0.50	0.33	0.51	0.70	0.09	0.29	0.49	0.10	0.31	0.56	0.00	0.21	0.44	0.37	0.58	0.78	0.55	0.68	0.83	0.05	0.31	0.57	0.14	0.31	0.49
CF	0.78	0.92	1.08	0.02	0.13	0.31	0.74	0.91	1.09	0.56	0.71	0.85	0.43	0.59	0.90	0.02	0.22	0.70	0.05	0.33	0.60	0.55	0.76	0.98	0.17	0.88	1.05
Panel B. Confidence																											
Con	−0.03	0.18	0.46	−0.14	0.20	0.64	0.00	0.35	0.81	−0.24	0.11	0.51	−0.10	0.21	0.58	−0.03	0.30	0.72	0.00	0.44	0.92	−0.01	0.34	0.82	−0.03	0.37	0.83
WF	0.14	0.31	0.49	0.10	0.33	0.64	0.41	0.59	0.78	−0.06	0.19	0.44	0.11	0.37	0.65	0.32	0.53	0.71	0.51	0.71	0.90	0.44	0.61	0.79	0.41	0.60	0.81
CF	0.15	0.36	0.55	−0.90	−0.76	−0.61	−0.13	0.01	0.14	−0.21	−0.09	0.04	0.52	0.79	0.97	0.01	0.47	0.68	−0.23	0.05	0.56	−0.22	−0.04	0.10	−0.11	0.04	0.69

Notes: Posterior 16%, median and 84% of the factor loadings by World Factor (WF), Country Factor (CF) and Idiosyncratic Factor (IF) for latent factor model of sentiment.

Appendix D Parameter Estimates From Regression of Asset Return Series on World and Country Factors of the Driving Variables

Table D1: Parameter Estimates From Regression of Asset Return Series on World and Country Factors of the Driving Variables

