# A Political Capital Asset Pricing Model

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### Abstract

We construct a bivariate factor of political stability and economic policy confidence, and show that it commands a significant premium of up to 15% per annum, in the global, developed, and emerging markets, robust to ICAPM, Fama-French five-factor, Carhart, and ICAPM Redux. We propose an international capital asset pricing model incorporating the political factor, and test estimations in the global, developed, and emerging markets. The model explains up to 77% of cross-sectional returns, has good predictive power, performs better than the benchmark models in pricing equity indices and explains up to an incremental 25% of cross-sectional returns, and is robust out of sample.

1

# 1 Introduction

The ascendancy of politics over economic policies was ascertained recently by scholars and political analysts arguing "It's not the economy, stupid!" to explain the electoral success of the German populist AfD in 2017, and the election of Donald Trump with the subsequent gains of the Democratic party in the 2018 mid-terms. Twenty-five years earlier, however, the winning slogan "It's the economy, stupid!" claimed the dominance of economic policies during the 1992 US presidential election.[1] Between these polar opposites, we have complex interactions with economic policies creating politics, and vice versa (Schattschneider, 1935, p. 288). Pástor and Veronesi (2012); Kelly et al. (2016) refer to the "obvious ties" between political uncertainty and financial markets, and offer a theoretical framework for evaluating the influence exerted by political uncertainty on the financial markets. In this paper we build on the seminal work of Douglass C. North (1991), co-recipient of the 1993 Nobel Memorial Prize in Economic Sciences (henceforth, DCN), to identify *both* politics and policy variables as significant determinants of the cross section of international equity excess returns.

DCN casts politics and policies within his work on institutions. He calls institutions "the rules of the game in a society or, more formally, the humanly devised constraints that shape human interaction", classifies rules into "political (and judicial) rules, economic rules, and contracts", and notes a two-way causality between politics and policies. Their complex interactions non-withstanding, politics and economic policies are distinct variables, but the distinction is not made in the literature studying their effects on financial markets. For instance, event studies around elections, a preferred method in empirical studies, confound a political event (election) with a policy change, depending on the election outcome. Adopting DCN's arguments (p. 5) for separating the analysis of politics from economic policy choices, we construct a bivariate *political factor* (P-factor) using two measurable variables, namely *political stability* and *confidence in government economic policy*, and show that it is a significant determinant of cross-sectional international equity returns.

Gala, Pagliardi, and Zenios (2018) (henceforth, GPZ) document empirically that both variables are priced in international stock markets, and their differential or joint effect is not explained by existing asset pricing models. They show that investment strategies exploiting politics-policy predictability generate economically

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[1]Campaign strategist James Carville coined the slogan for Bill Clinton's campaign, and its opposite was used by Schwander and Manow (2017) for the German elections and by The Washington Post for the US elections (`https://tinyurl.com/y6fow6jb`, accessed March 2019); Reuters used it in reference to the 2018 Swedish elections (`https://tinyurl.com/y6yts2pm`, accessed March 2019).

large and strongly statistically significant (at the 0.01 level) abnormal returns —6% for developed and 19% for emerging markets, per annum (p.a.)— with reference to six prominent models.[2] The alphas on bivariate portfolio sorts are roughly the sum of the alphas on univariate sorts. These findings lead us to construct a bivariate factor, which, added to the best-performing existing model, improves significantly the cross-sectional adjusted $R^2$. This provides further motivation to develop an international capital asset pricing model incorporating the political risk factor (P-CAPM) to explain the abnormal returns. We use the six prominent models as benchmarks to assess the performance of our model.

In the DCN classification, contracts are firm specific, giving rise to unpriced idiosyncratic risk, but politics and economic policy variables create systematic risks that may be priced, and this is what the P-CAPM does. DCN describes two channels through which rules affect economic performance, and, consequently, asset prices. He argues that rules, by constraining the choices of maximizing agents, "create order and attempt to reduce *uncertainty in exchange*", and, together with the technology employed, "they determine *transaction and transformation costs* and hence the profitability and feasibility of engaging in economic activity" (italics ours). Hence, first, rules determine the "uncertainty discount", and, second, they reflect the cost of contract enforcement, influence employment, organizational forms, demand for skills and the rate of return to increase in knowledge, and the discovery and evaluation of new markets. All these factors go into the transformation process (DCN, ch. 9) determining the transaction and transformation costs of the rules underlying the constraints in exchange.[3] Costs and uncertainty affect both firms and consumers, and we develop a model of these agents' behavior subject to exogenous politics and policy shocks to derive a political asset pricing model in reduced form that can be put to the data.

In testing model hypotheses grounded theoretically on DCN we face a measurement problem, since "we can not see, feel, touch, or even measure institutions" (DCN, p. 107); see also Fitzpatrick (1983); Kobrin (1979); Bekaert et al. (2016). Indicative of the difficulty faced by researchers in this area, Lehkonen and Heimonen (2015) find that the effect of political risk on stock market returns is not

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[2]The benchmark models used in GPZ are the World CAPM (Harvey, 1991), ICAPM (Adler and Dumas, 1983; Dumas and Solnik, 1995), Fama-French three- and five-factor models (Fama and French, 2012, 2017) (henceforth, FF3 and FF5), Carhart (1997) as extended to the international markets in (Fama and French, 2012), and ICAPM Redux (Brusa et al., 2014)

[3]DCN also recognizes that maximizing agents may choose to alter the rules. His work addresses institutional change and subsequent literature studies the effect of institutional arrangements on political stability and policy uncertainty, see, e.g., Lehkonen and Heimonen (2015) and references therein, but we are agnostic to the root causes of political stability or confidence in government policy.

robust to the measure their political variable, namely, the functioning of democracy. Researchers rely on identifying risks at a high level of aggregation looking at several indicators of politics or policy, such as the ICRG aggregate political risk index (PRS Group, 2005), the World Bank (WB) governance indicators (Kaufman et al., 2010), the corruption perception index (Transparency International, 2017) (abbreviated TI), or using elections for event studies (Bernhard and Leblang, 2006), and Baker et al. (2016) construct the EPU index for economic policy uncertainty, using news textual analysis.

To address the DCN measurement problem we construct the P-factor as a mimicking portfolio of political stability and confidence in government economic policy, using country ratings from the Ifo World Economic Survey (Becker and Wohlrabe, 2007; Stangl, 2007) (abbreviated WES, and described in section 2.1) for a sample of 42 countries. The use of WES for asset pricing is new.

Figure 1 illustrates median and top and bottom quintile ratings of the politics (Panel A) and policy (Panel B) variables for our country sample, from March 1992 to December 2016, and summary statistics (Panel C) for the global sample, and two sub-samples of 22 developed and 20 emerging markets. We note significant temporal and cross-sectional variability in policy confidence and appreciable variability in political stability, with fairly moderate intertemporal, cross-sectional, and rank (Kendall $\tau$) correlations. The fact that these two variables are not highly correlated, and the strong evidence of large abnormal returns in GPZ, suggest the construction of a bivariate factor. The P-CAPM incorporates these exogenous politics and policy variables in the spirit of recent literature that adds macro variables, such as labor market tightness (Kuehn et al., 2017) and market-wide liquidity (Liu, 2006), to asset pricing. The model explains well cross-sectional returns at the portfolio and country levels, it performs better than benchmark models in several explanatory and predictive tests, and is robust out of sample on frontier markets.

## 1.1   Related literature

Significant strands of literature study the effects of political stability or economic policy uncertainty on financial markets.

Political stability is an important factor for economic variables, such as growth or inflation (Alesina et al., 1996; Barro, 1991), corporate investments (Julio and Yook, 2012; Jens, 2017), and foreign direct investment (Bekaert et al., 2016; Jensen, 2008). The impact of political uncertainty on financial markets is also well documented. Bittlingmayer (1998) establishes political events as the main source of

4

**Figure 1 – The variables of the political risk factor**

This figure plots the median ratings and the top and bottom quintiles, of political stability (Panel A) and confidence in government economic policy (Panel B) for a group of 42 countries from the Ifo World Economic Survey. Panel C provides summary statistics for the global markets, and two sub-samples of 22 developed and 20 emerging markets. Data span the period March 1992 to December 2016. Political stability ratings range from 1 to 9, and policy confidence from 0 to 100, with higher values indicating more stability and confidence.

**(a)** Political stability

**(b)** Economic policy confidence
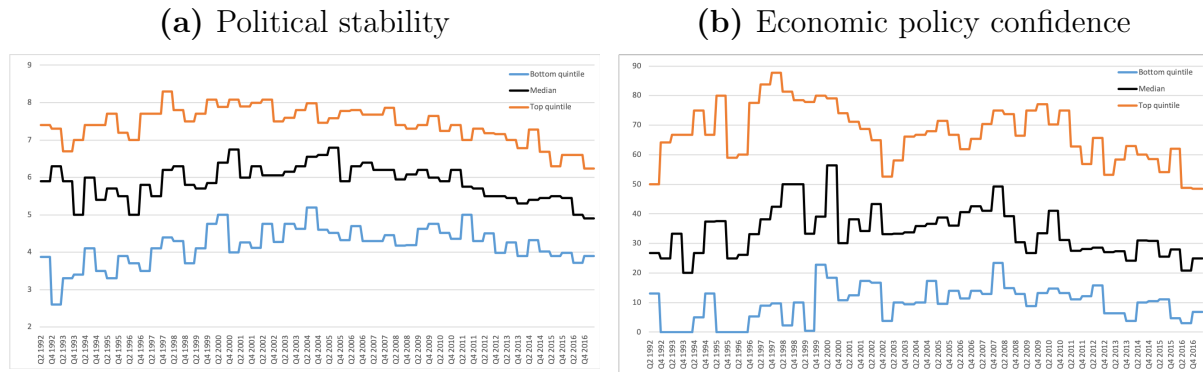


**(c)** Summary statistics

|                                        | Global | Developed | Emerging |
| -------------------------------------- | ------ | --------- | -------- |
| Politics (Mean)                        | 5.71   | 6.73      | 4.59     |
| Politics (StDev)                       | 1.29   | 1.17      | 1.42     |
| Policy (Mean)                          | 38.59  | 46.09     | 30.34    |
| Policy (StDev)                         | 23.97  | 25.23     | 22.58    |
| Intertemporal corr. politics-policy    | 0.43   | 0.39      | 0.46     |
| Cross-sectional corr. politics-policy  | 0.54   | 0.48      | 0.49     |
| Kendall $\tau$ politics-policy         | 0.40   | 0.34      | 0.37     |

financial volatility during the transition from Imperial to Weimar Republic, and the effects of political processes —elections, cabinet negotiations etc— on financial markets are documented in foreign exchange (Bachman, 1992; Bernhard and Leblang, 2002) and stock returns (Belo et al., 2013; Leblang and Mukherjee, 2005), among others. Political uncertainty is shown to have a positive marginal impact on sovereign bond spreads (Bekaert et al., 2014), and on the term premium between the 3- and 6-month US Treasury rates (Caporale and Caporale, 2008). Elections provide natural event studies and this motivates research on the effects of political cycles on financial markets (Bernhard and Leblang, 2006; Caporale and Caporale, 2008; Białkowski et al., 2008; Belo et al., 2013; Santa-Clara and Valkanov, 2003). Closer to our work are Pástor and Veronesi (2013), who develop a general equi-

5

librium model and find evidence, consistent with model predictions, that political uncertainty carries a risk premium in stock prices, and extended in Kelly et al. (2016) where they document a risk premium on long-dated option prices.

When it comes to economic policies, it has been recognized since Friedman (1977) that uncertainty is a determinant for long-term economic performance. Pástor and Veronesi (2012) develop an equilibrium model linking economic policy uncertainty to stock prices. The construction of the EPU index spurred empirical studies of economic policy uncertainty effects on asset prices, the economic cycle, corporate investments, and access to capital, see Baker et al. (2016).[4] The impact of EPU on financial markets, in particular, is studied in Brogaard and Detzel (2015); Pástor and Veronesi (2013), among others.

Our work bridges the two strands of asset pricing literature cited above. We establish an important, theoretically and empirically, link of political stability and economic policy uncertainty to asset prices, necessitating a bivariate factor. The new factor is not spanned by the factors of existing models. The abnormal returns across politics, policy, and politics-policy portfolios, shown in GPZ to be robust to existing capital asset pricing models, motivate us to develop an asset pricing model incorporating both kinds of uncertainty. Bridging these two strands is particularly relevant, given the difficulty in distinguishing politics from policy measures (for instance, Pástor and Veronesi (2013) use EPU as a proxy for political uncertainty) or the use of confounding election events to document political effects on the financial markets (e.g., Leblang and Mukherjee (2005); Bernhard and Leblang (2006); Julio and Yook (2012); Kelly et al. (2016); Jens (2017)).

Our empirical findings also inform the literature on the "political risk sign paradox" (Diamonte et al., 1996; Perotti and Van Oijen, 2001; Lehkonen and Heimonen, 2015; Dimic et al., 2015), according to which more political risk entails lower, not higher, returns. We find premia for developed markets consistent with this literature, and show that the paradox is only apparent.

## 1.2 Research design and contribution

We first construct the P-factor as a zero cost tradable mimicking portfolio (section 2), and show that it carries a significant risk premium which is robust to several asset pricing models, and improves cross-sectional adjusted $R^2$ by up to 29% when added to the best-performing benchmark. We validate the factor (section 3) using beta-sorted portfolios to show that the factor mimics political stability

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[4]An extensive bibliography using EPU is available at `http://www.policyuncertainty.com/`.

and economic policy confidence variables, and run spanning regressions to establish, importantly, that it is not spanned by the factors of the benchmark models. We show that it is highly correlated with, and explains through OLS regressions, alternative bivariate factors that we construct using other political variables, and also compare with a univariate factor mimicking the ICRG index.

We then provide a three-factor P-CAPM in reduced form (section 4). The model is derived in Appendix A, where we show how the stochastic discount factors, exchange rates, and equity returns are affected by the political stability and economic policy shocks, in addition to standard productivity shocks, and derive the reduced form model from three common factors. The model is put to the data. This is the main test and, following Fama and French (2017), we run both a global and two local versions of the model. We estimate risk premia on the global P-CAPM factors for the 42 international stock market indices, and on two local models for developed and emerging markets, and provide strong positive evidence for the performance of all models. Using standard tests (Lustig et al., 2011; Cochrane, 2005) we show that P-CAPM explains the cross-sectional excess returns at both the portfolio and country levels, test the model in a horse race against the benchmark models, and show that it matches well, and better than the benchmarks, predicted excess returns with realized excess returns in the cross-section. We hasten to add, however, that some of these models (FF3, FF5, Carhart) are designed for portfolios sorted on some characteristics and not country-wide indices, whereas P-CAPM —and World CAPM, ICAPM, and ICAPM Redux— are applicable to international indices.

Interestingly, the results contribute an asset pricing model for emerging markets with a large and significant political risk premium of 15% p.a. explaining 77% of cross-sectional returns. This is noteworthy since existing asset pricing models are not well suited for emerging markets (Harvey, 2001), and is all the more relevant because the world capitalization of these markets almost tripled from 9% in 2000 to 23% in 2016.[5] The tests on the developed markets yield an economically and statistically significant negative premium, which is consistent with the political risk sign paradox. We use regressions with lead and lag of the political variables around the WES ratings release dates to show a clear pattern of sign reversal from contemporaneous to expected returns and suggest an explanation for the paradox.

Robustness checks (section 5) estimate the model using Fama-MacBeth regressions (Fama and MacBeth, 1973), run a randomized experiment with noise political factors, test for out-of-sample performance using an enlarged set that includes fron-

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[5]Data from `https://data.worldbank.org/indicator/CM.MKT.LCAP.CD`, accessed November 2018.

tier markets,[6] and test a univariate factor we construct from portfolio sorts on the ICRG index. This test serves to show that the bivariate factor, based on a novel use of WES, has better explanatory power than the univariate alternative. Readers who are convinced by the literature for the need to include a political factor in asset pricing models, but may question the need for a bivariate factor, will find in the test results a convincing answer.

Our paper brings DCN into the asset pricing literature as an "umbrella theory" (Fama and French, 2018) and contributes a bivariate political factor as an important determinant of international equity market returns. The construction of a political factor as a tradable mimicking portfolio of politics and policy variables addresses the measurement problem, and allows us to add these variables to the asset pricing literature through a Political Capital Asset Pricing Model. Our work contributes in distinguishing between political stability and economic policy uncertainty. In global and local estimations we find that the model explains well cross-sectional returns, has good predictive power, performs better than the benchmarks in several tests, explaining up to an incremental 25% of cross-sectional returns, and is robust out of sample. As a byproduct of our empirical findings we shed light on the apparent political sign paradox.

# 2 Political risk factor and evidence of a premium

We describe politics and policy variables and available data for constructing a bivariate political risk factor, and document an economically and statistically significant risk premium.

## 2.1 Political variables and data availability

We summarize in Table 1 eligible political variables and data availability, based on the DCN rules classification and current literature. These variables have been studied for their impact on economic performance or the financial markets, but their use in an asset pricing model is new.[7] We choose the WES variables for our

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[6]See Dimic et al. (2015) and references therein for works on frontier markets cross-sectional returns.

[7]See Alesina et al. (1996) for political stability, Kurtz and Schrank (2007); Kaufman et al. (2010) for government effectiveness, Kaufman et al. (2010) for regulatory quality, La Porta et al. (1997); Mauro (1995) for legal and administrative restrictions, Mauro (1995) for corruption, Baker et al. (2016); Pástor and Veronesi (2012) for policy uncertainty, Becker and Wohlrabe (2007); Stangl (2007); Gala et al. (2018) for confidence in government economic policy.

work, since they are available for a longer period and with higher frequency than the WB politics variables, and cover more countries than the EPU policy variable. We use pairs of variables from the other data sets to create alternative bivariate factors for validation.

### Table 1 – Political (and judicial) and policy variables

This table summarizes political variables and data availability for creating a political risk factor following the DCN rules classification. WES is the Ifo World Economic Survey (Becker and Wohlrabe, 2007; Stangl, 2007), WB is from the World Bank governance indicators (Kaufman et al., 2010), TI is from Transparency International (2017), EPU is from Baker et al. (2016).

| Source | Variable | Countries | Frequency | Start year |
|--------|----------|-----------|-----------|------------|
| | Political (and judicial) rules | | | |
| WES | Political stability | 66 | Semi-annual | 1992 |
| WB | Political stability | 214 | Annual | 1996 |
| WB | Government effectiveness | 214 | Annual | 1996 |
| WB | Voice and accountability | 214 | Annual | 1996 |
| WB | Regulatory quality | 214 | Annual | 1996 |
| WB | Rule of law | 214 | Annual | 1996 |
| WES | Administrative restrictions | 66 | Semi-annual | 1992 |
| TI | Corruption | 180 | Annual | 1995 |
| | Economic rules | | | |
| WES | Economic policy confidence | 66 | Semi-annual | 1992 |
| EPU | Economic policy uncertainty | 21 | Monthly | 1991 |

WES is a survey of national experts conducted quarterly since March 1983 by the Ifo Institute for Economic Research in Munich, in cooperation with the Paris based International Chamber of Commerce, and financial support from the European Commission.[8] Results are announced in February, May, August and November. Its longitudinal data enable the analysis of economic, financial, political and investment climate across countries (Stangl, 2007). The initial micro data set contained 482 observations from 50 countries, but more countries were added over the years, and since April 2002, WES has been stabilized at about 1,000 experts from more than 90 countries. The experts hold degrees in economics (54%), business (19%), natural sciences (10%), professional and applied sciences, and other social sciences, law, or humanities (17%). Over 40% hold a PhD. The experts are in leading positions or engage in economic research at international corporations (65%), research institutes (10%), chambers of commerce (10%), consulates and embassies

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[8]See https://www.cesifo-group.de/ifoHome/facts/Survey-Results/World-Economic-Survey.html, accessed February 2018.

(5%), or are affiliated with international organizations, foundations, media and the press, or small scale enterprises (10%).

Since 1992 the survey includes two questions on political stability and economic policy confidence:

1. "[A]ssess the importance of the following factors which influence the climate for foreign investors in this country: political instability is absent, low or high."

2. "Is the economy of your country currently facing the following problems? Lack of confidence in the government's economic policy."

These questions are asked semi-annually, with the answers to the stability question released in February and August, and to the policy question in May and November. Absence of political instability receives the value 9, low receives 5, and high receives 1. For policy confidence, participants answer with a Yes (value 100) or No (value 0). WES averages the experts' answers to each question, so that political stability is rated from 1 (low) to 9 (high), and policy confidence is rated from 100 (low) to 0 (high). For consistency, we linearly transform policy ratings to denote low confidence by 0 and high by 100. (Summary statistics are given in the online Appendix Table B.1.)

We also consider as a possible variable the monthly ICRG political risk index. This index does not fit the DCN classification since it aggregates politics with economic policy, by equally weighting variables for "Government Stability", "Socioeconomic Conditions", and "Investment profile", among others, but given its widespread acceptance we construct a univariate ICRG factor for the sake of comparison.[9]

We obtain the WB, TI, EPU, and ICRG data from the respective web sites.[10] The international factors for World CAPM, Fama-French three- and five-factor models, and Carhart, are from the web site of Kenneth French,[11] from where we also take the risk-free rate as the one-month US Treasury bills rate. These factors are for developed markets, and for global and emerging markets we use as the market factor the USD returns of the Morgan Stanley Capital International market indices MSCI AC (All countries) World from Datastream. The Dollar and Carry factors for

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[9]ICRG is used by Bekaert et al. (2014); Erb et al. (1996); Diamonte et al. (1996); Boutchkova et al. (2012), among others, but the construction of a risk factor from this index is new.

[10]See, respectively, `http://info.worldbank.org/governance/wgi/#home`, `https://www.transparency.org/research/cpi/overview`, `http://www.policyuncertainty.com/`, and `https://epub.prsgroup.com/customer/accessible`, accessed November 2018.

[11]See `http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Developed`, accessed February 2018.

the global and developed market models are from the web site of Hanno Lustig[12], and we construct the factors for emerging markets. For ICAPM we construct log currency excess returns for the three currency factors, using Datastream. As test assets we use the MSCI Investable country indices in USD, including dividends.

We use data spanning March 1992 to December 2016 (henceforth, 1992–2016), following the MSCI classification of countries into developed or emerging.[13] For the majority of the years in our sample period there are 22 developed and 20 emerging markets.[14] The set of 42 markets is our global set, and we also use a broader set for out-of-sample testing, denoted by "Global$^+$", that adds 29 frontier markets.[15] This market segment is small, yet it is increasing in importance with market capitalization surging from \$0.53bn in 1992 to \$1.08tn in 2016.[16] We have 298 monthly observations for a total of 12,516 for the global set and 21,158 for Global$^+$.

## 2.2 The P-factor

We choose political stability and economic policy confidence as the variables to construct the P-factor, based on the documented premium for political uncertainty (Pástor and Veronesi, 2013; Kelly et al., 2016), the impact of policy uncertainty on asset prices (Pástor and Veronesi, 2012; Brogaard and Detzel, 2015), and the documented abnormal returns of portfolio sorts on these two variables (GPZ).

As the political variables are not traded, we seek a (maximally correlated) tradable mimicking portfolio (Cochrane, 2005; Liu, 2006; Brogaard and Detzel, 2015), constructing the P-factor as the gains on a portfolio of unconditional sorts of countries by their WES ratings in the politics-policy variables. We exploit the cross-sectional variability of these two variables with a zero cost strategy, going long in an equally weighted portfolio of stock markets in the countries in the bottom quantile and short in the top quantile (L-H portfolio). The P-factor is the returns on L-H, exploiting the fact that this portfolio generates economically and statistically

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[12]See `https://people.stanford.edu/hlustig/data-and-code`, accessed February 2018.

[13]MSCI has indices for 46 countries, but we exclude the four for which WES has no data (Indonesia, Kuwait, Saudi Arabia, and Singapore).

[14]On the last day of the sample the developed countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong-Kong, Ireland, Israel, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, UK, US. The emerging countries are Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Russia, South Africa, Taiwan, Thailand, Turkey.

[15]On the last date of our sample the frontier markets are Argentina, Bahrein, Bangladesh, Bosnia-Herzegovina, Botswana, Bulgaria, Croatia, Estonia, Ghana, Jamaica, Jordan, Kazakhstan, Kenya, Kuwait, Lithuania, Mauritius, Morocco, Nigeria, Oman, Palestine, Romania, Saudi Arabia, Slovenia, Sri Lanka, Trinidad and Tobago, Tunisia, Ukraine, Vietnam, Zimbabwe.

[16]Data from `https://data.worldbank.org/indicator/CM.MKT.LCAP.CD`, accessed November 2018.

significant average returns, and we construct a global factor (PG) as a mimicking portfolio in all markets, and local factors for developed (PD) and emerging (PE) markets. PG is the return on L-H portfolios from $5 \times 3$ sorts of the sample of 42 countries, and PD and PE are the returns on L-H portfolios from $3 \times 6$ sorts for the 22 developed and 20 emerging markets, respectively. We construct the factors using monthly observations. The political variables are semiannual but the P-factor tracks the monthly performance of the portfolio's long and short positions. The portfolio is rebalanced quarterly at the end of the month of the WES ratings release.

In Figure 2 we plot the efficient frontier implied by the factors of the benchmark models,[17] and the frontiers obtained when adding the global factor PG, and the local factors PD and PE. We display the location of each factor in this space, and the slopes of the lines from the origin to each factor give the Sharpe ratio. The efficient frontier shifts slightly upwards when PG is added to the benchmark factors and the maximum Sharpe ratio increases from 1.74 to 1.80. When adding PD and PE the upward shift is much larger, with the maximum Sharpe ratio increasing from 1.74 to 2.[18] Table 2 provides summary statistics of all factors, and we observe that the P-factors have higher Sharpe ratios in absolute value than the market portfolio. These results suggest that the political factors can contribute to current asset pricing models, and this is what we test next. The negative Sharpe ratio in developed markets forewarns about a political sign paradox, which we also address.

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[17]The benchmark factors are MKT (excess return on MSCI World Index in USD), MKTLC (excess return on MSCI World Index in local currency), SMB (small minus big, from Fama-French three-factor), HML (high minus low, from Fama-French three-factor), WML (winners minus losers, from Carhart), CMA (conservative minus aggressive, from Fama-French five-factor), RMW (robust minus weak, from Fama-French five-factor), EUR, GBP, JPY (log currency excess return for the Euro, the British pound, and the Japanese Yen, from ICAPM), Dollar and Carry (dollar and carry trade factors from Lustig et al. (2011)).

[18]We replicate the frontier of (Adrian et al., 2014, pp. 2586) using the international version of their factors (MKT, SMB, HML, WML), and obtain a maximum Sharpe ratio of 1.13, which is close to the 1.2 reported by the authors with US data, increasing to 1.23 when adding PG, and 1.51 when adding PD and PE.

Electronic copy available at: https://ssrn.com/abstract=3351403

## Figure 2 – The efficient frontiers implied by the benchmarks and the P-factor

This figure plots the mean-standard deviation frontier implied by the factors of the benchmark models (lower curve), when adding the global political factor (middle curve), and when adding the two local factors for developed and emerging markets (upper curve). It also displays the location of each benchmark factor, the global political factor PG, and the developed and emerging market factors PD and PE. The benchmark factors are MKT (excess return on MSCI World Index in USD), MKTLC (excess return on MSCI World Index in local currency), SMB (small minus big), HML (high minus low), WML (winners minus losers), CMA (conservative minus aggressive), RMW (robust minus weak), EUR, GBP, JPY (log currency excess return for the Euro, the British pound, and the Japanese Yen), Dollar, and Carry (carry trade). Data are monthly, spanning 1992–2016. Returns and standard deviations are in percentage points.
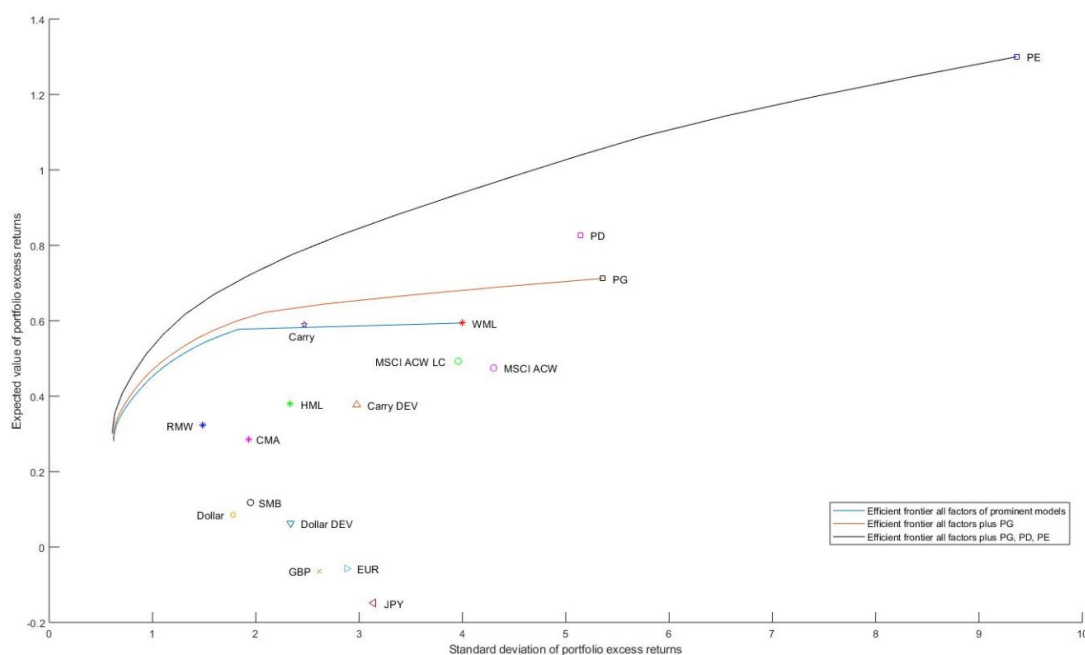
**Table 2** – **Summary statistics of the benchmark factors and the P-factors**

This table provides summary statistics of the benchmark factors, and of the global political factor PG and the local developed and emerging market factors PD and PE. The benchmark factors are MKT (excess return on MSCI World Index in USD), MKTLC (excess return on MSCI World Index in local currency), SMB (small minus big), HML (high minus low), WML (winners minus losers), CMA (conservative minus aggressive), RMW (robust minus weak), EUR, GBP, JPY (log currency excess return for the Euro, the British pound, and the Japanese Yen), Dollar, and Carry (carry trade). Means, standard deviations, and Sharpe ratios are annualized, estimated over the period 1992–2016.

| | PG | PD | PE | MKT | MKTLC | SMB | HML | WML | CMA | RMW | EUR | GBP | JPY | Dollar | Carry |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Correlation | | | | | | | | |
| PD | 0.29 | | | | | | | | | | | | | | |
| PE | 0.59 | -0.04 | | | | | | | | | | | | | |
| MKT | 0.12 | 0.03 | 0.13 | | | | | | | | | | | | |
| MKTLC | 0.15 | 0.04 | 0.13 | 0.95 | | | | | | | | | | | |
| SMB | 0.14 | 0.02 | 0.00 | -0.05 | -0.18 | | | | | | | | | | |
| HML | -0.09 | 0.14 | -0.15 | -0.15 | -0.16 | 0.02 | | | | | | | | | |
| WML | -0.06 | -0.04 | -0.02 | -0.23 | -0.24 | 0.14 | -0.25 | | | | | | | | |
| CMA | -0.19 | 0.05 | -0.17 | -0.40 | -0.41 | -0.04 | 0.72 | -0.05 | | | | | | | |
| RMW | -0.14 | -0.07 | -0.11 | -0.46 | -0.42 | -0.24 | 0.21 | 0.16 | 0.22 | | | | | | |
| EUR | -0.08 | 0.03 | -0.04 | 0.34 | 0.12 | 0.10 | 0.11 | -0.10 | 0.03 | -0.09 | | | | | |
| GBP | -0.17 | 0.03 | 0.01 | 0.33 | 0.15 | 0.08 | 0.09 | -0.09 | -0.04 | -0.04 | 0.54 | | | | |
| JPY | -0.04 | -0.07 | -0.01 | 0.06 | -0.11 | 0.02 | -0.04 | -0.02 | 0.07 | -0.06 | 0.28 | 0.11 | | | |
| Dollar | -0.04 | 0.01 | -0.02 | 0.53 | 0.30 | 0.14 | 0.06 | -0.15 | -0.08 | -0.16 | 0.85 | 0.62 | 0.38 | | |
| Carry | 0.13 | 0.10 | -0.02 | 0.39 | 0.42 | 0.03 | -0.04 | -0.12 | -0.16 | -0.11 | 0.04 | 0.21 | -0.34 | 0.25 | 1 |
| Mean | 8.54% | -9.92% | 15.60% | 5.88% | 5.62% | 1.41% | 4.55% | 7.13% | 3.43% | 3.87% | -0.69% | -0.76% | -1.78% | 1.03% | 7.08% |
| StDev | 18.55% | 17.81% | 32.43% | 14.71% | 13.64% | 6.75% | 8.08% | 13.84% | 6.69% | 5.16% | 9.99% | 9.07% | 10.88% | 6.16% | 8.56% |
| p-value | 0.047 | 0.004 | 0.028 | 0.079 | 0.072 | 0.306 | 0.048 | 0.020 | 0.061 | 0.001 | 0.749 | 0.705 | 0.453 | 0.462 | 0.000 |
| Sharpe | 0.46 | -0.56 | 0.48 | 0.40 | 0.41 | 0.21 | 0.56 | 0.52 | 0.51 | 0.75 | -0.07 | -0.08 | -0.16 | 0.17 | 0.83 |

14

## 2.3  Political risk premium

We now test for a premium on the P-factor. We estimate the $k$th factor beta of the $i$th asset, by running the first-step time-series regression

$$r_{i,t} - r_t^f = \alpha_i + \beta_{1,i} f_{1,t} + \beta_{2,i} f_{2,t} \ldots + \beta_{K,i} f_{K,t} + \epsilon_{i,t}, \tag{1}$$

where, at time $t$, $r_{i,t}$ is the return on asset $i$, $r_t^f$ is the risk-free rate, $f_{k,t}$ is the $k$th factor return, $\alpha_i$ is the intercept, and $\epsilon_{i,t}$ is the error term. We then run the second-step OLS cross-sectional regression (Cochrane, 2005, ch. 12) to estimate the risk premia (lambda's),

$$\mathbb{E}(r_i) = \lambda_1 \beta_{1,i} + \lambda_2 \beta_{2,i} \ldots + \lambda_K \beta_{K,i} + \eta_i, \tag{2}$$

where $\mathbb{E}$ denotes time average and $\eta_i$ is the pricing error term. Standard errors are adjusted to account for the generated regressor problem from the estimation of factor loadings in the first step (Shanken, 1992).

We first estimate the risk premium of the P-factor and obtain $R^2$ of 0.50 in the global, 0.36 for developed, and a high 0.66 for emerging markets. A single political factor can explain a significant proportion of the cross-sectional variability in all market segments, suggesting that it can carry significant risk premium.

We then control for the factors of the benchmark models, by adding PG, PD, or PE, to the benchmark models and estimate risk premia on the corresponding markets. In Table 3 we report economically and statistically significant political risk premia in all market segments, robust to all benchmarks. PG is statistically significant at conventional levels, with an economically significant premium of 0.08 p.a., comparable to the market portfolio premium of 0.07 p.a. Adding PG improves the cross-sectional adjusted $R^2$ from 16% for Fama-French five-factor model to 24% for World CAPM. The premium on PD is -0.11 p.a., significant at the 0.01 level, with adjusted $R^2$ improvements from 8% for Fama-French five-factor to 42% for World CAPM. The counterintuitive negative sign of the political risk premium is consistent with the sign of the abnormal returns in GPZ and in line with the political sign paradox, and we explain it in section 4.4. For PE the premium is 0.15 p.a., significant at the 0.05 level, with $R^2$ improvements from 21% for ICAPM to 29% for Fama-French five-factor. For all three P-factors the annualized mean absolute pricing error (MAPE) and root mean square error (RMSE) are consistently reduced.

That the P-factor carries a premium when added to the benchmark models and

improves their explanatory power, implies that the markets price political stability and confidence in government economic policy, and none of the existing models prices these risks. Furthermore, the $R^2$ with the single P-factor is higher than that of the existing multi-factor models. The best performing Fama-French five-factor model has $R^2$ of 0.41 in the global markets (compared to 0.50 for PG), 0.26 in developed (compared to 0.36 for PD), and 0.52 in emerging (compared to 0.66 for PE), suggesting that the significant cross-sectional variability of the assets' exposures to the P-factors explains the cross-sectional variation in their average returns. The large and robust political premium, and the cross-sectional dispersion in the P-factor loadings, motivate us to develop the P-CAPM incorporating this factor.

## Table 3 – Cross-sectional estimation of risk premium on the P-factor

This table reports the risk premium on each factor estimated through a second-step cross-sectional regression using the time-series OLS estimates of the factor loadings ($\lambda_k$ from eqn. 2), on the sample of monthly observations for the global (Subtable I), developed (Subtable II), and emerging (Subtable III) markets, with and without the corresponding P-factor PG, PD or PE. $R^2$ is adjusted for the number of regressors. Standard errors are Shanken adjusted. MAPE is the annualized cross-sectional mean absolute pricing error and RMSE is the annualized cross-sectional root mean square error. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$. The sample spans 1992–2016.