	World Factor							Country-Specific Factor						
	Con	**MP**	**FP**	**PR**	**CO**	**CP**	**SE**	**Con**	**MP**	**FP**	**PR**	**CO**	**CP**	**SE**
Panel A. Parameter Estimates for Equity Returns														
Australia	0.000	0.110	-0.410	0.290	0.409	-0.006	0.390	0.000	0.260	-0.040	-0.110	0.319	0.316	-0.122
	(0.972)	(0.327)	(0.000)	(0.018)	(0.438)	(0.973)	(0.003)	(0.992)	(0.052)	(0.732)	(0.382)	(0.295)	(0.015)	(0.341)
Canada	0.002	0.066	-0.406	0.331	0.154	-0.233	0.447	-0.010	0.070	0.120	0.160	0.350	0.345	0.045
	(0.982)	(0.523)	(0.000)	(0.005)	(0.364)	(0.147)	(0.000)	(0.948)	(0.499)	(0.285)	(0.164)	(0.009)	(0.001)	(0.691)
Denmark	0.003	0.107	-0.421	0.259	0.037	-0.076	0.403	0.000	0.060	-0.060	0.210	0.100	0.463	-0.067
	(0.971)	(0.318)	(0.000)	(0.032)	(0.835)	(0.648)	(0.002)	(0.987)	(0.638)	(0.296)	(0.021)	(0.374)	(0.000)	(0.572)
Japan	0.004	0.130	-0.446	0.212	-0.180	-0.036	0.415	0.000	0.090	-0.090	0.100	0.360	0.474	0.019
	(0.965)	(0.218)	(0.000)	(0.070)	(0.299)	(0.827)	(0.001)	(0.998)	(0.400)	(0.491)	(0.352)	(0.007)	(0.000)	(0.841)
New Zealand	0.000	0.011	-0.378	0.136	-0.251	0.054	0.408	0.000	-0.030	-0.040	0.170	0.130	0.194	-0.095
	(0.997)	(0.924)	(0.000)	(0.273)	(0.177)	(0.757)	(0.003)	(0.995)	(0.824)	(0.701)	(0.170)	(0.284)	(0.129)	(0.447)
Sweden	0.000	0.008	-0.401	0.147	-0.088	-0.174	0.595	0.010	0.090	0.070	0.170	0.060	0.333	0.199
	(0.998)	(0.936)	(0.000)	(0.192)	(0.601)	(0.271)	(0.000)	(0.920)	(0.496)	(0.573)	(0.186)	(0.650)	(0.006)	(0.202)
Switzerland	0.007	0.210	-0.388	0.139	-0.173	0.122	0.484	-0.010	0.130	0.090	0.230	-0.070	0.461	0.155
	(0.943)	(0.049)	(0.000)	(0.234)	(0.321)	(0.457)	(0.000)	(0.951)	(0.196)	(0.410)	(0.039)	(0.533)	(0.000)	(0.299)
United Kingdom	0.000	0.012	-0.395	0.195	-0.115	-0.047	0.455	0.010	0.250	-0.010	0.010	0.180	0.496	0.160
	(0.997)	(0.914)	(0.000)	(0.110)	(0.523)	(0.781)	(0.001)	(0.956)	(0.012)	(0.808)	(0.907)	(0.066)	(0.000)	(0.109)
United States	0.004	0.131	-0.429	0.267	-0.244	0.007	0.400	0.000	0.020	-0.170	0.230	0.090	0.372	-0.118
	(0.964)	(0.214)	(0.000)	(0.024)	(0.160)	(0.964)	(0.002)	(0.985)	(0.891)	(0.131)	(0.081)	(0.367)	(0.001)	(0.390)
Panel B. Parameter Estimates for Bond Returns														
Australia	0.000	-0.009	0.173	-0.507	-0.284	0.251	-0.334	0.000	-0.190	0.070	-0.020	0.020	-0.306	0.029
	(0.998)	(0.934)	(0.068)	(0.000)	(0.121)	(0.146)	(0.012)	(0.994)	(0.157)	(0.514)	(0.889)	(0.842)	(0.022)	(0.824)
Canada	-0.002	-0.059	0.162	-0.280	-0.231	0.206	-0.379	0.020	-0.220	0.070	-0.110	-0.150	-0.306	0.029
	(0.986)	(0.621)	(0.114)	(0.037)	(0.243)	(0.269)	(0.008)	(0.853)	(0.058)	(0.571)	(0.349)	(0.278)	(0.005)	(0.229)
Denmark	-0.001	-0.036	0.112	-0.243	-0.380	0.077	-0.261	0.010	-0.210	0.110	-0.070	0.000	-0.141	-0.009
	(0.992)	(0.774)	(0.288)	(0.080)	(0.067)	(0.690)	(0.076)	(0.958)	(0.123)	(0.072)	(0.476)	(0.968)	(0.251)	(0.946)
Japan	-0.003	-0.082	0.168	-0.081	-0.116	0.156	-0.325	0.000	-0.050	0.540	-0.240	0.030	-0.288	0.009
	(0.981)	(0.514)	(0.119)	(0.561)	(0.575)	(0.425)	(0.030)	(0.999)	(0.631)	(0.000)	(0.036)	(0.818)	(0.004)	(0.928)
New Zealand	-0.001	-0.023	0.122	-0.299	-0.189	0.302	-0.391	0.010	0.220	0.030	-0.020	0.020	-0.204	0.133
	(0.995)	(0.847)	(0.229)	(0.025)	(0.337)	(0.104)	(0.006)	(0.960)	(0.083)	(0.713)	(0.863)	(0.858)	(0.109)	(0.288)
Sweden	-0.002	-0.052	0.078	-0.388	-0.361	0.201	-0.284	0.010	0.100	0.060	-0.030	0.020	-0.101	-0.288
	(0.988)	(0.664)	(0.440)	(0.004)	(0.069)	(0.276)	(0.044)	(0.913)	(0.464)	(0.657)	(0.844)	(0.874)	(0.410)	(0.081)
Switzerland	0.001	0.023	0.187	-0.304	-0.451	0.123	-0.291	0.020	-0.440	-0.040	-0.060	0.310	-0.143	-0.004
	(0.994)	(0.843)	(0.065)	(0.022)	(0.023)	(0.502)	(0.038)	(0.834)	(0.000)	(0.715)	(0.590)	(0.008)	(0.214)	(0.981)
United Kingdom	-0.002	-0.054	0.149	-0.321	-0.252	0.225	-0.276	-0.010	-0.240	0.130	0.110	-0.020	-0.187	-0.071
	(0.987)	(0.657)	(0.150)	(0.019)	(0.210)	(0.234)	(0.055)	(0.964)	(0.042)	(0.060)	(0.369)	(0.864)	(0.093)	(0.542)
United States	0.000	-0.013	0.234	-0.304	-0.145	0.242	-0.444	0.020	0.190	0.200	-0.010	-0.010	-0.370	0.117
	(0.997)	(0.908)	(0.018)	(0.018)	(0.441)	(0.175)	(0.001)	(0.865)	(0.216)	(0.073)	(0.965)	(0.912)	(0.001)	(0.399)