### Subtable I. Global

| | World CAPM | | Fama-French three-factor | | | | Carhart | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | MKT | PG | MKT | SMB | HML | PG | MKT | SMB | HML | WML | PG |
| Premium | 0.074* | | 0.067* | 0.011 | -0.014 | | 0.068* | 0.013 | -0.021 | 0.060 | |
| | (0.028) | | (0.040) | (0.655) | (0.607) | | (0.038) | (0.602) | (0.409) | (0.121) | |
| $R^2$ | 0.284 | | 0.319 | | | | 0.351 | | | | |
| MAPE | 0.026 | | 0.025 | | | | 0.024 | | | | |
| RMSE | 0.010 | | 0.009 | | | | 0.009 | | | | |
| Premium | 0.062* | 0.084* | 0.064* | -0.007 | -0.002 | 0.085* | 0.065* | -0.007 | -0.010 | 0.061 | 0.083* |
| | (0.059) | (0.068) | (0.049) | (0.762) | (0.950) | (0.066) | (0.046) | (0.783) | (0.679) | (0.115) | (0.073) |
| $R^2$ | 0.519 | | 0.525 | | | | 0.585 | | | | |
| MAPE | 0.022 | | 0.021 | | | | 0.020 | | | | |
| RMSE | 0.008 | | 0.008 | | | | 0.007 | | | | |

| | Fama-French five-factor | | | | | | ICAPM | | | | | ICAPM Redux | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | MKT | SMB | HML | CMA | RMW | PG | MKT | EUR | GBP | JPY | PG | MKTLC | Dollar | Carry | PG |
| Premium | 0.065* | -0.002 | -0.014 | -0.027 | 0.024 | | 0.078* | -0.013 | -0.012 | -0.006 | | 0.069* | 0.009 | 0.049 | |
| | (0.046) | (0.944) | (0.597) | (0.319) | (0.276) | | (0.023) | (0.687) | (0.704) | (0.855) | | (0.033) | (0.636) | (0.188) | |
| $R^2$ | 0.411 | | | | | | 0.347 | | | | | 0.319 | | | |
| MAPE | 0.024 | | | | | | 0.026 | | | | | 0.026 | | | |
| RMSE | 0.009 | | | | | | 0.009 | | | | | 0.009 | | | |
| Premium | 0.066* | -0.017 | -0.002 | -0.002 | 0.022 | 0.082* | 0.063* | 0.002 | -0.002 | -0.004 | 0.084* | 0.060* | 0.009 | 0.015 | 0.085* |
| | (0.042) | (0.467) | (0.945) | (0.939) | (0.327) | (0.070) | (0.051) | (0.960) | (0.938) | (0.918) | (0.066) | (0.055) | (0.642) | (0.651) | (0.061) |
| $R^2$ | 0.567 | | | | | | 0.520 | | | | | 0.519 | | | |
| MAPE | 0.021 | | | | | | 0.022 | | | | | 0.022 | | | |
| RMSE | 0.007 | | | | | | 0.008 | | | | | 0.008 | | | |

## Table 3 – (continued)

Subtable II. Developed

| | World CAPM | | Fama-French three-factor | | | | Carhart | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | PD | MKT | SMB | HML | PD | MKT | SMB | HML | WML | PD |
| Premium | 0.061* | | 0.065* | -0.019 | -0.018 | | 0.065* | -0.020 | -0.016 | 0.077* | |
| | (0.066) | | (0.046) | (0.325) | (0.494) | | (0.048) | (0.292) | (0.530) | (0.014) | |
| $R^2$ | -0.038 | | 0.104 | | | | 0.184 | | | | |
| MAPE | 0.023 | | 0.022 | | | | 0.021 | | | | |
| RMSE | 0.009 | | 0.008 | | | | 0.007 | | | | |
| Premium | 0.064* | -0.116* | 0.064* | -0.009 | -0.011 | -0.112* | 0.064* | -0.010 | -0.009 | 0.076* | -0.111* |
| | (0.053) | (0.008) | (0.050) | (0.650) | (0.676) | (0.008) | (0.052) | (0.606) | (0.706) | (0.015) | (0.009) |
| $R^2$ | 0.375 | | 0.373 | | | | 0.441 | | | | |
| MAPE | 0.019 | | 0.019 | | | | 0.018 | | | | |
| RMSE | 0.006 | | 0.006 | | | | 0.006 | | | | |

| | Fama-French five-factor | | | | | | ICAPM | | | | | ICAPM Redux | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | SMB | HML | CMA | RMW | PD | MKT | EUR | GBP | JPY | PD | MKTLC | Dollar | Carry | PD |
| Premium | 0.066* | -0.018 | -0.019 | 0.006 | 0.028 | | 0.071* | -0.022 | -0.029 | -0.005 | | 0.076* | -0.011 | 0.048* | |
| | (0.046) | (0.355) | (0.472) | (0.780) | (0.129) | | (0.029) | (0.423) | (0.240) | (0.859) | | (0.018) | (0.647) | (0.060) | |
| $R^2$ | 0.261 | | | | | | 0.213 | | | | | 0.144 | | | |
| MAPE | 0.021 | | | | | | 0.019 | | | | | 0.019 | | | |
| RMSE | 0.007 | | | | | | 0.007 | | | | | 0.007 | | | |
| Premium | 0.065* | -0.012 | -0.009 | 0.006 | 0.015 | -0.105* | 0.072* | -0.015 | -0.025 | -0.006 | -0.110* | 0.072* | -0.002 | 0.049* | -0.112* |
| | (0.048) | (0.529) | (0.727) | (0.785) | (0.369) | (0.011) | (0.029) | (0.592) | (0.321) | (0.837) | (0.010) | (0.024) | (0.944) | (0.056) | (0.009) |
| $R^2$ | 0.338 | | | | | | 0.532 | | | | | 0.506 | | | |
| MAPE | 0.021 | | | | | | 0.016 | | | | | 0.015 | | | |
| RMSE | 0.006 | | | | | | 0.005 | | | | | 0.006 | | | |

**Table 3 – (continued)**

Subtable III. Emerging

| | World CAPM | | Fama-French three-factor | | | | Carhart | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | PE | MKT | SMB | HML | PE | MKT | SMB | HML | WML | PE |
| Premium | 0.085* | | 0.078* | 0.005 | 0.024 | | 0.082* | 0.005 | 0.012 | 0.051 | |
| | (0.029) | | (0.053) | (0.843) | (0.399) | | (0.044) | (0.854) | (0.679) | (0.191) | |
| $R^2$ | 0.467 | | 0.497 | | | | 0.509 | | | | |
| MAPE | 0.027 | | 0.025 | | | | 0.024 | | | | |
| RMSE | 0.009 | | 0.009 | | | | 0.008 | | | | |
| Premium | 0.079* | 0.150* | 0.063 | 0.018 | 0.028 | 0.150* | 0.066* | 0.019 | 0.014 | 0.039 | 0.146* |
| | (0.041) | (0.049) | (0.103) | (0.496) | (0.333) | (0.049) | (0.088) | (0.468) | (0.607) | (0.301) | (0.055) |
| $R^2$ | 0.686 | | 0.790 | | | | 0.778 | | | | |
| MAPE | 0.021 | | 0.016 | | | | 0.018 | | | | |
| RMSE | 0.007 | | 0.005 | | | | 0.006 | | | | |

| | Fama-French five-factor | | | | | | ICAPM | | | | | ICAPM Redux | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | SMB | HML | CMA | RMW | PE | MKT | EUR | GBP | JPY | PE | MKTLC | Dollar | Carry | PE |
| Premium | 0.068* | 0.003 | 0.029 | -0.008 | 0.009 | | 0.086* | 0.010 | 0.027 | -0.013 | | 0.053 | 0.035* | 0.097* | |
| | (0.075) | (0.912) | (0.299) | (0.743) | (0.757) | | (0.030) | (0.768) | (0.416) | (0.722) | | (0.143) | (0.091) | (0.029) | |
| $R^2$ | 0.517 | | | | | | 0.495 | | | | | 0.524 | | | |
| MAPE | 0.025 | | | | | | 0.026 | | | | | 0.022 | | | |
| RMSE | 0.008 | | | | | | 0.008 | | | | | 0.008 | | | |
| Premium | 0.061 | 0.008 | 0.030 | 0.006 | 0.026 | 0.153* | 0.079* | 0.017 | 0.022 | 0.004 | 0.151* | 0.039 | 0.039* | 0.074* | 0.134* |
| | (0.111) | (0.739) | (0.296) | (0.810) | (0.353) | (0.043) | (0.044) | (0.617) | (0.504) | (0.907) | (0.046) | (0.278) | (0.066) | (0.064) | (0.071) |
| $R^2$ | 0.811 | | | | | | 0.706 | | | | | 0.748 | | | |
| MAPE | 0.016 | | | | | | 0.020 | | | | | 0.018 | | | |
| RMSE | 0.005 | | | | | | 0.006 | | | | | 0.006 | | | |

# 3  P-factor validation

Before we proceed to develop and test a model incorporating the P-factor, we validate that the new factor mimics the political variables using beta-sorted portfolios. We also show that the new factor is highly correlated with, and explains through OLS regressions, alternative bivariate factors that we construct using combinations of other political variables from Table 1, and compare it with a univariate factor we construct based on the ICRG index. Most importantly, we show that the new factor is not spanned by the benchmark ones.

## 3.1  Beta-sorted portfolios

We show first that the sorting of countries by politics-policy variables measures the country's exposure to the P-factor, by building portfolios sorted by each country's sensitivity to it. Following Lustig et al. (2011) we regress the $i$th country excess return on a constant and the P-factor. The slope, $\beta_{\text{P-factor},i}$, gives us the $i$th country exposure to the P-factor. We sort countries by their betas, and build portfolio $H_\beta$ as an equally weighted portfolio of countries in the top quintile, portfolio $L_\beta$ in the bottom quintile, and portfolio $M_\beta$ of all remaining countries in the middle. This process is repeated for PG, PD, and PE.

A low (high) rating for politics and policy indicates worse (better) political conditions, and a large (small) P-factor beta signals a large (small) exposure to political risks. Therefore, small-beta countries should exhibit high politics and policy ratings, and the converse for large-beta countries, and this is what we find (online Appendix Table C.1). The difference between the average ratings of $L_\beta$ and $H_\beta$ beta-sorted portfolios on PG is positive and large —2.78 for politics and 31.67 for policy— (p-value 0), and the political variable values increase monotonically from the most risky ($H_\beta$) to the least risky ($L_\beta$) portfolio. For PD beta-sorts the difference between the average ratings of $L_\beta$-$H_\beta$ is 2.12 for politics and 39.38 for policy, for PE beta-sorts the difference is 0.16 for politics and 14.79 for policy (p-values 0 to 0.05). Therefore, sorts based on the politics-policy variables and beta-sorts are clearly related, so that the political variables convey information about the political risks in their respective markets.

For PG and PE beta-sorts we observe a monotonic decrease of excess returns from the most risky ($H_\beta$) to the least risky ($L_\beta$) portfolio, with a statistically and economically significant annualized difference of 7.1% (PG) and 11.7% (PE). This is consistent with a risk factor. For PD beta-sorts we also observe a monotonic pattern of excess returns with a statistically and economically significant difference

20

of -5.8%. The counterintuitive (negative) sign for developed markets is consistent with the political risk sign paradox, and in section 4.4 we carry out additional tests to provide an explanation.

## 3.2 Spanning regressions

As a first assessment whether the P-factor may qualify as a new factor we look at its correlation with the benchmarks (Table 2). The correlations with PG are low, with coefficient absolute values in the range 0.04–0.19 and mean 0.11, compared to the correlations among all benchmark factors with maximum correlation coefficients in the range 0.16-0.85.[19] The correlations of PD and PE with the benchmark factors are very low in the absolute value range 0.01–0.17.

Using principal component analysis (online Appendix Table C.2) we find that eleven factors explain 99% of the variability of the twelve benchmark factors and the P-factor in each market segment, so it does not seem possible to reduce significantly the number of factors without loss of information. The market portfolio has loadings in all principal components, in the absolute value range 0.03–0.73, with an average of 0.20, and the remaining factors (except the P-factors) are loaded in all factors with average loadings 0.18–0.22. PG loadings are in the absolute value range 0.01–0.75 in twelve principal components, with an average of 0.18, PD loadings are in the absolute value range 0.01–0.86 in twelve principal components, with an average of 0.15, and PE loadings in the absolute value range 0.01–0.91 in twelve principal components, with an average of 0.16. These results support the view that the P-factor carries information that may improve the explanatory power of existing asset pricing models.

However, the P-factor would be superfluous if it were spanned. We regress PG, PD, and PE on the factors of each benchmark model in the respective markets. A zero intercept with a high adjusted $R^2$ would imply that the P-factor is spanned by the benchmark (Fama and French, 2017; Hou et al., 2018; Fama and French, 2018). Table 4 displays the spanning regression results, exhibiting very low adjusted $R^2$ up to 0.06 in all market segments, with intercepts in the strongly positive interval 0.06–0.19, statistically significant at conventional levels. The average intercepts (0.08, -0.10, and 0.16, respectively) match the factor means to two decimal points. Therefore, the P-factor is not spanned by the benchmarks.

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[19]We exclude the almost perfect correlation of the world market factors MKT and MKTLC.

**Table 4 – Spanning regression test for P-factor**

This table reports the intercept $\alpha$ and the $R^2$ adjusted for the number of regressors, of OLS regressions of the global (Panel A), developed (Panel B), and emerging (Panel C) market factors, on the factors of the benchmars. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$. The sample spans 1992–2016.

| | (a) PG | | (b) PD | | (c) PE | |
|---|---|---|---|---|---|---|
| | $\alpha$ | $R^2$ | $\alpha$ | $R^2$ | $\alpha$ | $R^2$ |
| World CAPM | 0.076* | 0.014 | -0.101* | -0.003 | 0.141* | 0.011 |
| | (0.073) | | (0.004) | | (0.031) | |
| FF3 | 0.078* | 0.039 | -0.119* | 0.013 | 0.167* | 0.022 |
| | (0.064) | | (0.001) | | (0.013) | |
| Carhart | 0.089* | 0.042 | -0.119* | 0.009 | 0.177* | 0.020 |
| | (0.037) | | (0.001) | | (0.007) | |
| FF5 | 0.097* | 0.048 | -0.095* | 0.018 | 0.191* | 0.020 |
| | (0.026) | | (0.014) | | (0.007) | |
| ICAPM | 0.066 | 0.055 | -0.102* | -0.006 | 0.137* | 0.007 |
| | (0.117) | | (0.003) | | (0.039) | |
| ICAPM Redux | 0.062 | 0.037 | -0.102* | -0.008 | 0.157* | 0.016 |
| | (0.163) | | (0.004) | | (0.022) | |
| Factor mean | 0.085* | | -0.099* | | 0.156* | |
| | (0.047) | | (0.004) | | (0.028) | |

## 3.3 Alternative factors

To test that the P-factor is robust to the choice of politics and policy variables, we construct alternative global and local factors as the returns of L-H unconditional portfolio sorts of countries by their ratings in pairs of the variables from Table 1. We also construct univariate political factors for all, developed, and emerging markets, as the returns of L-H sorted by the ICRG index, denoted by IPG, IPD, and IPE, respectively. We estimate the correlations and run OLS regressions of these factors on the corresponding P-factors, and present the results in Table 5.

The correlations of the alternative factors from Table 1 with PG are high, ranging from 0.66 to 0.83, the regression slopes are statistically significant (p-values 0) and the intercepts are not, and the $R^2$ are high in the range 0.43–0.70. Likewise, the correlation coefficients with PD are in the range 0.57–0.75, with significant regression slopes and zero intercepts, and $R^2$ in the range 0.32–0.56. For PE, we obtain significant slopes with correlations of 0.37-0.72 and $R^2$ in the range 0.14–0.52.[20] Therefore, the P-factor is highly correlated with, and explains, alternative

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[20]The sole factor that does not correlate highly with the P-factors is the one combining WES political

bivariate factors constructed using other possible pairs of politics-policy variables. Whereas Lehkonen and Heimonen (2015) find that the effects of politics on stock market returns depend on the measures they use (in their case, the functioning of democracy), our results suggest that the P-factor is robust. We note, however, that in emerging markets the intercepts are significant and $R^2$ are low —from 0.14 to 0.34— for factors based on administrative restrictions, regulatory quality or corruption, suggesting these political variables as potentially additional important determinants of cross-sectional stock returns in emerging markets.

The factor means of the univariate indices are 5.24% for IPG, -4.61% for IPD, and 10.98% for IPE, per annum. These are much smaller in absolute value than the factor means of PG (8.54% p.a), PD (-9.92% p.a) and PE (15.60% p.a) and the ICRG factor does not exploit the cross-sectional variation in asset returns as well as the P-factor. This supports our argument for a bivariate factor. The corresponding ICRG factors have medium correlations with PG and PD (0.55 and 0.48, respectively), but a relatively low 0.33 with PE. Regressions on the corresponding P-factor have zero or extremely small intercept and non zero slope, but the $R^2$ is a low 0.30 with PG, 0.23 with PD, and 0.11 with PE. Hence, the P-factor does not clearly explain the ICRG factor and we further compare the two in an asset pricing model in section 5.4.

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stability with EPU. The regression of this alternative global factor on PG has significant slope 0.58 (p-value 0.008), and zero intercept (p-value 0.980), but the correlation is rather low at 0.34, and the local factors have a correlation of 0.11 with PD and 0.29 with PE, with significant slopes 0.091 for PD and 0.223 for PE, and $R^2$ of 0.01 and 0.08. We attribute this to small sample size, since EPU is available for fewer countries than the other variables we consider and this alternative factor is constructed using only 20 out of the 42 countries for the global case, 13 for developed and 7 for emerging markets.

## Table 5 – Regression of alternative political factors on the P-factor

This table reports the correlation ($\rho$), the OLS regression coefficients (intercept $\alpha$, slope $\beta$), and $R^2$ of alternative global and local political risk factors on the corresponding P-factors. Alternative factors are constructed as the returns of L-H portfolios based on unconditional sorts of countries by their ratings in pairs of variables from Table 1, and on univariate sorts by the ICRG political risk index. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$. The sample spans 1992–2016. Standard errors are Newey-West.

| | (a) Global | | | | (b) Developed | | | | (c) Emerging | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $\rho$ | $\alpha$ | $\beta$ | $R^2$ | $\rho$ | $\alpha$ | $\beta$ | $R^2$ | $\rho$ | $\alpha$ | $\beta$ | $R^2$ |
| Policy-Stability WB | 0.773 | 0.003 | 1.127* | 0.597 | 0.627 | -0.001 | 0.708* | 0.393 | 0.723 | 0.015* | 0.852* | 0.522 |
| | | (0.150) | (0.000) | | | (0.706) | (0.000) | | | (0.002) | (0.000) | |
| Policy-Admin. restrictions | 0.657 | 0.003 | 0.743* | 0.432 | 0.568 | 0.001 | 0.609* | 0.323 | 0.584 | 0.011* | 0.557* | 0.341 |
| | | (0.335) | (0.000) | | | (0.756) | (0.000) | | | (0.010) | (0.000) | |
| Policy-Corruption | 0.834 | 0.000 | 1.045* | 0.695 | 0.655 | -0.001 | 0.690* | 0.429 | 0.380 | 0.010* | 0.375* | 0.144 |
| | | (0.913) | (0.000) | | | (0.673) | (0.000) | | | (0.016) | (0.036) | |
| Policy-Govt. effectiveness | 0.776 | 0.001 | 1.033* | 0.602 | 0.697 | 0.002 | 0.700* | 0.485 | 0.506 | 0.004 | 0.504* | 0.256 |
| | | (0.744) | (0.000) | | | (0.383) | (0.000) | | | (0.272) | (0.000) | |
| Policy-Reg. quality | 0.780 | -0.001 | 0.960* | 0.609 | 0.610 | -0.002 | 0.702* | 0.372 | 0.370 | 0.009* | 0.355* | 0.137 |
| | | (0.665) | (0.000) | | | (0.510) | (0.000) | | | (0.031) | (0.022) | |
| Policy-Rule of law | 0.748 | 0.001 | 1.140* | 0.560 | 0.685 | -0.001 | 0.818* | 0.469 | 0.462 | 0.008 | 0.550* | 0.214 |
| | | (0.770) | (0.000) | | | (0.720) | (0.000) | | | (0.143) | (0.000) | |
| Policy-Voice and account. | 0.750 | 0.002 | 1.040* | 0.563 | 0.749 | -0.001 | 0.724* | 0.562 | 0.661 | 0.004 | 0.844* | 0.437 |
| | | (0.514) | (0.000) | | | (0.478) | (0.000) | | | (0.398) | (0.000) | |
| ICRG political risk | 0.552 | 0.001 | 0.458* | 0.304 | 0.484 | -0.001 | 0.299* | 0.234 | 0.327 | 0.006* | 0.210* | 0.107 |
| | | (0.605) | (0.000) | | | (0.439) | (0.000) | | | (0.056) | (0.000) | |

# 4  Model testing

The political capital asset pricing model we develop —see Appendix A for the derivation— assumes both local and non-diversifiable global shocks. Country-specific and common global political shocks are the novelty of the model. Global market shocks are supported by an extensive finance literature.[21] Global political shocks follow from the political science literature, starting with neofunctionalism (Haas, 1964) that identifies "functional spillovers" due to the interconnection of various economic sectors, and "political spillovers" stemming from supranational governance models. Recent literature documents empirically and explains theoretically the diffusion of politics and policy shocks, e.g. Simmons et al. (2007), and Colombo (2013); Delis et al. (2018); Böhlmelt et al. (2016) establish that national borders do not prevent political instability spillovers.[22] Houle et al. (2016) show that economic and international political shocks explain spatially and temporally clustered regime transitions on a sample of 125 countries from 1875 to 2004. Complementary theories explain the drivers of global change (Simmons and Elkins, 2004), including social constructions by communities of experts and international organizations, coercion by powerful nation states and supranational institutions, competition that reduces costs and lowers constraints, and learning from peers. This strand of literature challenges the closed polity view of states, and posits that transnational factors and linkages between states strongly influence risks.

Allowing for global political shocks, alongside local shocks, we obtain a model where political stability and economic policy risks can not be diversified away. We depart from Fama and French (1993); Carhart (1997); Fama and French (2012, 2017) who posit, based on empirical observations, that size and value (Fama-French three-factor) augmented by momentum (Carhart), or by operating profitability and investment (Fama-French five-factor) are priced factors. We follow recent works that incorporate macro variables in asset pricing, such as labor market tightness (Kuehn et al., 2017) and liquidity (Liu, 2006), and develop a model of the optimal behavior of firms and consumers in a multi-country economy, subject to politics and policy shocks, as well as the usual country-specific and global productivity shocks. Building on Berk et al. (1999); Backus et al. (2001); Yogo (2006) for the form of the stochastic discount factors, Bekaert (1996); Bansal (1997) for the relationship

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[21]See, for instance, (Lustig et al., 2011, footnote 14) for references attributing exchange rate shocks to systematic risk exposures.

[22]Political spillover studies include, among others, the diffusion of democratization (Brinks and Coppedge, 2006), financial liberalization (Simmons and Elkins, 2004), and electoral revolutions (Bamert et al., 2015).

to exchange rates, and Martin (2013) for the dynamics of price-dividend ratios, we identify common factors that capture the non-diversifiable shocks and obtain a reduced form model amenable to empirical testing. The three factor P-CAPM (cf. appendix eqn. 34) we put to the data is given by:

$$r_{i,t} - r_t^f = \alpha_i + \beta_{Mi}\text{MKT}_t + \beta_{Di}\text{Dollar}_t + \beta_{Pi}\text{P-factor}_t + \epsilon_{i,t}. \tag{3}$$

We estimate the factor loadings $\beta_{Mi}, \beta_{Di}, \beta_{Pi}$ using the market portfolio (MKT), the Dollar factor, and the P-factor. Since the efficient frontier implied when adding PD and PE envelops the frontier implied by adding only PG, it follows that the global factor does not span the local ones. However, unlike Fama and French (2017), we test the global factor as well, since it explains well the global markets and works out-of-sample.[23] Hence, we estimate a global model using PG as the P-factor, and local models using PD and PE for developed and emerging markets. We use MSCI AC World as the MKT for the global and emerging markets model, MSCI World for the developed markets model, and the corresponding Dollar factor for each model. We run time-series regressions at the portfolio and country levels, and assess the model's ability to explain the cross-sectional variation of portfolio and country returns. Finally, we gauge its predictive power.

## 4.1 Time-series estimations

### 4.1.1 Portfolio level

We first test the model on portfolios created using bivariate unconditional sorts on the political variables. We run time-series regressions on the H (top quantile), L (bottom quantile), and M (all remaining countries in the middle) of portfolio sorts, using the same quantiles as in the factor construction. As the top quantile portfolios have the highest politics and policy ratings, the P-factor loadings should *increase* monotonically from H to L, and this is what Table 6 confirms. The loadings increase monotonically from -0.08 (H) to 0.92 (L) for PG, from -0.30 (H) to 0.70 (L) for PD, and from -0.27 (H) to 0.73 (L) for PE. $R^2$ of the corner portfolios is in the high range 0.85–0.93 for the global, 0.79–0.84 for the developed, and 0.60–0.79 for the emerging markets model. By contrast, the loadings of H and L on both the MKT and Dollar factors are identical to three decimal points, and the

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[23]In spanning regressions of PD on the factors of the global P-CAPM we find non zero intercept and very low $R^2$ (0.08). However, in spanning regressions of PE the intercept is but $R^2$ is relatively low (0.35), and regressing PG on PE we find non significant intercept and the same $R^2$, so that PG and PE are correlated.

constants $\alpha$ (not reported) are not significant. Therefore, a large proportion of the inter-temporal return variability of portfolio sorts on the political variables are explained *exclusively* by the P-factor. The Dollar explains none of the cross-sectional variability in developed and emerging markets, extending the finding by (Lustig et al., 2011, p. 3748) for currency returns in developed and all markets, to equity returns in developed, emerging, and the global markets.

27

## Table 6 – P-CAPM factor loadings of political-sorted portfolios

This table reports results with time-series regressions on the global (Panel A), developed (Panel B), and emerging (Panel C) market portfolios created using bivariate sorts on the political variables. H denotes the top quantile, L the bottom quantile, and M all remaining countries in the middle, using the same quantiles as in the P-factor construction. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$. The sample spans 1992–2016. Standard errors are Newey-West.

| | (a) Global | | | | (b) Developed | | | | (c) Emerging | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | Dollar | PG | $R^2$ | MKT | Dollar | PD | $R^2$ | MKT | Dollar | PE | $R^2$ |
| H | 1.012* | 0.533* | -0.079* | 0.846 | 1.006* | 0.457* | -0.297* | 0.786 | 0.929* | 1.055* | -0.267* | 0.602 |
| | (0.000) | (0.000) | (0.011) | | (0.000) | (0.000) | (0.000) | | (0.000) | (0.000) | (0.000) | |
| M | 0.960* | 0.627* | 0.106* | 0.773 | 1.031* | 0.288* | 0.015 | 0.857 | 0.860* | 1.144* | -0.073 | 0.491 |
| | (0.000) | (0.000) | (0.006) | | (0.000) | (0.000) | (0.513) | | (0.000) | (0.000) | (0.102) | |
| L | 1.012* | 0.533* | 0.921* | 0.925 | 1.006* | 0.457* | 0.703* | 0.843 | 0.929* | 1.055* | 0.733* | 0.788 |
| | (0.000) | (0.003) | (0.000) | | (0.000) | (0.000) | (0.000) | | (0.000) | (0.000) | (0.000) | |

### 4.1.2 Country level

Although tests on portfolio sorts are standard in the finance literature (Fama and French, 2017, 1993; Lustig et al., 2011; Liu, 2006; Kuehn et al., 2017), they may be subject to data-snooping bias (Lo and MacKinlay, 1990; Lustig et al., 2011). To complete the analysis we use country indices to test the null hypothesis that pricing error intercepts $\alpha_i$ are jointly zero for all assets $i$. Using the GRS test (Gibbons et al., 1989) in estimating the model (cf. eqn.3) we obtain a statistic of 1.134 (p-value 0.275) for global, 0.743 (p-value 0.793) for developed, and 0.376 (p-value 0.994) for emerging markets. The null can not be rejected for any model.

We also compare the model with the benchmarks using GRS tests on a 10-year rolling window, so that we approximately split our sample in two, using ten years of monthly data to estimate the GRS statistic and repeating this experiment in monthly steps over fifteen years. In Table 7 we report the percentage of rolling window tests rejecting the null for each model. Overall, P-CAPM has zero rejections at the 0.01 level and is ahead or in a tie with the benchmarks.

**Table 7 – Horse race: Percentage of rolling GRS tests rejecting the null**

This table reports results of GRS tests of the null hypothesis that all pricing errors are jointly zero for the global, developed, and emerging markets. On display are the percentage of windows where the null is rejected at the 0.01 level. Tests are run on a 10-year monthly rolling window from 1992–2016.

|             | Global  | Developed | Emerging |
|-------------|---------|-----------|----------|
| World CAPM  | 7.82%   | 0.00%     | 6.70%    |
| FF3         | 30.17%  | 3.35%     | 11.73%   |
| Carhart     | 20.67%  | 1.12%     | 8.94%    |
| FF5         | 18.44%  | 0.00%     | 15.64%   |
| ICAPM       | 5.59%   | 0.00%     | 7.82%    |
| ICAPM Redux | 0.00%   | 1.68%     | 0.00%    |
| P-CAPM      | 0.00%   | 0.00%     | 0.00%    |

## 4.2 Cross-sectional asset pricing

We now estimate risk premia using OLS cross-sectional regression of average excess returns on the factor loadings and report the results in Table 8. The world equity market factor is priced with a statistically significant annual risk premium of 0.06. This is in agreement with the regnant literature that international investors are compensated for their exposure to risks correlated with returns on the world equity

29

## Table 8 – Risk premia on the P-CAPM factors

This table reports the premia $\lambda_k$ (cf. eqn. 2) estimated using cross-sectional OLS regressions on the factors of the global (Panel A), the developed markets (Panel B), and the emerging markets (Panel C) P-CAPM, using monthly observations. $R^2$ is adjusted for the number of regressors. Standard errors are Shanken corrected. MAPE is the annualized cross-sectional mean absolute pricing error and RMSE is the annualized cross-sectional root mean square error. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$. The sample spans 1992–2016.

|  | (a) Global | | | (b) Developed | | | (c) Emerging | | |
|---|---|---|---|---|---|---|---|---|---|
|  | MKT | Dollar | PG | MKT | Dollar | PD | MKT | Dollar | PE |
| Risk premium | 0.062* | 0.009 | 0.084* | 0.070* | 0.000 | -0.112* | 0.061 | 0.037* | 0.153* |
|  | (0.052) | (0.644) | (0.067) | (0.034) | (0.985) | (0.008) | (0.112) | (0.083) | (0.047) |
| $R^2$ | 0.520 | | | 0.425 | | | 0.770 | | |
| MAPE | 0.022 | | | 0.018 | | | 0.016 | | |
| RMSE | 0.008 | | | 0.006 | | | 0.006 | | |
| Factor mean | 0.057* | 0.010 | 0.085* | 0.059* | 0.008 | -0.099* | 0.057* | 0.023 | 0.156* |
|  | (0.090) | (0.462) | (0.047) | (0.079) | (0.679) | (0.004) | (0.090) | (0.106) | (0.028) |

market. The annual risk premium is 0.08 on PG, -0.11 on PD, and a large 0.15 on PE, all statistically significant at conventional levels. The adjusted $R^2$ for the global model is a high 0.52, which compares favorably with the best benchmark at 0.41, and the adjusted $R^2$ for developed and emerging markets (0.42 and 0.77) compare favorably with the best benchmark adjusted $R^2$ of 0.26 for developed and 0.52 for emerging markets (see Table 3). Consistently, the P-CAPM has smaller MAPE and RMSE values than the benchmarks.

We find no statistical evidence for a Dollar premium.[24] This is consistent with our results from Table 6. We show later (section 5.1) that Dollar is useful in explaining the level of stock market returns, in agreement with the finding by (Lustig et al., 2011, p. 3748) for currency returns.

Overall, P-CAPM explains well the cross-sectional returns in the corresponding market segments, and has better explanatory power than the benchmarks at the country level.

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[24]In emerging markets, Dollar is significant at conventional levels but this is not corroborated when using Fama-MacBeth regressions to check for robustness, see online appendix Table D.2 (Panel C).

## 4.3   Realized vs predicted returns

We now assess the P-CAPM predictive power. In Figure 3 we give a pictorial representation of the performance of the global model in the cross section (the picture is very similar for the local models). The horizontal axis depicts the monthly excess returns predicted by each model using conditional betas. Predicted excess returns for each country are computed by estimating the model betas using a 60-month rolling window and multiplying the conditional betas by the corresponding factor means over the same time window. The vertical axis depicts monthly average realized excess returns on the assets over the window, and is common to all plots.

We draw the least square error line fitted to the data, and the 45° line through the origin on which all points should lie for perfect prediction. We report in Table 9 the intercepts, slopes, and $R^2$ for the fitted lines for all models. The fitted line for the global P-CAPM has an almost perfect slope of 0.99, with Carhart a distant second (slope 0.76), and the $R^2$ is higher than the benchmarks by 10%–28%. The developed markets model yields a fitted line with slope 1.02, with ICAPM a close second (slope 0.92), and higher $R^2$ by a 14%–31%. For emerging markets, the slope is 0.91, with Carhart a distant second (slope 0.74), and higher $R^2$ by 4%–25%. The intercepts are quite small in all market segments.

Overall, P-CAPM has very good predictive power in all market segments in the three criteria (slope, intercept, and $R^2$).

### Table 9 – Realized vs predicted excess returns

In this table we report the intercepts ($\alpha$), slopes ($\beta$), and $R^2$ for the least square error line fitted to the data of realized vs predicted monthly returns for the global (Panel A), developed (Panel B), and emerging (Panel C) markets models. The data for the global model are illustrated in Figure 3. Perfect predictions lie on a zero-intercept line with slope 1. Constants are scaled, multiplying the original coefficient by $10^3$. The sample spans 1992–2016.

|  | (a) Global | | | (b) Developed | | | (c) Emerging | | |
|---|---|---|---|---|---|---|---|---|---|
|  | $\alpha$ | $\beta$ | $R^2$ | $\alpha$ | $\beta$ | $R^2$ | $\alpha$ | $\beta$ | $R^2$ |
| World CAPM | 4.44 | 0.53 | 0.10 | 2.19 | 0.72 | 0.27 | 6.60 | 0.35 | 0.03 |
| FF3 | 3.40 | 0.62 | 0.16 | 1.72 | 0.71 | 0.29 | 5.12 | 0.53 | 0.10 |
| Carhart | 2.62 | 0.76 | 0.28 | 0.77 | 0.81 | 0.39 | 4.32 | 0.74 | 0.24 |
| FF5 | 3.46 | 0.58 | 0.18 | 0.84 | 0.81 | 0.44 | 5.63 | 0.41 | 0.09 |
| ICAPM | 4.21 | 0.64 | 0.15 | 1.46 | 0.92 | 0.44 | 6.47 | 0.41 | 0.05 |
| ICAPM Redux | 3.11 | 0.60 | 0.18 | 1.38 | 0.87 | 0.38 | 4.25 | 0.52 | 0.13 |
| P-CAPM | 1.60 | 0.99 | 0.38 | 0.98 | 1.02 | 0.58 | 2.12 | 0.91 | 0.28 |

31

## Figure 3 – Realized versus predicted excess returns

This figure plots average realized monthly excess returns against those predicted by the models estimated conditionally. Predicted excess returns for each country are computed by estimating betas using a 60-month rolling window and multiplying the estimated conditional betas by the corresponding factor means over the time window. Realized returns are the monthly average excess returns on the assets over the window, and are common to all plots. The red line is the best linear fit, whereas the green line is the 45° line through the origin, on which all points should lie for perfect prediction. The sample spans 1992–2016, for the global markets.

**(a)** World CAPM

**(b)** FF3

**(c)** Carhart



**(d)** FF5

**(e)** ICAPM

**(f)** ICAPM Redux



**(g)** P-CAPM



32
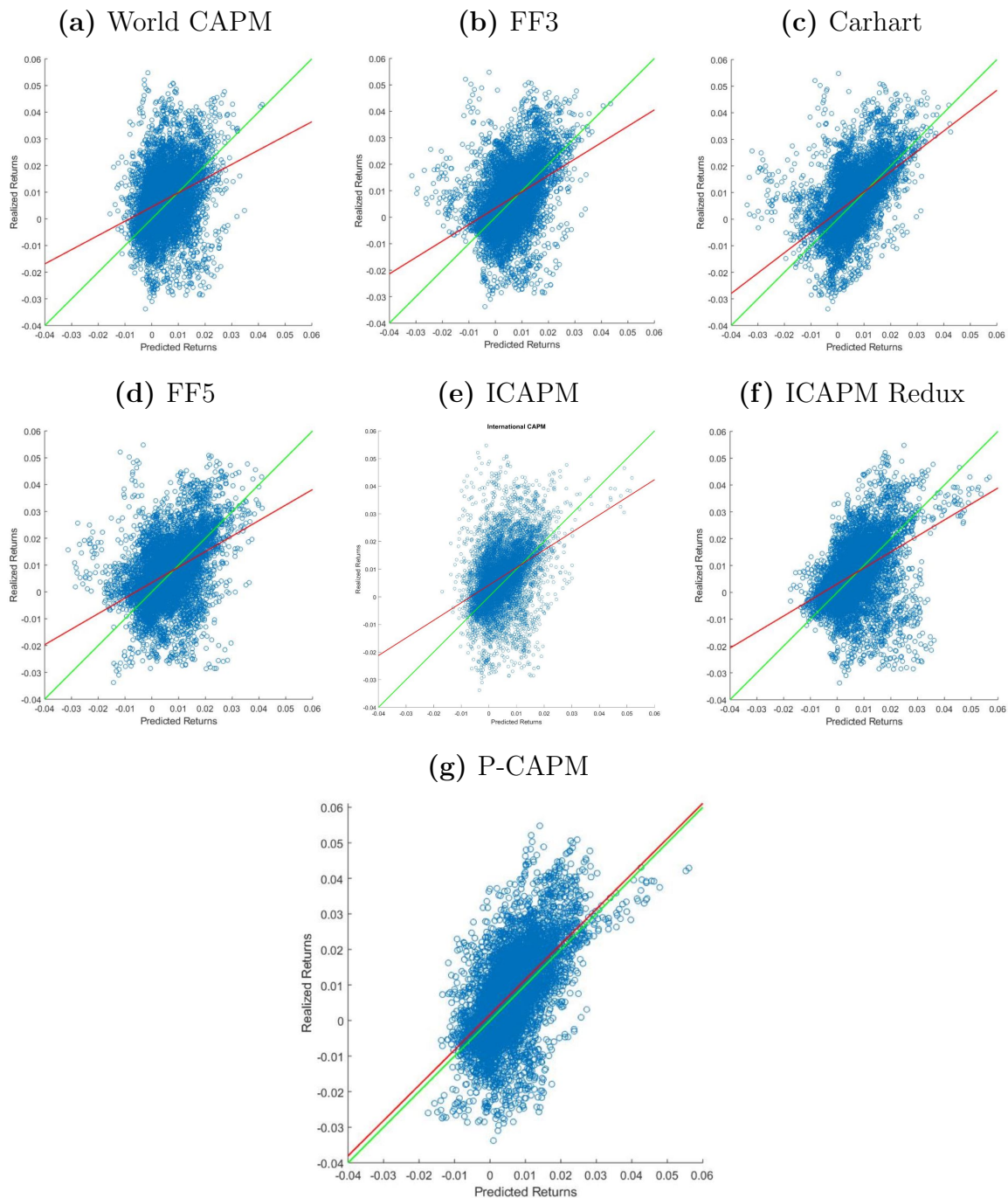
## 4.4 Political risk sign paradox

We investigate the short- and long-run impact of the politics and policy variables on returns, and provide an explanation for the negative premium for developed markets. We run lead-lag panel regressions of stock market returns on the policy and politics variables, with returns computed at different time horizons before or after the WES release dates. Figure 4 shows the regression slopes for returns up to $\pm 60$ months from the release date for policy confidence (Panel A) and political stability (Panel B), for both developed (blue markers) and emerging (orange markers) countries. The value of the regression slopes is clearly decreasing, with a sign reversal some time after the reference date. The betas are positive with leading political variables, so that highly rated politics and policies are associated with positive past (realized) returns —and the converse for low rated politics and policies— but the situation is reversed with lagged variables regressed on future (expected) returns. The sign reversal is consistent with the observation of (Brogaard and Detzel, 2015, p.17) for the US stock market, that economic policy uncertainty is associated with a contemporaneous decrease in returns but an increase in future excess returns.

The timing of the sign reversals can explain the different signs of the risk premium between developed and emerging markets. For emerging markets, both policy and politics betas are significantly positive until -12 months, and become significantly negative from +6 months onwards. The same pattern is observed in developed markets but with delayed reversal. (Note, also, a weak statistical significance for the political stability beta due to the small variability of stability in these markets.) The betas of the forecasting regressions show a predictable positive long-term effect of political risks on future stock prices across both market segments. This is consistent with the evidence of future stock returns being positively related to current policy uncertainty (Brogaard and Detzel, 2015) and political risk (Erb et al., 1996). These results suggest that political risks are long-run risks, as per the model of Bansal and Yaron (2004).

Since the WES ratings reflect political events with a delay of up to six months, the difference in the timing of sign reversal suggests that political events in emerging markets have a more immediate impact on prices or that the political events are more abrupt —according to DCN (ch. 10) political changes can be either incremental or discontinuous— as opposed to incremental changes in developed markets. Therefore, we conjecture that returns measured contemporaneously with the WES announcement, as we do, are future returns with respect to political events in emerging markets, whereas they are contemporaneous with events in developed markets. With WES semi-annual release dates we do not observe the exact timing

**Figure 4 – Lead-lag regressions of returns on politics and policy**

This figure reports the slope coefficients of lead-lag panel regressions of stock market returns on economic policy (Panel A) and political stability (Panel B), at different horizons before and after the WES release dates. The blue markers denote developed, orange denote emerging markets, and circles denote values that are not significant at conventional levels. Standard errors are clustered at the country level. The sample spans 1992–2016.