Table D1: *continued from previous page*

	World Factor							Country-Specific Factor						
	Con	**MP**	**FP**	**PR**	**CO**	**CP**	**SE**	**Con**	**MP**	**FP**	**PR**	**CO**	**CP**	**SE**
	Panel C. Parameter Estimates for Currency Returns													
Australia	-0.014	-0.441	-0.194	0.441	0.455	-0.275	0.339	0.000	0.040	0.060	0.070	0.000	-0.434	-0.157
	(0.868)	(0.000)	(0.019)	(0.000)	(0.005)	(0.066)	(0.003)	(0.999)	(0.737)	(0.562)	(0.608)	(0.974)	(0.001)	(0.216)
Canada	-0.007	-0.218	-0.205	0.337	0.615	-0.563	0.419	-0.040	0.400	0.190	-0.270	0.220	-0.111	0.032
	(0.935)	(0.025)	(0.013)	(0.002)	(0.000)	(0.000)	(0.000)	(0.716)	(0.000)	(0.079)	(0.015)	(0.095)	(0.264)	(0.769)
Denmark	-0.003	-0.097	0.262	-0.053	0.276	0.087	-0.077	0.000	0.130	0.010	-0.100	0.160	-0.716	-0.143
	(0.978)	(0.442)	(0.016)	(0.704)	(0.186)	(0.655)	(0.601)	(0.963)	(0.180)	(0.887)	(0.164)	(0.073)	(0.000)	(0.140)
Japan	0.009	0.276	0.262	-0.016	-0.198	0.020	-0.224	0.000	0.120	-0.170	-0.120	-0.290	-0.670	-0.154
	(0.935)	(0.025)	(0.013)	(0.906)	(0.321)	(0.916)	(0.117)	(0.997)	(0.141)	(0.084)	(0.155)	(0.004)	(0.000)	(0.034)
New Zealand	-0.004	-0.137	-0.186	0.403	0.012	-0.043	0.244	0.000	-0.110	0.080	0.200	0.360	-0.446	0.115
	(0.967)	(0.255)	(0.071)	(0.003)	(0.950)	(0.817)	(0.084)	(0.977)	(0.311)	(0.296)	(0.060)	(0.001)	(0.000)	(0.275)
Sweden	-0.005	-0.155	-0.313	0.451	0.288	-0.011	0.256	-0.030	-0.240	-0.050	0.220	0.010	-0.167	0.028
	(0.959)	(0.157)	(0.001)	(0.000)	(0.112)	(0.947)	(0.049)	(0.795)	(0.083)	(0.726)	(0.091)	(0.931)	(0.168)	(0.862)
Switzerland	0.000	-0.012	0.160	-0.014	-0.249	0.333	-0.332	0.010	-0.200	-0.110	-0.180	-0.230	-0.421	0.203
	(0.997)	(0.920)	(0.130)	(0.919)	(0.223)	(0.085)	(0.024)	(0.925)	(0.051)	(0.342)	(0.095)	(0.048)	(0.001)	(0.169)
United Kingdom	-0.001	-0.029	-0.362	0.199	-0.023	-0.192	0.237	0.010	0.280	-0.170	0.040	0.080	-0.208	0.194
	(0.993)	(0.808)	(0.001)	(0.129)	(0.906)	(0.297)	(0.089)	(0.956)	(0.012)	(0.008)	(0.734)	(0.480)	(0.048)	(0.078)
United States	0.006	0.194	0.160	-0.418	-0.502	0.446	-0.092	0.040	0.450	-0.130	-0.240	0.050	-0.301	-0.049
	(0.950)	(0.081)	(0.090)	(0.001)	(0.007)	(0.011)	(0.474)	(0.684)	(0.004)	(0.229)	(0.070)	(0.643)	(0.004)	(0.715)
	Panel D. Parameter Estimates for House Returns													
Australia	-0.003	-0.099	-0.049	0.624	-0.009	0.105	0.350	0.000	0.220	-0.020	0.030	0.210	-0.144	-0.024