**(a)** Economic policy confidence



**(b)** Political stability
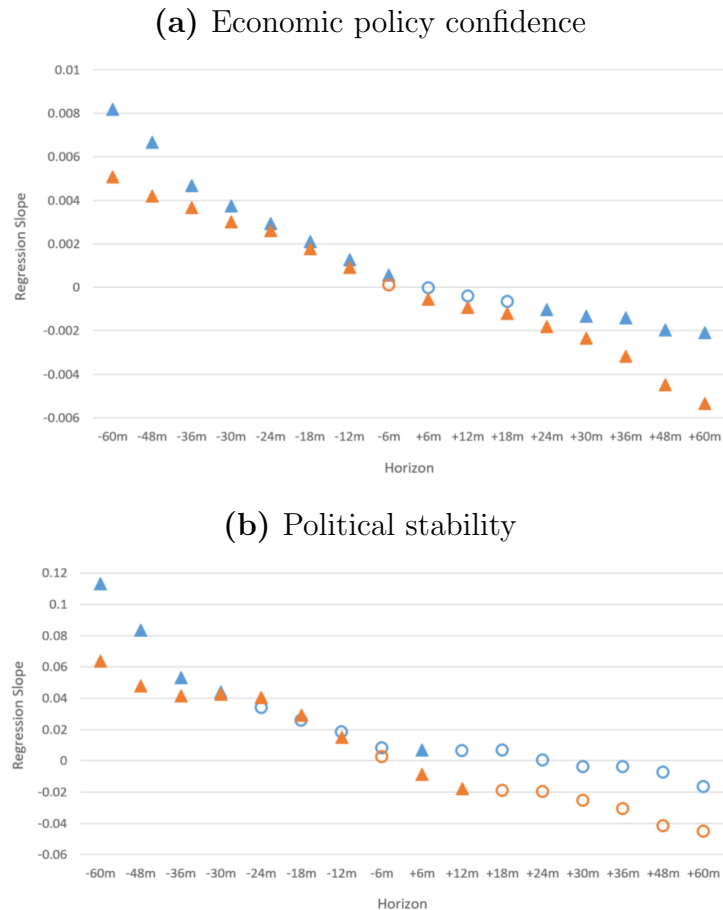


of market reaction to political events, and to test our conjecture we turn to the Thompson Reuters-MarketPsych Sentiment Indices (Reuters, 2013) which provide daily reaction of market sentiment to, among other things, political events. With daily data we expect to find identical market response for both developed and emerging markets. We create daily portfolio sorts by the sentiment indicators for "Government Instability" and "Economic Uncertainty", denoting by $H_{SI}$ the top quantile portfolio, $L_{SI}$ the bottom quantile, and $M_{SI}$ the portfolio of all remaining countries in the middle, using the same quantiles as in the factor construction. In Table 10 we observe a monotonic pattern in contemporaneous returns for both mar-

34

ket segments, with the low instability-low uncertainty portfolio $L_{SI}$ outperforming the high instability-high uncertainty $H_{SI}$ by a statistically significant 8.2% p.a. in developed and 17.8% p.a. in emerging markets. This finding, and the positive slopes of realized returns on the politics and policy ratings, are consistent with the evidence of contemporaneous US stock returns being negatively related to policy uncertainty (Brogaard and Detzel, 2015), and extends to developed markets the finding of Erb et al. (1996); Perotti and Van Oijen (2001); Diamonte et al. (1996) that emerging markets upgraded in their political ratings experience higher contemporaneous returns. Figure 4 shows a strong contemporaneous impact of politics and policy variables in both developed and emerging markets.

The impact of political variables on expected returns is consistent with finance theory. The negative premium for developed markets when using the WES data is consistent with the effects of political variables on contemporaneous returns, so what has been called a paradox in the literature is explained by distinguishing between contemporaneous and future returns. Given the delays in the release of political variable measures, and, symmetrically, the fact that political changes can be either incremental or discontinuous, this is not an easy task.

## Table 10 – Average returns of politics-policy portfolio sorts on market sentiment index

This table reports annualized average returns and the associated Sharpe ratios, of bivariate portfolio sorts by the daily Thompson Reuters-MarketPsych Sentiment Indices for 'Government Instability" and "Economic Uncertainty" for developed and emerging markets. Higher values of the sentiment index denote higher government instability and more economic uncertainty. $H_{SI}$ is the top quantile portfolio, $L_{SI}$ the bottom quantile, and $M_{SI}$ is the portfolio of all remaining countries in the middle, using the same quantiles as in the factor construction. The asterisk (*) denotes statistical significance at least at the 10% level. The sample period is from January 1, 1998 to December 31, 2015.

|  | Developed | Emerging |
|---|---|---|
| $H_{SI}$ | 0.034 | 0.017 |
| $M_{SI}$ | 0.076 | 0.069 |
| $L_{SI}$ | 0.116 | 0.195 |
| $L_{SI}$-$H_{SI}$ | 0.082* | 0.178* |
| p-value | (0.095) | (0.008) |
| Sharpe Ratio | 0.385 | 0.612 |

# 5 Robustness tests

To test for robustness we re-estimate the model using Fama-MacBeth regressions, run a randomized experiment to rule out serendipity, and use out-of-sample data to reduce potential sensitivity to outliers and data mining. We also test the univariate ICRG factor and find it priced only in developed markets, which brings us back to our point of departure and reinforces our main argument for a bivariate factor.[25]

## 5.1 Fama-MacBeth premia estimates

We run Fama-MacBeth regressions, with standard errors adjusted according to Newey and West (1987); Shanken (1992), and find robust political risk premia with reference to all benchmark models and in all market segments (online Appendix Table D.1). The premium on PG is in the (narrow) range 0.09–0.10, depending on the benchmark model, and the premia on PD and PE are identical to two decimal points to those obtained with OLS, all significant at conventional levels. The improvements to adjusted $R^2$ when adding the political factors are identical to those estimated with OLS for all benchmark models and in all market segments. Estimating the P-CAPM using Fama-MacBeth (online Appendix Table D.2) we find risk premium of 0.10 on PG, -0.11 on PD, and 0.16 on PE, statistically significant at conventional levels, and, with the exception of PG that is higher than the factor mean, they are identical to two decimal points to the OLS estimates. The premium on MKT is identical to the OLS estimates, the Dollar factor is not significant in all market segments, and the $R^2$ and errors are identical to the OLS estimates. Overall, the premia estimates are robust to Fama-MacBeth regressions.

We explore the meaning of the Dollar factor. Including a constant in the second step of Fama-MacBeth reduces the RMSE to 0.008 from 0.0014 when PG is the sole pricing factor, and adding the Dollar factor to PG and the MKT leaves the error at 0.008. Likewise, adding a constant to the second step when PD is the sole factor, reduces RMSE to 0.007 from 0.0223, and to 0.008 from 0.029 when PE is the factor, and adding the Dollar in either case leaves the respective reduced errors unchanged. Hence, Dollar acts like a constant in the cross section and is a determinant of the level but explains none of the cross-sectional average returns variability, consistently with the finding of (Lustig et al., 2011, p. 3748) for currency returns.

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[25]We also ran tests with bivariate conditional sorts and using quintiles in unconditional sorts for constructing the P-factor, and found that the risk premium is statistically significant with all specifications, consistently improves adjusted $R^2$ when added to the benchmarks, and the P-CAPM has high explanatory and predictive power.

## 5.2 Randomized experiment

To demonstrate the robustness and highlight the strength of our model we follow Adrian et al. (2014) and perform an experiment with a randomized political factor to show that the results are almost certainly not due to chance. We simulate P-factors by randomly drawing from the empirical distribution of PG, PD, and PE, respectively, with the same length and with replacement. A factor drawn at random should have no explanatory power in the cross section of expected returns. We generate 100,000 random factors, use them in our cross-sectional asset pricing for all market segments, and estimate the probability that a random factor would perform at least as well as our P-factor by achieving higher $R^2$, lower MAPE, or both. We report the results in Table 11 and we observe that the probability is 0.02% for the global and developed, and 0% for the emerging markets model. We obtain identical results with factors drawn from a Gaussian distribution with same mean and variance as the P-factor. Comparing the average $R^2$ from the randomized tests —0.28 for global, 0.07 for developed, and 0.46 for emerging markets model— with the $R^2$ obtained using a model with the MKT and Dollar factors only —0.29, 0.06, and 0.49, respectively— we confirm that the random factor can not explain cross-sectional return variability. This rules out serendipitous model performance.

### Table 11 – P-CAPM with random P-factor

This table examines how likely it is for a noise factor to produce the results of the P-CAPM. We run 100,000 simulations constructing random P-factors by sampling with replacement from the empirical distribution of our PG, PD, and PE, and estimate P-CAPM with the random factor replacing the P-factor. In the first three rows we report the probability that the random factor model does better than the P-CAPM in terms of cross-sectional adjusted $R^2$, mean absolute pricing error MAPE, or in both. In the last row we report the average $R^2$ across the 100,000 simulations. The sample spans 1992–2016.

|  | Global | Developed | Emerging |
|---|---|---|---|
| $R^2$ | 0.06% | 0.03% | 0.02% |
| MAPE | 0.04% | 0.12% | 0.00% |
| Joint $R^2$-MAPE | 0.02% | 0.02% | 0.00% |
| Average $R^2$ | 0.28 | 0.07 | 0.46 |

## 5.3 Out-of-sample testing

We test the global model on the enlarged set Global$^+$. First, we use OLS cross-sectional regressions and find a statistically significant political risk premium on PG in the range 0.07–0.09, depending on the benchmark model, with an average of 0.08 which is identical to the in-sample premium and the factor mean to two decimal points, see Table 12. PG is priced in the set Global$^+$, and it improves the adjusted $R^2$ of the benchmarks by 6%–12%. We estimate the risk premia on the P-CAPM factors, see Table 13, and find a premium of 0.06 on MKT, 0.08 on PG, and non-significant on the Dollar, as with the in-sample estimation.

We also check the robustness of the model's predictive power and report in Table 14 the parameters of the fitted lines to the realized vs predicted excess returns in the cross-section. The fitted line for the P-CAPM has slope 0.96, with Carhart a distant second (slope 0.72), the $R^2$ is higher than the benchmarks by 9%–22%, and the intercepts are quite small. Hence, the P-CAPM has good out-of-sample predictive power in the three criteria (slope, intercept, and $R^2$).

38

## Table 12 – Out-of-sample cross-sectional estimation of premium on the P-factor

This table reports the risk premium on each factor estimated through a second-step cross-sectional regression using the time-series OLS estimates of the factor loadings ($\lambda_k$ from eqn. 2), with and without the global political factor PG. Estimation is on the sample of monthly observations for developed, emerging, and frontier markets ("Global$^+$"). $R^2$ is adjusted for the number of regressors. Standard errors are Shanken adjusted. MAPE is the annualized cross-sectional mean absolute pricing error and RMSE is the annualized cross-sectional root mean square error. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$. The sample spans 1992–2016.

| | World CAPM | | Fama-French three-factor | | | | Carhart | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | PG | MKT | SMB | HML | PG | MKT | SMB | HML | WML | PG |
| Premium | 0.071* | | 0.073* | -0.009 | 0.011 | | 0.074* | -0.007 | 0.005 | 0.047 | |
| | (0.027) | | (0.021) | (0.652) | (0.626) | | (0.020) | (0.717) | (0.823) | (0.172) | |
| $R^2$ | 0.022 | | 0.030 | | | | 0.048 | | | | |
| MAPE | 0.041 | | 0.041 | | | | 0.040 | | | | |
| RMSE | 0.017 | | 0.017 | | | | 0.017 | | | | |
| Premium | 0.061* | 0.087* | 0.064* | -0.009 | 0.016 | 0.081* | 0.066* | -0.008 | 0.009 | 0.035 | 0.072* |
| | (0.055) | (0.039) | (0.040) | (0.641) | (0.460) | (0.057) | (0.036) | (0.684) | (0.677) | (0.295) | (0.090) |
| $R^2$ | 0.115 | | 0.119 | | | | 0.139 | | | | |
| MAPE | 0.038 | | 0.039 | | | | 0.038 | | | | |
| RMSE | 0.016 | | 0.016 | | | | 0.016 | | | | |

| | Fama-French five-factor | | | | | | ICAPM | | | | | ICAPM Redux | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | SMB | HML | CMA | RMW | PG | MKT | EUR | GBP | JPY | PG | MKTLC | Dollar | Carry | PG |
| Premium | 0.076* | -0.009 | 0.014 | 0.009 | 0.005 | | 0.071* | 0.008 | 0.010 | -0.035 | | 0.062* | 0.015 | 0.050* | |
| | (0.017) | (0.657) | (0.530) | (0.590) | (0.717) | | (0.027) | (0.718) | (0.666) | (0.262) | | (0.036) | (0.290) | (0.051) | |
| $R^2$ | 0.050 | | | | | | 0.036 | | | | | 0.055 | | | |
| MAPE | 0.043 | | | | | | 0.040 | | | | | 0.040 | | | |
| RMSE | 0.017 | | | | | | 0.017 | | | | | 0.017 | | | |
| Premium | 0.068* | -0.006 | 0.018 | 0.017 | 0.003 | 0.082* | 0.056* | 0.022 | 0.010 | -0.019 | 0.088* | 0.052* | 0.017 | 0.028 | 0.079* |
| | (0.029) | (0.746) | (0.415) | (0.330) | (0.841) | (0.049) | (0.072) | (0.343) | (0.677) | (0.529) | (0.038) | (0.073) | (0.227) | (0.235) | (0.058) |
| $R^2$ | 0.166 | | | | | | 0.122 | | | | | 0.119 | | | |
| MAPE | 0.040 | | | | | | 0.037 | | | | | 0.038 | | | |
| RMSE | 0.015 | | | | | | 0.016 | | | | | 0.016 | | | |

**Table 13 – Out-of-sample risk premia on the P-CAPM factors**

This table reports the risk premia $\lambda_k$ (cf. eqn. 2) using cross-sectional OLS regressions on the factors of the global P-CAPM estimated on developed, emerging, and frontier markets, using monthly observations. $R^2$ is adjusted for the number of regressors. Standard errors are Shanken corrected. MAPE is the annualized cross-sectional mean absolute pricing error and RMSE is the annualized cross-sectional root mean square error. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$. The sample spans 1992–2016.

|  | MKT | Dollar | PG |
|---|---|---|---|
| Risk premium | 0.059* | 0.017 | 0.083* |
|  | (0.056) | (0.225) | (0.048) |
| $R^2$ | 0.123 |  |  |
| MAPE | 0.037 |  |  |
| RMSE | 0.016 |  |  |
| Factor mean | 0.057* | 0.010 | 0.085* |
|  | (0.090) | (0.462) | (0.047) |

**Table 14 – Out-of-sample realized vs predicted excess returns**

In this table we report the intercepts ($\alpha$), slopes ($\beta$), and $R^2$ for the least square error line fitted to the data of realized vs predicted returns on monthly observations for developed, emerging, and frontier markets. Perfect predictions lie on a zero-intercept line with slope 1. Constants are scaled, multiplying the original coefficient by $10^3$. The sample spans 1992–2016.

|  | $\alpha$ | $\beta$ | $R^2$ |
|---|---|---|---|
| World CAPM | 4.08 | 0.54 | 0.09 |
| FF3 | 3.19 | 0.61 | 0.14 |
| Carhart | 2.61 | 0.72 | 0.22 |
| FF5 | 3.55 | 0.55 | 0.16 |
| ICAPM | 3.96 | 0.65 | 0.14 |
| ICAPM Redux | 2.84 | 0.60 | 0.16 |
| P-CAPM | 1.59 | 0.96 | 0.31 |

## 5.4 Univariate ICRG political risk factor

We test for a risk premium on the global IPG factor and the local factors IPD and IPE, and find non-significant premium on IPG, significant on IPD at conventional levels with all benchmark models, and significant on IPE with Fama-French three- and five-factor models and Carhart (online Appendix Table D.3). Adding the IPD factor to the best performing benchmark for developed markets increases adjusted $R^2$ by about the same as with PD. Naturally, the improvements are much smaller

40

when we add IPG or IPE compared to PG and PE. We also test the P-CAPM with the ICRG factor, and again find the univariate factor significant only in developed markets with $R^2$ of 0.54, which is higher by 0.12 from when using IPD, with slightly lower errors MAPE and RMSE (online Appendix Table D.4).

Overall, the findings with the ICRG factor corroborate a political risk premium but are not as clear cut as with the P-factor. Incorporating the univariate factor in P-CAPM can not explain the cross-sectional returns for the global and emerging markets whereas the bivariate factor does. IPD could serve as a proxy for PD, since developed markets have rather stable politics (the ratio of standard deviation to the mean is 0.309 for emerging but only 0.174 for developed markets). However, the ICRG factor mean is much lower, and consequently the risk premium is under-estimated. ICRG, which aggregates twelve variables in a single index, is priced only in developed markets, whereas the P-factor, which uses two disaggregated variables based on the DCN classification, is priced in all market segments with higher premium and stronger statistical significance. This highlights, again, the need for a bivariate factor, especially when both variables have high variability.

# 6 Conclusions

This paper prices jointly politics and policy variables. Grounded on the theory of Douglass C. North, it argues that one should look at both politics and policies as distinct determinants of stock market returns, informs the choice of variables in constructing a political risk factor, and develops a Political Capital Asset Pricing Model.

We show that a political risk factor constructed as a mimicking portfolio of political stability and confidence in economic policy variables commands a large and statistically significant premium in international stock markets, robust to several prominent asset pricing models. The political factor is not spanned by existing factors. It is robust in capturing difficult-to-measure political variables in the sense that it is highly correlated with and can explain alternative factors that we construct using several political variables inherited from the literature.

We incorporate the P-factor in a three-factor asset pricing model, that we derive theoretically in reduced form. We test both a global and two local models for developed and emerging markets, at the portfolio and country levels. The annual risk premium on the P-factor is statistically and economically significant in all market segments, up to 15% p.a. The three-factor P-CAPM explains 52% of the cross-sectional returns in the global markets, 42% in developed, and 77% in emerging.

41

In several explanatory and predictive tests the model performs well, and none of the existing models performs uniformly better, although we recognize that not all of the existing models we test are designed for country-wide indices. The global model is robust to out-of-sample testing on frontier markets.

Reinforcing our main argument in favor of a bivariate factor, we construct and test a univariate factor on the ICRG aggregate political risk index and find that it is not priced in the global and emerging markets. It is priced in developed markets, but its mean is less than half that of the bivariate factor mean and commands a significantly lower premium.

The negative political risk premium we observe in developed markets, has been termed a political sign paradox in the literature. We show that both developed and emerging markets attain lower contemporaneous returns with higher political risk, whereas higher risk entails higher expected returns for long horizons, but with different hysteresis for each market segment, which gives rise to a negative risk premium when using semiannual political variable ratings. Using daily market sentiment for the political variables we obtain lower contemporaneous returns in both markets, with low rated politics and policy variables, but in the long run both market segments exhibit higher returns with higher political risks. This is in accord with the long-run risk model of Bansal and Yaron (2004), and the apparent paradox is explained by distinguishing between contemporaneous and expected returns.

Whereas the P-factor, overall, explains well alternative factors, when using factors based on administrative restrictions, regulatory quality or corruption, we find low $R^2$ in emerging markets (0.14–0.34) with significant intercepts. This suggests that these political variables may be additional important determinants of cross-sectional stock returns in emerging markets.

Studies using survey data may face an endogeneity problem if the survey participants base their responses on the observable past performance of the national stock market. In our work this is unlikely for two reasons. First, we are using a bi-variate factor and the answers to the politics and policy questions are not highly correlated, as they would have been if they were both driven by a common latent factor. Second, there is significant variance in the responses of the experts —the standard deviation of the politics ratings averages 2.01 across all countries, compared to the average rating of 5.71, and the average policy rating of 38.59 shows lack of consensus from a Yes or No answer, and similar observations hold for developed and emerging markets— implying differences of opinion as experts take several factors into account. Endogeneity can be reasonably ruled out.

Our work incorporates political variables in asset pricing and contributes to

our understanding of political effects on the international stock markets, showing in particular that looking at both politics and policies leads to a more accurate estimation of such effects. Further research on the interaction of economic channels with the politics and policy variables should provide an even more complete picture of the politics-policy effects on capital markets.

The pricing of politics and policy uncertainty is an important problem receiving attention both in the academic literature and the media, but pricing politics in an asset pricing model has remained an open question, mostly because of the theoretical difficulties —in absence of a clear theory to provide guidance in identifying the multidimensional aspects of political risk— and the empirical issues —in absence of large datasets to measure the multiple dimensions of political risk and test it on the global markets. Building on the theoretical work of DCN and with a novel use of the WES data, this paper develops an asset pricing model where politics and policy risks take center stage.

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# A    Model derivation

We provide theoretical underpinnings leading to the three-factor reduced-form model that we subject to empirical testing. We consider an $L$-country international economy. Each country $i \in \{1, 2, ..., L\}$ produces at time $t$ one single good from one technology (firm). International financial markets are frictionless and integrated so that investors can trade on any available financial asset, possibly through exchange rate markets, regardless of their residence. They all have access to $L$ nominal money market accounts (one per country) and to $L$ dividend-paying stocks (equities) issued by the firms, all denominated in their respective local currency. The reference USD investor (of country $i = 1$) has access to the reference money market account, which is riskless, unlike the remaining $L-1$ money market accounts which are risky due to exchange rate uncertainty, due to (implicit) real rigidities and violations of purchasing power parity (PPP). International financial markets are assumed to be complete, as the set of tradable assets in each country spans all the risks affecting that country.