	(0.974)	(0.360)	(0.591)	(0.000)	(0.960)	(0.531)	(0.007)	(0.993)	(0.105)	(0.864)	(0.797)	(0.093)	(0.275)	(0.855)
Canada	0.009	0.264	-0.298	0.544	0.004	0.107	0.015	-0.010	0.060	0.150	-0.190	0.310	0.099	-0.162
	(0.929)	(0.015)	(0.002)	(0.000)	(0.980)	(0.517)	(0.905)	(0.959)	(0.597)	(0.215)	(0.105)	(0.028)	(0.360)	(0.177)
Denmark	0.004	0.136	-0.553	0.098	0.523	0.163	0.181	0.000	0.030	0.000	0.010	0.270	0.217	-0.007
	(0.960)	(0.160)	(0.000)	(0.359)	(0.002)	(0.276)	(0.112)	(0.994)	(0.831)	(0.943)	(0.913)	(0.033)	(0.079)	(0.957)
Japan	-0.002	-0.055	-0.213	0.279	-0.346	0.128	-0.084	0.000	-0.010	0.100	0.090	0.210	0.238	-0.174
	(0.987)	(0.655)	(0.044)	(0.043)	(0.091)	(0.502)	(0.561)	(1.000)	(0.953)	(0.513)	(0.482)	(0.156)	(0.031)	(0.105)
New Zealand	0.001	0.016	-0.402	0.113	-0.178	0.127	0.263	0.000	0.120	-0.030	0.090	0.430	-0.188	-0.162
	(0.996)	(0.892)	(0.000)	(0.378)	(0.353)	(0.479)	(0.056)	(0.976)	(0.306)	(0.687)	(0.420)	(0.000)	(0.104)	(0.156)
Sweden	0.002	0.053	-0.405	0.193	0.348	0.192	0.375	0.020	0.200	0.270	0.150	0.250	0.042	0.146
	(0.986)	(0.623)	(0.000)	(0.109)	(0.053)	(0.254)	(0.004)	(0.829)	(0.148)	(0.049)	(0.229)	(0.051)	(0.721)	(0.348)
Switzerland	0.008	0.261	-0.041	-0.321	-0.083	0.554	-0.017	0.000	0.050	0.010	0.150	0.050	0.003	-0.130
	(0.936)	(0.028)	(0.683)	(0.015)	(0.667)	(0.003)	(0.901)	(0.984)	(0.668)	(0.925)	(0.237)	(0.723)	(0.982)	(0.445)
United Kingdom	0.001	0.042	-0.385	0.545	0.313	0.011	0.170	0.010	0.330	-0.050	-0.050	0.420	0.068	0.115
	(0.988)	(0.680)	(0.000)	(0.000)	(0.065)	(0.943)	(0.158)	(0.945)	(0.002)	(0.401)	(0.652)	(0.000)	(0.496)	(0.274)
United States	0.004	0.129	-0.389	-0.149	-0.063	0.282	0.179	0.020	0.240	0.060	0.100	0.490	-0.151	0.031
	(0.968)	(0.269)	(0.000)	(0.246)	(0.742)	(0.120)	(0.190)	(0.817)	(0.094)	(0.589)	(0.421)	(0.000)	(0.120)	(0.809)

Notes: Panels A, B, C and D display the parameter estimates associated with the regressions of the equity, bond, currency and house returns, respectively, on the World Factor and the respective Country-Specific Factors for Monetary Policy (MP), Fiscal Policy (FP), Production (PR), Consumption (CO), Commodity Prices (CP), Sentiment (SE) and a constant (con) are reported with associated p-values for the t-test that the null hypothesis that the coefficient equals zero displayed beneath the parameter estimates in parentheses.