Firms choose their investment $I_{i,t}$ to maximize the market value of equity. Investors exhibit Epstein-Zin preferences defined over their consumption plans. We describe the agents' choices and explain the mechanisms leading to a capital asset pricing model with a bivariate political factor. Prices and rates of return are expressed in local currency in nominal terms.

## A.1    Firms

We abstract from labor and consider physical capital only. This is the opposite assumption from the labor CAPM (Kuehn et al., 2017) that abstracts from physical capital, and is a more natural since capital is more mobile, and permits international asset pricing.

Each firm $i$ generates output $Y_{i,t}$ at time $t$, according to the production function

$$Y_{i,t} = \exp\left[x_{w,t} + z_{i,t} + f_{i,t} + g_{i,t} + \pi_i p_{w,t} + \mu_i e_{w,t}\right] (K_{i,t})^{\kappa}. \tag{4}$$

$K_i$ is capital, with exponent $\kappa < 1$ representing the capital share of production, $x_w$ is a worldwide productivity shock, $z_i$ a country-specific productivity shock, and all other shocks are political: $f_i$ is a country-specific political stability shock, $g_i$ a country-specific economic policy shock, and $p_w$ (political stability) and $e_w$ (economic policy) are worldwide political shocks which can have a different impact

51

on each firm (country) through the intensity parameters $\pi_i$ and $\mu_i$.[26]

Following Berk et al. (1999); Kuehn et al. (2017), we assume that the first two shocks obey, respectively, the Gaussian AR(1) processes

$$
\begin{aligned}
x_{w,t} &= \rho_{x_w} x_{w,t-1} + \sigma_{x_w} u_t^{x_w}, & (5) \\
z_{i,t} &= \rho_{z_i} z_{i,t-1} + \sigma_{z_i} u_t^{z_i}. & (6)
\end{aligned}
$$

$u_t^{x_w}$ and $u_t^{z_i}$ are uncorrelated iid standard normal variates, so that firm-specific innovations are independent across countries and from worldwide shocks.

The country-specific and common global political shocks are the novelty of the model. Assuming, based on the literature reviewed earlier, global political shocks, alongside local shocks, we obtain a model where political stability and economic policy risks can not be diversified away.

The processes $f_i$, $g_i$, $p_w$ and $e_w$ are uncorrelated to one another and to the previous processes, and have the same dynamics. For simplicity, we denote by $h_k$ any member of this collection of processes, obeying

$$
\begin{aligned}
h_{k,t} &= \rho_{h_k} h_{k,t-1} + \tilde{h}_t^k, & (7) \\
\tilde{h}_t^k &= \begin{cases} 0 & \text{with probability } 1 - b_k \\ \nu_t^k & \text{with probability } b_k. \end{cases} & (8)
\end{aligned}
$$

The distribution of $\nu_t^k$ is the double exponential Laplace[27]

$$
f(x) = \text{Prob}\left[\nu_t^k \in [x; x + dx]\right]/dx = \frac{1}{2}\alpha_k \exp\left[-\alpha_k |x|\right]. \qquad (9)
$$

$1/\alpha_k$ is the diversity parameter and controls the fatness of the tails. The Laplace distribution is symmetric around zero with thicker tails for lower $\alpha_k$, and it captures the empirically observed distribution of political stability and economic policy confidence changes, as illustrated in Figure 5 for the countries in our sample. The Jarque-Bera test rejects the normality assumption with zero p-value.

---

[26]Effects on growth from political and economic policy uncertainty are documented in the reviewed economics literature, e.g., Alesina et al. (1996); Barro (1991); Friedman (1977), the presence of local and global political shocks follows from the political science literature, e.g, Simmons et al. (2007); Haas (1964), and most financial economists would agree that global shocks impact the economy, see, for instance, the extensive literature attributing exchange rate shocks to systematic risk exposures in (Lustig et al., 2011, footnote 14).

[27]Any distribution that satisfies the central limit theorem leads to the same reduced form model. The Laplacian distribution fits observed data, and can be useful for model calibrations.

Physical capital obeys the law of motion

$$K_{i,t+1} = (1 - d_i) K_{i,t} + I_{i,t}. \tag{10}$$

That is, capital at $(t+1)$ depends on previously installed capital, with depreciation rate $d_i$, and on the firm's investment decision $I_{i,t}$, which is not restricted to be positive at all times.

In the absence of retained earnings, the (positive) dividend $D_{i,t}$ distributed by firm $i$ to the shareholders is given by

$$D_{i,t} = Y_{i,t} - I_{i,t}. \tag{11}$$

Subtracting fixed operating costs from output would yield similar results (Brusa et al., 2014; Kuehn et al., 2017).

The firm maximizes the market value of equity $V_{i,t}$, by choosing its investment policy to solve the Bellman equation

$$V_{i,t} = \max_{I_{i,t}} \left[ D_{i,t} + \mathbb{E}_t \left[ M_{i,t+1} V_{i,t+1} \right] \right], \tag{12}$$

where $\mathbb{E}_t$ is the conditional expectation operator and $M_{i,t+1}$ is the country $i$ pricing kernel, or stochastic discount factor (SDF), defined in eqn. (14) below. The optimization model is constrained by eqns. (4)–(11). These constraints establish the link between production and investment in the real economy, with the stock market, as $D_{i,t}$ and $\mathbb{E}_t [V_{i,t+1}]$, depend on the processes $x_w$, $z_i$, $f_i$, $g_i$, $p_w$ and $e_w$.

## A.2 Consumers

The representative consumer of country $i$ optimizes the Epstein-Zin lifetime utility of consumption $C_{i,t}$,

$$U_{i,t} = \left( (1 - \delta_i) C_{i,t}^{1 - \frac{1}{\varphi_i}} + \delta_i \left\{ \mathbb{E}_t \left[ U_{i,t+1}^{1 - \gamma_i} \right] \right\}^{\frac{1}{\phi_i}} \right)^{\frac{1}{1 - \frac{1}{\varphi_i}}}. \tag{13}$$

$\gamma_i$ is a measure of relative risk aversion, $\varphi_i$ is the intertemporal elasticity of substitution, $\phi_i$ is defined by $\phi_i = \frac{1 - \gamma_i}{1 - \frac{1}{\varphi_i}}$, and $\delta_i$ is the subjective discount factor. This recursive utility function disentangles the intertemporal elasticity of consumption from risk aversion, and makes the wealth-to-consumption ratio —equivalently, the return on aggregate wealth, i.e., on the market portfolio— a pricing factor. Epstein

and Zin (1991) show that the SDF is given by

$$M_{i,t+1} = \delta_i^{\phi_i} \left( \frac{C_{i,t+1}}{C_{i,t}} \right)^{-\frac{\phi_i}{\varphi_i}} (R_{i,t+1})^{\phi_i-1}, \tag{14}$$

where $R_{i,t+1}$ is the gross return on the market portfolio. Since, for any period $t$, consumption $C_{i,t}$ (strongly) depends on $D_{i,t}$ (at the aggregate level, $C_t^w = \sum_{i=1}^{L} C_{i,t} = \sum_{i=1}^{L} D_{i,t}$), the SDF inherits the dependence of $D_{i,t}$ on the shock processes. This mechanism links production, investment, and consumption in the real economy to financial asset prices.

## A.3    SDF, exchange rates, and equity returns

Following Berk et al. (1999); Backus et al. (2001); Yogo (2006) we assume that the SDF is exponentially affine, and denoting $m_{i,t+1} = \log M_{i,t+1}$, we have

$$m_{i,t+1} = A_i - \lambda_i^{x_w} u_{t+1}^{x_w} - \lambda_i^{z_i} u_{t+1}^{z_i} - \lambda_i^{f_i} \hat{f}_{t+1}^i - \lambda_i^{g_i} \hat{g}_{t+1}^i - \lambda_i^{p_w} \hat{p}_{t+1}^w - \lambda_i^{e_w} \hat{e}_{t+1}^w, \tag{15}$$

where the constant $A_i$ reflects the effect of utility parameters $\phi_i$ and $\delta_i$ on the SDF, the lambdas reflect the market prices of the risks associated with $x_w$, $z_i$, $f_i$, $g_i$, $\pi_i p_w$, $\mu_i e_w$, and the innovations on the political factors are given by

$$\hat{f}_{t+1}^i = \tilde{f}_{t+1}^i - \log \mathbb{E}_t \left[ e^{\tilde{f}_{t+1}^i} \right], \tag{16}$$

and, similarly, for $\hat{g}_{t+1}^i$, $\hat{p}_{t+1}^w$ and $\hat{e}_{t+1}^w$.

For the reference country ($i = 1$) we drop the index and write

$$m_{t+1} = A - \lambda^{x_w} u_{t+1}^{x_w} - \lambda^z u_{t+1}^z - \lambda^f \hat{f}_{t+1} - \lambda^g \hat{g}_{t+1} - \lambda^{p_w} \hat{p}_{t+1}^w - \lambda^{e_w} \hat{e}_{t+1}^w. \tag{17}$$

Exchange rates fluctuate randomly due to (implicit) rigidities in the goods markets and violations of PPP. We denote by $S_t^i$ the exchange rate between currency $i$ and the USD, and the log change by $\Delta s_{t+1}^i = \log \left( \frac{S_{t+1}^i}{S_t^i} \right)$. As the pricing kernel is unique, due to the complete market assumption, $\Delta s_{t+1}^i$ is equal to the difference between the reference and foreign log stochastic discount factors[28]

---

[28]Consider a risky asset $i$ whose random gross return, expressed in currency $i$, is denoted by $R_{t+1}^i$. From the Euler equations of domestic and foreign consumers, we have $\mathbb{E}_t \left[ M_{t+1} R_{t+1}^i \frac{S_t^i}{S_{t+1}^i} \right] = \mathbb{E}_t \left[ M_{i,t+1} R_{t+1}^i \right] = 1$, so that $\frac{S_t^i}{S_{t+1}^i} = \frac{M_{i,t+1}}{M_{t+1}}$, see, e.g., Bekaert (1996); Bansal (1997).

$$\Delta s^i_{t+1} = m_{t+1} - m_{i,t+1}$$

$$= (A - A_i) + (\lambda_i^{x_w} - \lambda^{x_w})u^{x_w}_{t+1} + (\lambda_i^{z_i} u^{z_i}_{t+1} - \lambda^z u^z_{t+1}) + (\lambda_i^{f_i} \hat{f}^i_{t+1} - \lambda^f \hat{f}_{t+1})$$

$$+ (\lambda_i^{g_i} \hat{g}^i_{t+1} - \lambda^g \hat{g}_{t+1}) + (\lambda_i^{p_w} - \lambda^{p_w})\hat{p}^w_{t+1} + (\lambda_i^{e_w} - \lambda^{e_w})\hat{e}^w_{t+1}. \qquad (18)$$

Noting that $\mathbb{E}_t[\Delta s^j_{t+1}] = A - A_i$, we obtain innovations in exchange rates log changes:

$$\Delta s^i_{t+1} - \mathbb{E}_t[\Delta s^i_{t+1}] = (\lambda_i^{x_w} - \lambda^{x_w})u^{x_w}_{t+1} + (\lambda_i^{z_i} u^{z_i}_{t+1} - \lambda^z u^z_{t+1}) + (\lambda_i^{f_i} \hat{f}^i_{t+1} - \lambda^f \hat{f}_{t+1})$$

$$+ (\lambda_i^{g_i} \hat{g}^i_{t+1} - \lambda^g \hat{g}_{t+1}) + (\lambda_i^{p_w} - \lambda^{p_w})\hat{p}^w_{t+1} + (\lambda_i^{e_w} - \lambda^{e_w})\hat{e}^w_{t+1}. \qquad (19)$$

We now turn to equity returns for the reference investor. The log return on the stock market of country $i$ is given in local currency by $r_{i,t+1} = \log\left(\frac{V_{i,t+1}+D_{i,t+1}}{V_{i,t}}\right)$, and in USD by $r^\$_{i,t+1} = r_{i,t+1} - \Delta s^i_{t+1}$. To derive innovations in equity returns, we need a dividend growth process and the associated price-dividend ratio process. From eqns. (4) to (12), we obtain the following dividend growth process for each $i$

$$\Delta d_{i,t+1} = \log\left(\frac{D_{i,t+1}}{D_{i,t}}\right) = \mu_{di} + \sigma_{di}^{x_w} u^{x_w}_{t+1} + \sigma_{di}^{z_i} u^{z_i}_{t+1} + \sigma_{di}^{f_i} \hat{f}^i_{t+1}$$

$$+ \sigma_{di}^{g_i} \hat{g}^i_{t+1} + \sigma_{di}^{p_w} \hat{p}^w_{t+1} + \sigma_{di}^{e_w} \hat{e}^w_{t+1}. \qquad (20)$$

For the asset price $V_{i,t}$, we have the Euler equation

$$V_{i,t} = \mathbb{E}_t\left[M_{i,t+1}\left(V_{i,t+1} + D_{i,t+1}\right)\right], \qquad (21)$$

or, using the price-dividend ratio $X_{i,t} = \frac{V_{i,t}}{D_{i,t}}$,

$$X_{i,t} = \mathbb{E}_t\left[M_{i,t+1}\left(\frac{D_{i,t+1}}{D_{i,t}}\right)\left(1 + \frac{V_{i,t+1}}{D_{i,t+1}}\right)\right]. \qquad (22)$$

Thus, the gross log return on equity (stock market) $i$ becomes

$$r_{i,t+1} = \log\frac{D_{i,t+1} + V_{i,t+1}}{V_{i,t}} = \log\left(\frac{D_{i,t+1}}{D_{i,t}}\left(\frac{1 + X_{i,t+1}}{X_{i,t}}\right)\right). \qquad (23)$$

When shocks are iid, as in our case, Martin (2013) proved that the price-dividend ratio is a constant, say $X_i$, and we have $r_{i,t+1} = a_i + \Delta d_{i,t+1}$, with $a_i = \log\left[\frac{(1+X_i)}{X_i}\right]$.[29]

---

[29]Martin (2013) uses cumulants to deal with non-Gaussian distributions. His result applies to any iid

Substituting for the dividend process (cf. eqn. 20), and given that $a_i$ is a constant, we obtain the innovations to the log gross stock return $r_{i,t+1}$ in local currency,

$$r_{i,t+1} - \mathbb{E}_t\left[r_{i,t+1}\right] = \sigma_{i,d}^{x_w} u_{t+1}^{x_w} + \sigma_{i,d}^{z_i} u_{t+1}^{z_i} + \sigma_{i,d}^{f_i} \hat{f}_{t+1}^i + \sigma_{i,d}^{g_i} \hat{g}_{t+1}^i + \sigma_{i,d}^{p_w} \hat{p}_{t+1}^w + \sigma_{i,d}^{e_w} \hat{e}_{t+1}^w. \quad (24)$$

Subtracting (19) from (24) we obtain the log gross return innovations on asset $i$ in USD,

$$
\begin{aligned}
r_{i,t+1}^{\$} - \mathbb{E}_t\left[r_{i,t+1}^{\$}\right] &= \gamma_i^{x_w} u_{t+1}^{x_w} + \gamma_i^{z_i} u_{t+1}^{z_i} + \gamma^z u_{t+1}^z + \gamma_i^{f_i} \hat{f}_{t+1}^i + \gamma^f \hat{f}_{t+1} \\
&\quad + \gamma_i^{g_i} \hat{g}_{t+1}^i + \gamma^g \hat{g}_{t+1} + \gamma_i^{p_w} \hat{p}_{t+1}^w + \gamma_i^{e_w} \hat{e}_{t+1}^w.
\end{aligned}
\quad (25)
$$

The gammas are loadings on innovations defined by $\gamma_i^{x_w} = \sigma_{i,d}^{x_w} - \lambda_i^{x_w} + \lambda^{x_w}$, $\gamma_i^{z_i} = \sigma_{i,d}^{z_i} - \lambda_i^{z_i}$, $\gamma^z = \lambda^z$, $\gamma_i^{f_i} = \sigma_{i,d}^{f_i} - \lambda_i^{f_i}$, $\gamma^f = \lambda^f$, $\gamma_i^{g_i} = \sigma_{i,d}^{g_i} - \lambda_i^{g_i}$, $\gamma^g = \lambda^g$, $\gamma_i^{p_w} = \sigma_{i,d}^{p_w} - \lambda_i^{p_w} + \lambda^{p_w}$ and $\gamma_i^{e_w} = \sigma_{i,d}^{e_w} - \lambda_i^{e_w} + \lambda^{e_w}$.

The presence of the US-specific terms $\gamma^z u_{t+1}^z$, $\gamma^f \hat{f}_{t+1}$ and $\gamma^g \hat{g}_{t+1}$ is due to the $i$th asset log return being expressed in the reference currency and not its own. The foreign stock return expressed in USD depends on the foreign and US productivity and political shocks, and on systematic, worldwide productivity and political shocks.

## A.4 Common Factors

From eqn. (25) we note that the effects of country-specific productivity ($u^{z_i}$, $u^z$) and political shocks ($\hat{f}^i$, $\hat{f}$, $\hat{g}^i$, $\hat{g}$) can be eliminated through international diversification. Thus, expected international excess returns depend on their exposure to innovations in global productivity $x_w$ and global political shocks $\hat{p}_w$ and $\hat{e}_w$. These variables, however, are not observable, and in order to take the model to the data, we seek factors that are computable from available data and are spanned by the non-observables. We show that the world market portfolio (MKT), the Dollar factor of Lustig et al. (2011) and the P-factor can play the role of mimicking portfolios.

$\text{MKT}_{t+1}$ is the cross-country average of USD excess returns, so averaging (25) we obtain

$$\text{MKT}_{t+1} - \mathbb{E}_t\left[\text{MKT}_{t+1}\right] = \bar{\gamma}^{x_w} u_{t+1}^{x_w} + \bar{\gamma}^{p_w} \hat{p}_{t+1}^w + \bar{\gamma}^{e_w} \hat{e}_{t+1}^w, \quad (26)$$

---

consumption growth process for which cumulants are well defined, as we have for political shocks. We only have to assume that the consumption growth process has the same form as the dividend growth process on the grounds that they are close to each other at the country level, and are equal at the aggregate level.

56

where the bar above a variable denotes averaging across countries, and the country-specific productivity and political innovations (approximately) cancel out by diversification.

$\text{Dollar}_{t+1}$ is the average across currencies of USD excess returns on money markets,

$$\text{Dollar}_{t+1} = \frac{1}{L} \sum_{i=1}^{L} \left[ r_{i,t}^f - r_t^f - \Delta s_{t+1}^i \right], \tag{27}$$

where $r_{i,t}^f$ is the log return on the money market account $i$, which is riskless for investor $i$ but not for all other investors, including the reference one (except for $i = 1$ in the latter case, where $r_t^f$ is risk-free).[30] Using (19), and noting that country-specific productivity innovations and political shocks (approximately) cancel out by diversification, we obtain the Dollar factor innovations

$$\text{Dollar}_{t+1} - \mathbb{E}_t \left[ \text{Dollar}_{t+1} \right] = \bar{\lambda}^{x_w} u_{t+1}^{x_w} + \bar{\lambda}^{p_w} \hat{p}_{t+1}^w + \bar{\lambda}^{e_w} \hat{e}_{t+1}^w, \tag{28}$$

where the lambda's are loadings on innovations, with $\bar{\lambda}^{x_w}$ the average of $(\lambda_i^{x_w} - \lambda^{x_w})$ (cf. eqn. 19), and $\bar{\lambda}^{p_w}$ and $\bar{\lambda}^{e_w}$ the average of the $(\lambda_i^{p_w} - \lambda^{p_w})$ and $(\lambda_i^{e_w} - \lambda^{e_w})$, respectively. Thus in our model the Dollar factor captures effects due to both aggregate productivity and political shocks. This reflects the influence of the country's exchange rate on the performance of the country's real economy for a USD investor.

The P-factor is given by

$$\text{P-factor}_{t+1} = \frac{1}{N_L} \sum_{i_L=1}^{N_L} r_{i_L,t+1}^{\$} - \frac{1}{N_H} \sum_{i_S=1}^{N_H} r_{i_S,t+1}^{\$}, \tag{29}$$

where $i_L, i_H$ indicate stock markets in the long and short legs of the mimicking portfolio, with $N_L$ and $N_H$ the respective number of assets. Substituting (25) into (29) we obtain

$$\text{P-factor}_{t+1} - \mathbb{E}_t \left[ \text{P-factor}_{t+1} \right] = \bar{\theta}^{x_w} u_{t+1}^{x_w} + \bar{\theta}^{p_w} \hat{p}_{t+1}^w + \bar{\theta}^{e_w} \hat{e}_{t+1}^w, \tag{30}$$

where the theta averages $(\bar{\theta})$, computed from eqns. (29) and (25), are loadings on innovations, and the country-specific productivity and political shocks are again assumed to (approximately) vanish through diversification. Assuming further, for ease of interpretation, that $\bar{\theta}^{x_w}$ is approximately nil (because of the subtraction in

---

[30]Recall from standard finance theory that the riskless rate in country $i$, $r_{i,t}^f$, is equal to minus the log expectation of the country's SDF.

the long-short position), eqn. (30) reduces to

$$\text{P-factor}_{t+1} - \mathbb{E}_t\left[\text{P-factor}_{t+1}\right] \simeq \bar{\theta}^{p_w}\hat{p}_{t+1}^w + \bar{\theta}^{e_w}\hat{e}_{t+1}^w. \tag{31}$$

The P-factor captures political stability and economic policy shocks. (This was documented empirically in section 3.1.)

## A.5  The P-CAPM

Given the Euler equation relative to the risky asset $i$, we have, from (17), after standard log-linear approximation to the pricing kernel $M_{t+1}$,[31]

$$\mathbb{E}_t\left[r_{i,t+1}^{\$} - r_{t+1}^f\right] = -\text{cov}\left[r_{i,t+1}^{\$}, m_{t+1}\right] = \text{cov}\left[r_{i,t+1}^{\$}, \lambda^{x_w}u_{t+1}^{x_w} + \lambda^{p_w}\hat{p}_{t+1}^w + \lambda^{e_w}\hat{e}_{t+1}^w\right], \tag{32}$$

where the terms $\lambda^z u_{t+1}^z$, $\lambda^f \hat{f}_{t+1}$ and $\lambda^g \hat{g}_{t+1}$ have disappeared as uncorrelated to $r_{i,t+1}^{\$}$. We replace $x_w$ and the couple $(\hat{p}^w, \hat{e}^w)$ by the corresponding mimicking portfolio returns MKT, Dollar, and P-factor to express (32) as the linear model

$$\mathbb{E}_t\left[r_{i,t+1}^{\$}\right] - r_{t+1}^f = \beta_{Mi}\mathbb{E}_t\left[\text{MKT}_{t+1}\right] + \beta_{Di}\mathbb{E}_t\left[\text{Dollar}_{t+1}\right] + \beta_{Pi}\mathbb{E}_t\left[\text{P-factor}_{t+1}\right], \tag{33}$$

where the factor loadings $\beta_{Mi}, \beta_{Di}, \beta_{Pi}$ are the slopes in the time-series regression

$$r_{i,t} - r_t^f = \alpha_i + \beta_{Mi}\text{MKT}_t + \beta_{Di}\text{Dollar}_t + \beta_{Pi}\text{P-factor}_t + \epsilon_{i,t}, \tag{34}$$

with error term $\epsilon_{i,t}$. This is our three-factor international political capital asset pricing model.

We point out that we could arrive to this model following the tradition initiated by Merton (1973) and extended to an international economy (Solnik, 1974; Adler and Dumas, 1983), by adding to the world market portfolio one or more factors of currency and inflation risk(s) due to implicit violations of PPP and showing, empirically, that one of these factors could be the P-factor. We chose the consumption based approach as it explains the mechanisms through which global and local politics-policy shocks affect stock market returns.

---

[31]According to the Euler equation, the expected excess return on asset $i$ is equal to $-\text{cov}\left[\frac{M_{t+1}}{\mathbb{E}_t[M_{t+1}]}, R_{i,t+1}^{\$} - R_{t+1}^f\right]$. Using $\frac{M_{t+1}}{\mathbb{E}_t[M_{t+1}]} = e^{\log M_{t+1} - \log \mathbb{E}_t[M_{t+1}]} \simeq 1 + m_{t+1} - r_{t+1}^f$ (since $\mathbb{E}_t[M_{t+1}] = R_{t+1}^f$) and $R_{i,t+1}^{\$} \simeq 1 + r_{i,t+1}^{\$}$ yields $\mathbb{E}_t\left[r_{i,t+1}^{\$} - r_{t+1}^f\right] = -\text{cov}\left[m_{t+1}, r_{i,t+1}^{\$}\right]$ since $r_{t+1}^f$ is known at $t$.

**Figure 5 – Changes in the political variables follow a Laplace distribution**

This figure plots the empirically observed distribution of changes of political stability (Panel A) and confidence in economic policy (Panel B) ratings from WES of the 42 countries in our sample during the testing period spanning 1992–2016 (blue), the Laplace distribution (red) with $\alpha = 0.773$ (political stability) and $\alpha = 14.923$ (economic policy confidence), imputed to match the sample mean and variance of the respective panel data, and the Gaussian distribution (yellow).

**(a)** Political stability



**(b)** Economic policy confidence



59
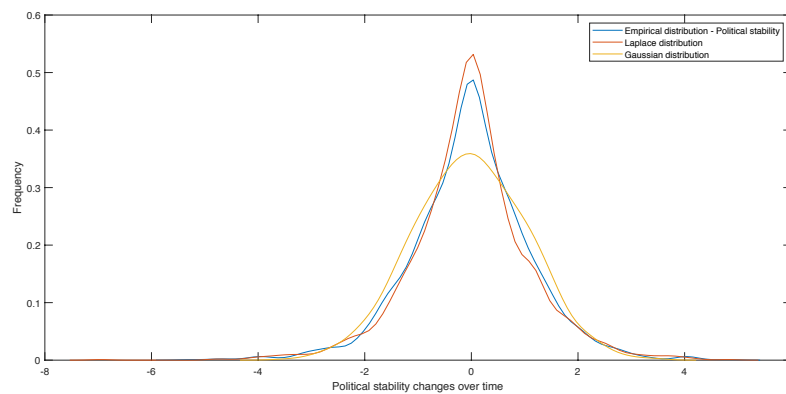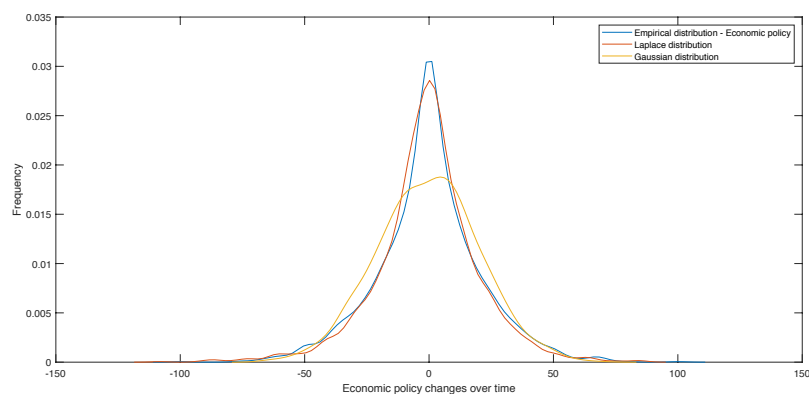
# On-line Appendices

In this Internet Appendix, we provide summary statistics for the WES dataset (Section B), and provide supplementary empirical results for the factor validation (Section C) and robustness tests (Section D).

# B  The Ifo World Economic Survey variables

**Table B.1 – Summary statistics of the political variables**

This table reports the mean and standard deviation of political stability and confidence in government economic policy ratings from Ifo World Economic Survey (WES). The sample spans 1992–2016, for developed (Panel A), emerging (Panel B), and the global (Panel C) markets.

### (a) Developed

| | Stability Mean | Stability StDev | Policy Mean | Policy StDev |
|---|---|---|---|---|
| Austria | 7.63 | 0.78 | 50.51 | 21.75 |
| Belgium | 5.70 | 1.39 | 41.60 | 22.69 |
| Denmark | 7.38 | 0.96 | 64.67 | 24.66 |
| Finland | 7.93 | 0.78 | 61.33 | 31.63 |
| France | 6.69 | 1.07 | 30.46 | 22.92 |
| Germany | 7.36 | 0.47 | 30.42 | 22.44 |
| Greece | 6.19 | 2.32 | 29.20 | 30.31 |
| Ireland | 7.07 | 0.92 | 60.34 | 33.09 |
| Italy | 4.01 | 1.32 | 15.24 | 13.36 |
| Netherlands | 7.33 | 1.11 | 62.86 | 24.66 |
| Norway | 7.60 | 1.17 | 72.38 | 26.04 |
| Spain | 6.09 | 1.52 | 39.17 | 28.37 |
| Sweden | 6.67 | 1.19 | 51.01 | 27.93 |
| Switzerland | 7.94 | 0.75 | 65.71 | 19.49 |
| UK | 6.88 | 1.41 | 44.44 | 29.34 |
| Canada | 6.49 | 1.32 | 68.69 | 23.42 |
| USA | 7.21 | 0.93 | 35.88 | 27.03 |
| Hong-Kong | 5.70 | 1.19 | 30.99 | 22.42 |
| Japan | 5.95 | 0.99 | 18.68 | 14.90 |
| Australia | 7.18 | 1.21 | 53.59 | 27.65 |
| New Zealand | 6.27 | 1.12 | 50.23 | 28.31 |
| Portugal | 6.83 | 1.53 | 36.90 | 27.08 |
| | | | | |
| Average | 6.73 | 1.17 | 46.09 | 25.23 |

### (b) Emerging

| | Stability Mean | Stability StDev | Policy Mean | Policy StDev |
|---|---|---|---|---|
| Czech republic | 4.98 | 1.59 | 34.14 | 28.87 |
| Hungary | 5.63 | 1.35 | 16.74 | 16.59 |
| Poland | 4.90 | 1.50 | 26.84 | 20.19 |
| Russia | 3.95 | 1.59 | 15.67 | 13.73 |
| Brazil | 4.83 | 1.72 | 32.48 | 23.73 |
| Chile | 6.99 | 1.10 | 62.01 | 30.70 |
| Colombia | 4.19 | 1.48 | 41.95 | 23.99 |
| Mexico | 4.68 | 1.17 | 26.37 | 23.00 |
| Peru | 3.71 | 1.38 | 39.55 | 24.02 |
| Israel | 3.97 | 1.83 | 26.03 | 21.02 |
| Turkey | 3.79 | 1.51 | 23.18 | 21.97 |
| China | 5.27 | 0.73 | 62.04 | 22.40 |
| India | 4.48 | 1.69 | 36.89 | 24.70 |
| South Korea | 4.92 | 0.77 | 21.89 | 18.61 |
| Malaysia | 5.33 | 1.58 | 44.80 | 32.76 |
| Philippines | 4.28 | 1.59 | 31.47 | 30.29 |
| Taiwan | 4.37 | 1.45 | 6.72 | 12.53 |
| Thailand | 3.18 | 1.28 | 17.70 | 19.43 |
| Egypt | 3.89 | 1.45 | 12.32 | 17.08 |
| South Africa | 4.48 | 1.45 | 27.91 | 21.68 |
| | | | | |
| Average | 4.59 | 1.42 | 30.34 | 22.58 |

### (c) Global

| | Stability Mean | Stability StDev | Policy Mean | Policy StDev |
|---|---|---|---|---|
| Average | 5.71 | 1.29 | 38.59 | 23.97 |

# C Supplementary material for factor validation

### Table C.1 – Portfolio sorts based on the P-factor loadings

This table reports average WES ratings of the political stability and economic policy variables, and excess returns on portfolios sorted by the slope coefficient of an OLS regression of each country's excess return on a constant and PG for the global (Panel A), PD for developed (Panel B), and PE for emerging (Panel C) markets. $H_\beta$ is an equally weighted beta-sorted portfolio of countries in the top quintile, portfolio $L_\beta$ in the bottom quintile, and $M_\beta$ is the beta-sorted portfolio of all remaining countries in the middle. The sample spans 1992–2016. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$.

| | (a) Global | | | (b) Developed | | | (c) Emerging | | |
|---|---|---|---|---|---|---|---|---|---|
| | Politics | Policy | Return | Politics | Policy | Return | Politics | Policy | Return |
| $H_\beta$ | 4.389 | 20.926 | 0.142 | 5.467 | 23.493 | 0.036 | 4.368 | 24.611 | 0.176 |
| $M_\beta$ | 5.699 | 40.080 | 0.071 | 6.862 | 47.775 | 0.073 | 4.708 | 29.529 | 0.087 |
| $L_\beta$ | 7.172 | 52.594 | 0.070 | 7.586 | 62.872 | 0.093 | 4.529 | 39.397 | 0.059 |
| $L_\beta$-$H_\beta$ | 2.783* | 31.668* | -0.071* | 2.120* | 39.379* | 0.058* | 0.161* | 14.787* | -0.117* |
| p-value | (0.000) | (0.000) | (0.078) | (0.000) | (0.000) | (0.016) | (0.052) | (0.000) | (0.055) |

## Table C.2 – **Principal component analysis of the P-factors**

This table reports the factor loadings and the eigenvalues of the principal components of the P-factors and the benchmark factors for the global (Subtable I), developed (Subtable II), and emerging (Subtable III) markets. The benchmark factors are MKT (excess return on MSCI World Index in USD), MKTLC (excess return on MSCI World Index in local currency), SMB (small minus big), HML (high minus low), WML (winners minus losers), CMA (conservative minus aggressive), RMW (robust minus weak), EUR, GBP, JPY (log currency excess return for the Euro, the British pound, and the Japanese Yen), Dollar, and Carry (carry trade). The sample spans 1992–2016.

### Subtable I. Global

| Factor | PC1 | PC2 | PC3 | PC4 | PC5 | PC6 | PC7 | PC8 | PC9 | PC10 | PC11 | PC12 | PC13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PG | 0.074 | -0.238 | -0.009 | 0.476 | -0.162 | 0.749 | 0.042 | -0.197 | -0.268 | 0.094 | 0.032 | -0.024 | -0.003 |
| MKT | 0.486 | -0.121 | 0.140 | -0.097 | -0.120 | -0.029 | 0.266 | -0.077 | 0.229 | 0.141 | 0.165 | 0.029 | -0.727 |
| MKTLC | 0.431 | -0.251 | 0.214 | -0.088 | -0.118 | -0.061 | 0.290 | -0.102 | 0.256 | 0.145 | 0.182 | 0.100 | 0.676 |
| SMB | 0.022 | 0.065 | -0.304 | 0.704 | 0.231 | -0.212 | -0.107 | 0.074 | 0.475 | 0.148 | 0.198 | 0.072 | 0.001 |
| HML | -0.107 | 0.387 | 0.495 | 0.245 | -0.064 | -0.002 | 0.232 | -0.147 | 0.204 | 0.177 | -0.616 | 0.046 | -0.002 |
| WML | -0.152 | -0.069 | -0.421 | -0.080 | 0.425 | 0.026 | 0.750 | -0.104 | -0.101 | 0.051 | -0.143 | -0.003 | 0.000 |
| CMA | -0.240 | 0.398 | 0.338 | 0.174 | -0.089 | -0.077 | 0.358 | 0.117 | -0.254 | -0.061 | 0.642 | -0.054 | 0.003 |
| RMW | -0.258 | 0.168 | 0.100 | -0.366 | 0.298 | 0.557 | -0.098 | 0.044 | 0.528 | 0.143 | 0.224 | 0.037 | 0.002 |
| EUR | 0.308 | 0.422 | -0.154 | -0.010 | 0.062 | 0.127 | -0.025 | -0.297 | -0.009 | -0.547 | 0.019 | 0.542 | 0.031 |
| GBP | 0.289 | 0.328 | -0.040 | -0.096 | 0.327 | -0.049 | -0.237 | -0.172 | -0.396 | 0.657 | 0.068 | 0.088 | 0.044 |
| JPY | 0.066 | 0.284 | -0.389 | -0.085 | -0.518 | 0.151 | 0.145 | 0.560 | 0.030 | 0.256 | -0.105 | 0.227 | 0.050 |
| Dollar | 0.405 | 0.364 | -0.134 | 0.006 | 0.066 | 0.135 | 0.019 | 0.082 | 0.068 | -0.219 | -0.064 | -0.768 | 0.100 |
| Carry | 0.258 | -0.146 | 0.318 | 0.113 | 0.476 | 0.112 | 0.014 | 0.674 | -0.165 | -0.162 | -0.128 | 0.187 | -0.012 |
| Eigenvalue | 0.266 | 0.179 | 0.121 | 0.095 | 0.091 | 0.066 | 0.054 | 0.040 | 0.036 | 0.034 | 0.013 | 0.006 | 0.000 |
| Cumulative % | 0.266 | 0.445 | 0.566 | 0.660 | 0.751 | 0.817 | 0.870 | 0.911 | 0.946 | 0.980 | 0.994 | 1.000 | 1.000 |

**Table C.2 – (continued)**

Subtable II. Developed

| Factor | PC1 | PC2 | PC3 | PC4 | PC5 | PC6 | PC7 | PC8 | PC9 | PC10 | PC11 | PC12 | PC13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PD | 0.019 | 0.044 | 0.205 | -0.052 | 0.427 | 0.858 | -0.130 | 0.081 | -0.007 | 0.091 | 0.046 | -0.019 | -0.004 |
| MKT | 0.475 | -0.180 | 0.089 | -0.181 | -0.003 | -0.005 | 0.281 | 0.171 | 0.172 | -0.111 | 0.167 | 0.004 | -0.723 |
| MKTLC | 0.397 | -0.311 | 0.206 | -0.214 | -0.045 | 0.009 | 0.311 | 0.172 | 0.163 | -0.124 | 0.165 | 0.073 | 0.675 |
| SMB | 0.045 | 0.089 | -0.177 | 0.426 | 0.648 | -0.296 | -0.096 | 0.333 | 0.269 | -0.168 | 0.209 | 0.044 | 0.058 |
| HML | -0.083 | 0.425 | 0.474 | -0.117 | 0.132 | -0.123 | 0.247 | 0.134 | 0.178 | -0.213 | -0.619 | 0.058 | -0.012 |
| WML | -0.143 | -0.060 | -0.355 | 0.429 | -0.040 | 0.266 | 0.751 | -0.074 | -0.004 | 0.003 | -0.154 | 0.011 | 0.006 |
| CMA | -0.218 | 0.440 | 0.288 | -0.137 | 0.110 | -0.138 | 0.372 | -0.170 | -0.100 | 0.239 | 0.622 | -0.068 | 0.004 |
| RMW | -0.248 | 0.204 | 0.075 | 0.199 | -0.566 | 0.209 | -0.105 | 0.555 | 0.286 | -0.161 | 0.248 | 0.008 | -0.013 |
| EUR | 0.350 | 0.387 | -0.129 | 0.079 | -0.073 | 0.071 | -0.026 | 0.061 | -0.563 | -0.305 | 0.070 | 0.525 | 0.034 |
| GBP | 0.328 | 0.290 | -0.011 | 0.220 | -0.153 | 0.110 | -0.140 | -0.582 | 0.578 | -0.001 | 0.051 | 0.167 | 0.045 |
| JPY | 0.070 | 0.272 | -0.496 | -0.433 | 0.031 | -0.001 | 0.047 | 0.285 | 0.227 | 0.527 | -0.129 | 0.233 | 0.055 |
| Dollar | 0.419 | 0.358 | -0.162 | 0.066 | -0.073 | 0.026 | -0.016 | 0.093 | -0.155 | -0.001 | -0.074 | -0.781 | 0.108 |
| Carry | 0.262 | -0.082 | 0.385 | 0.485 | -0.096 | -0.100 | -0.034 | 0.175 | -0.148 | 0.661 | -0.122 | 0.129 | -0.017 |
| Eigenvalue | 0.264 | 0.175 | 0.125 | 0.102 | 0.089 | 0.072 | 0.054 | 0.039 | 0.035 | 0.026 | 0.014 | 0.005 | 0.000 |
| Cumulative % | 0.264 | 0.439 | 0.564 | 0.666 | 0.756 | 0.828 | 0.882 | 0.921 | 0.956 | 0.981 | 0.995 | 1.000 | 1.000 |

**Table C.2 – (continued)**

Subtable III. Emerging

| Factor | PC1 | PC2 | PC3 | PC4 | PC5 | PC6 | PC7 | PC8 | PC9 | PC10 | PC11 | PC12 | PC13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PE | 0.083 | -0.192 | 0.040 | -0.135 | -0.240 | 0.913 | 0.109 | 0.163 | 0.042 | -0.060 | -0.028 | -0.012 | 0.004 |
| MKT | 0.502 | -0.080 | -0.200 | -0.073 | 0.017 | -0.072 | -0.108 | 0.235 | 0.106 | 0.179 | 0.137 | 0.183 | -0.727 |
| MKTLC | 0.449 | -0.201 | -0.300 | -0.035 | -0.001 | -0.094 | -0.146 | 0.260 | 0.128 | 0.192 | 0.144 | 0.198 | 0.675 |
| SMB | 0.016 | 0.072 | 0.420 | 0.576 | -0.417 | 0.009 | -0.134 | -0.097 | 0.399 | 0.266 | 0.078 | 0.222 | 0.003 |
| HML | -0.124 | 0.488 | -0.395 | 0.126 | -0.170 | 0.088 | -0.157 | 0.224 | 0.142 | 0.178 | 0.236 | -0.597 | -0.001 |
| WML | -0.157 | -0.143 | 0.480 | 0.077 | 0.295 | -0.029 | -0.317 | 0.699 | -0.140 | 0.006 | 0.031 | -0.147 | 0.000 |
| CMA | -0.260 | 0.460 | -0.236 | 0.038 | -0.185 | 0.031 | -0.013 | 0.361 | -0.238 | -0.082 | -0.222 | 0.621 | 0.002 |
| RMW | -0.278 | 0.160 | -0.038 | -0.160 | 0.609 | 0.195 | 0.050 | -0.052 | 0.576 | 0.258 | 0.049 | 0.236 | 0.004 |
| EUR | 0.298 | 0.415 | 0.242 | -0.062 | 0.116 | 0.068 | -0.084 | -0.073 | 0.064 | -0.607 | 0.508 | 0.111 | 0.068 |
| GBP | 0.271 | 0.319 | 0.160 | 0.056 | 0.267 | 0.253 | -0.253 | -0.309 | -0.522 | 0.473 | -0.050 | 0.020 | 0.057 |
| JPY | 0.082 | 0.235 | 0.362 | -0.427 | -0.213 | -0.169 | 0.595 | 0.194 | -0.029 | 0.356 | 0.163 | -0.038 | 0.065 |
| Dollar | 0.423 | 0.290 | 0.113 | 0.072 | 0.111 | -0.024 | 0.108 | 0.113 | 0.269 | -0.180 | -0.729 | -0.209 | 0.052 |
| Carry | 0.087 | -0.055 | -0.148 | 0.633 | 0.324 | 0.079 | 0.611 | 0.138 | -0.184 | -0.030 | 0.168 | -0.007 | -0.007 |
| Eigenvalue | 0.256 | 0.164 | 0.113 | 0.092 | 0.084 | 0.072 | 0.062 | 0.053 | 0.041 | 0.034 | 0.016 | 0.014 | 0.000 |
| Cumulative % | 0.256 | 0.420 | 0.533 | 0.625 | 0.708 | 0.780 | 0.843 | 0.896 | 0.936 | 0.970 | 0.986 | 1.000 | 1.000 |

# D    Supplementary material for robustness tests

## Table D.1 – Fama-MacBeth estimation of risk premium on the P-factor

This table reports the risk premium on each factor estimated using Fama-MacBeth regressions of the factor loadings ($\lambda_k$ from eqn. 2), on the sample of monthly observations for all (Subtable I), developed (Subtable II) and emerging (Subtable III) markets, with and without the corresponding P-factor PG, PD or PE. $R^2$ is adjusted for the number of regressors. Standard errors are Shanken corrected and Newey-West. MAPE is the annualized cross-sectional mean absolute pricing error and RMSE is the annualized cross-sectional root mean square error. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$. The sample spans 1992–2016.

### Subtable I. Global

| | World CAPM | | Fama-French three-factor | | | | Carhart | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | PG | MKT | SMB | HML | PG | MKT | SMB | HML | WML | PG |
| Premium | 0.073* | | 0.068* | 0.008 | -0.013 | | 0.069* | 0.010 | -0.020 | 0.061 | |
| | (0.063) | | (0.053) | (0.789) | (0.687) | | (0.054) | (0.742) | (0.513) | (0.112) | |
| $R^2$ | 0.284 | | 0.318 | | | | 0.348 | | | | |
| MAPE | 0.026 | | 0.025 | | | | 0.024 | | | | |
| RMSE | 0.010 | | 0.010 | | | | 0.010 | | | | |
| Premium | 0.061 | 0.095* | 0.065* | -0.011 | 0.005 | 0.099* | 0.066* | -0.011 | -0.003 | 0.070* | 0.099* |
| | (0.104) | (0.092) | (0.068) | (0.696) | (0.860) | (0.080) | (0.068) | (0.697) | (0.928) | (0.079) | (0.090) |
| $R^2$ | 0.523 | | 0.524 | | | | 0.582 | | | | |
| MAPE | 0.022 | | 0.022 | | | | 0.021 | | | | |
| RMSE | 0.008 | | 0.008 | | | | 0.008 | | | | |

| | Fama-French five-factor | | | | | | ICAPM | | | | | ICAPM Redux | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | SMB | HML | CMA | RMW | PG | MKT | EUR | GBP | JPY | PG | MKTLC | Dollar | Carry | PG |
| Premium | 0.066* | -0.005 | -0.015 | -0.022 | 0.024 | | 0.076* | -0.010 | -0.013 | -0.006 | | 0.068* | 0.009 | 0.050 | |
| | (0.061) | (0.868) | (0.638) | (0.487) | (0.373) | | (0.057) | (0.776) | (0.715) | (0.878) | | (0.060) | (0.697) | (0.266) | |
| $R^2$ | 0.415 | | | | | | 0.347 | | | | | 0.318 | | | |
| MAPE | 0.024 | | | | | | 0.026 | | | | | 0.026 | | | |
| RMSE | 0.009 | | | | | | 0.009 | | | | | 0.010 | | | |
| Premium | 0.067* | -0.021 | 0.001 | 0.000 | 0.023 | 0.088 | 0.063* | 0.000 | 0.007 | -0.003 | 0.093* | 0.060* | 0.009 | 0.015 | 0.096* |
| | (0.060) | (0.408) | (0.963) | (0.997) | (0.386) | (0.110) | (0.088) | (0.990) | (0.848) | (0.938) | (0.089) | (0.084) | (0.699) | (0.697) | (0.080) |
| $R^2$ | 0.565 | | | | | | 0.523 | | | | | 0.523 | | | |
| MAPE | 0.021 | | | | | | 0.021 | | | | | 0.021 | | | |
| RMSE | 0.008 | | | | | | 0.008 | | | | | 0.008 | | | |

**Table D.1 – (continued)**

Subtable II. Developed

| | World CAPM | | Fama-French three-factor | | | | Carhart | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | PD | MKT | SMB | HML | PD | MKT | SMB | HML | WML | PD |
| Premium | 0.061* | | 0.065* | -0.019 | -0.018 | | 0.065* | -0.020 | -0.016 | 0.077* | |
| | (0.100) | | (0.066) | (0.365) | (0.553) | | (0.074) | (0.329) | (0.594) | (0.013) | |
| $R^2$ | -0.038 | | 0.104 | | | | 0.184 | | | | |
| MAPE | 0.023 | | 0.022 | | | | 0.021 | | | | |
| RMSE | 0.009 | | 0.008 | | | | 0.008 | | | | |
| Premium | 0.064* | -0.116* | 0.064* | -0.009 | -0.011 | -0.112* | 0.064* | -0.010 | -0.009 | 0.076* | -0.111* |
| | (0.088) | (0.002) | (0.074) | (0.680) | (0.726) | (0.002) | (0.082) | (0.637) | (0.757) | (0.016) | (0.003) |
| $R^2$ | 0.375 | | 0.373 | | | | 0.441 | | | | |
| MAPE | 0.019 | | 0.019 | | | | 0.018 | | | | |
| RMSE | 0.007 | | 0.007 | | | | 0.006 | | | | |

| | Fama-French five-factor | | | | | | ICAPM | | | | | ICAPM Redux | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | SMB | HML | CMA | RMW | PD | MKT | EUR | GBP | JPY | PD | MKTLC | Dollar | Carry | PD |
| Premium | 0.066* | -0.018 | -0.019 | 0.006 | 0.028 | | 0.071* | -0.022 | -0.029 | -0.005 | | 0.076* | -0.011 | 0.048* | |
| | (0.074) | (0.418) | (0.533) | (0.804) | (0.178) | | (0.046) | (0.469) | (0.271) | (0.866) | | (0.020) | (0.688) | (0.089) | |
| $R^2$ | 0.261 | | | | | | 0.213 | | | | | 0.144 | | | |
| MAPE | 0.021 | | | | | | 0.019 | | | | | 0.019 | | | |
| RMSE | 0.007 | | | | | | 0.008 | | | | | 0.008 | | | |
| Premium | 0.065* | -0.012 | -0.009 | 0.006 | 0.015 | -0.105* | 0.072* | -0.015 | -0.025 | -0.006 | -0.110* | 0.072* | -0.002 | 0.049* | -0.112* |
| | (0.072) | (0.576) | (0.767) | (0.807) | (0.432) | (0.004) | (0.048) | (0.633) | (0.357) | (0.847) | (0.003) | (0.030) | (0.951) | (0.085) | (0.002) |
| $R^2$ | 0.338 | | | | | | 0.532 | | | | | 0.506 | | | |
| MAPE | 0.021 | | | | | | 0.016 | | | | | 0.015 | | | |
| RMSE | 0.007 | | | | | | 0.006 | | | | | 0.006 | | | |

## Table D.1 – (continued)

### Subtable III. Emerging

| | World CAPM | | Fama-French three-factor | | | | Carhart | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | PE | MKT | SMB | HML | PE | MKT | SMB | HML | WML | PE |
| Premium | 0.086* | | 0.081* | 0.004 | 0.032 | | 0.087* | 0.003 | 0.020 | 0.056 | |
| | (0.056) | | (0.047) | (0.879) | (0.312) | | (0.037) | (0.929) | (0.543) | (0.159) | |
| $R^2$ | 0.467 | | 0.478 | | | | 0.489 | | | | |
| MAPE | 0.027 | | 0.026 | | | | 0.025 | | | | |
| RMSE | 0.009 | | 0.009 | | | | 0.009 | | | | |
| Premium | 0.080* | 0.154* | 0.067* | 0.018 | 0.039 | 0.157* | 0.071* | 0.018 | 0.025 | 0.046 | 0.151* |
| | (0.073) | (0.066) | (0.096) | (0.487) | (0.257) | (0.067) | (0.072) | (0.510) | (0.464) | (0.215) | (0.074) |
| $R^2$ | 0.686 | | 0.785 | | | | 0.769 | | | | |
| MAPE | 0.021 | | 0.017 | | | | 0.019 | | | | |
| RMSE | 0.007 | | 0.006 | | | | 0.007 | | | | |

| | Fama-French five-factor | | | | | | ICAPM | | | | | ICAPM Redux | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | SMB | HML | CMA | RMW | PE | MKT | EUR | GBP | JPY | PE | MKTLC | Dollar | Carry | PE |
| Premium | 0.072* | 0.000 | 0.030 | -0.002 | 0.007 | | 0.084* | 0.018 | 0.026 | -0.016 | | 0.048 | 0.041 | 0.099* | |
| | (0.062) | (1.000) | (0.343) | (0.939) | (0.844) | | (0.064) | (0.627) | (0.466) | (0.705) | | (0.256) | (0.132) | (0.030) | |
| $R^2$ | 0.508 | | | | | | 0.500 | | | | | 0.526 | | | |
| MAPE | 0.025 | | | | | | 0.026 | | | | | 0.023 | | | |
| RMSE | 0.009 | | | | | | 0.009 | | | | | 0.009 | | | |
| Premium | 0.062 | 0.007 | 0.032 | 0.008 | 0.030 | 0.157* | 0.080* | 0.018 | 0.026 | 0.004 | 0.152* | 0.032 | 0.046* | 0.077* | 0.138 |
| | (0.111) | (0.772) | (0.342) | (0.802) | (0.292) | (0.061) | (0.082) | (0.620) | (0.469) | (0.923) | (0.060) | (0.419) | (0.091) | (0.075) | (0.104) |
| $R^2$ | 0.807 | | | | | | 0.712 | | | | | 0.753 | | | |
| MAPE | 0.016 | | | | | | 0.020 | | | | | 0.019 | | | |
| RMSE | 0.006 | | | | | | 0.007 | | | | | 0.007 | | | |

**Table D.2 – Risk premia on the P-CAPM factors with Fama-MacBeth regressions**

This table reports the premia $\lambda_k$ (cf. eqn. 2) estimated using Fama-MacBeth regressions on the factors of the global (Panel A), developed (Panel B), and emerging (Panel C) markets P-CAPM, using monthly observations. $R^2$ is adjusted for the number of regressors. Standard errors are Shanken corrected and Newey-West. MAPE is the annualized cross-sectional mean absolute pricing error and RMSE is the annualized cross-sectional root mean square error. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$. The sample spans 1992–2016.

| | (a) Global | | | (b) Developed | | | (c) Emerging | | |
|---|---|---|---|---|---|---|---|---|---|
| | MKT | Dollar | PG | MKT | Dollar | PD | MKT | Dollar | PE |
| Risk premium | 0.062* | 0.009 | 0.096* | 0.070* | 0.000 | -0.112* | 0.056 | 0.047 | 0.158* |
| | (0.086) | (0.702) | (0.088) | (0.054) | (0.987) | (0.002) | (0.187) | (0.102) | (0.065) |
| $R^2$ | 0.524 | | | 0.425 | | | 0.763 | | |
| MAPE | 0.022 | | | 0.018 | | | 0.017 | | |
| RMSE | 0.008 | | | 0.006 | | | 0.006 | | |
| Factor mean | 0.057* | 0.010 | 0.085* | 0.059* | 0.008 | -0.099* | 0.057* | 0.023 | 0.156* |
| | (0.090) | (0.462) | (0.047) | (0.079) | (0.679) | (0.004) | (0.090) | (0.106) | (0.028) |

## Table D.3 – Cross-sectional estimation of risk premium on the ICRG political factor

This table reports the risk premium on each factor estimated through a second-step cross-sectional regression using the time-series OLS estimates of the factor loadings ($\lambda_k$ from eqn. 2), on the sample of monthly observations for the global (Subtable I), developed (Subtable II), and emerging (Subtable III) markets, with and without the corresponding ICRG factor IPG, IPD or IPE. $R^2$ is adjusted for the number of regressors. Standard errors are Shanken adjusted. MAPE is the annualized cross-sectional mean absolute pricing error and RMSE is the annualized cross-sectional root mean square error. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$. The sample spans 1992–2016.

### Subtable I. Global

| | World CAPM | | Fama-French three-factor | | | | Carhart | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | IPG | MKT | SMB | HML | IPG | MKT | SMB | HML | WML | IPG |
| Premium | 0.074* | | 0.067* | 0.011 | -0.014 | | 0.068* | 0.013 | -0.021 | 0.060 | |
| | (0.028) | | (0.040) | (0.655) | (0.607) | | (0.038) | (0.602) | (0.409) | (0.121) | |
| $R^2$ | 0.284 | | 0.319 | | | | 0.351 | | | | |
| MAPE | 0.026 | | 0.025 | | | | 0.024 | | | | |
| RMSE | 0.010 | | 0.009 | | | | 0.009 | | | | |
| Premium | 0.064* | 0.040 | 0.063* | -0.001 | -0.004 | 0.040 | 0.064* | -0.004 | -0.009 | 0.079* | 0.042 |
| | (0.052) | (0.226) | (0.051) | (0.968) | (0.882) | (0.228) | (0.050) | (0.883) | (0.704) | (0.045) | (0.210) |
| $R^2$ | 0.428 | | 0.424 | | | | 0.539 | | | | |
| MAPE | 0.023 | | 0.023 | | | | 0.021 | | | | |
| RMSE | 0.009 | | 0.008 | | | | 0.007 | | | | |

| | Fama-French five-factor | | | | | | ICAPM | | | | | ICAPM Redux | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | SMB | HML | CMA | RMW | IPG | MKT | EUR | GBP | JPY | IPG | MKTLC | Dollar | Carry | IPG |
| Premium | 0.065* | -0.002 | -0.014 | -0.027 | 0.024 | | 0.078* | -0.013 | -0.012 | -0.006 | | 0.069* | 0.009 | 0.049 | |
| | (0.046) | (0.944) | (0.597) | (0.319) | (0.276) | | (0.023) | (0.687) | (0.704) | (0.855) | | (0.033) | (0.636) | (0.188) | |
| $R^2$ | 0.411 | | | | | | 0.347 | | | | | 0.319 | | | |
| MAPE | 0.024 | | | | | | 0.026 | | | | | 0.026 | | | |
| RMSE | 0.009 | | | | | | 0.009 | | | | | 0.009 | | | |
| Premium | 0.065* | -0.008 | -0.003 | -0.006 | 0.013 | 0.037 | 0.065* | 0.003 | -0.004 | -0.004 | 0.041 | 0.063* | 0.009 | 0.011 | 0.042 |
| | (0.045) | (0.743) | (0.905) | (0.798) | (0.528) | (0.265) | (0.043) | (0.921) | (0.895) | (0.902) | (0.215) | (0.046) | (0.630) | (0.753) | (0.213) |
| $R^2$ | 0.439 | | | | | | 0.430 | | | | | 0.450 | | | |
| MAPE | 0.022 | | | | | | 0.023 | | | | | 0.023 | | | |
| RMSE | 0.008 | | | | | | 0.008 | | | | | 0.008 | | | |

**Table D.3 – (continued)**

Subtable II. Developed

| | World CAPM | | Fama-French three-factor | | | | Carhart | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | IPD | MKT | SMB | HML | IPD | MKT | SMB | HML | WML | IPD |
| Premium | 0.061* | | 0.065* | -0.019 | -0.018 | | 0.065* | -0.020 | -0.016 | 0.077* | |
| | (0.066) | | (0.046) | (0.325) | (0.494) | | (0.048) | (0.292) | (0.530) | (0.014) | |
| $R^2$ | -0.038 | | 0.104 | | | | 0.184 | | | | |
| MAPE | 0.023 | | 0.022 | | | | 0.021 | | | | |
| RMSE | 0.009 | | 0.008 | | | | 0.007 | | | | |
| Premium | 0.069* | -0.060* | 0.069* | -0.015 | 0.004 | -0.058* | 0.068* | -0.015 | 0.002 | 0.069* | -0.054* |
| | (0.035) | (0.037) | (0.037) | (0.447) | (0.882) | (0.039) | (0.039) | (0.446) | (0.944) | (0.023) | (0.054) |
| $R^2$ | 0.538 | | 0.515 | | | | 0.517 | | | | |
| MAPE | 0.015 | | 0.016 | | | | 0.015 | | | | |
| RMSE | 0.006 | | 0.005 | | | | 0.005 | | | | |

| | Fama-French five-factor | | | | | | ICAPM | | | | | ICAPM Redux | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | SMB | HML | CMA | RMW | IPD | MKT | EUR | GBP | JPY | IPD | MKTLC | Dollar | Carry | IPD |
| Premium | 0.066* | -0.018 | -0.019 | 0.006 | 0.028 | | 0.071* | -0.022 | -0.029 | -0.005 | | 0.076* | -0.011 | 0.048* | |
| | (0.046) | (0.355) | (0.472) | (0.780) | (0.129) | | (0.029) | (0.423) | (0.240) | (0.859) | | (0.018) | (0.647) | (0.060) | |
| $R^2$ | 0.261 | | | | | | 0.213 | | | | | 0.144 | | | |
| MAPE | 0.021 | | | | | | 0.019 | | | | | 0.019 | | | |
| RMSE | 0.007 | | | | | | 0.007 | | | | | 0.007 | | | |
| Premium | 0.068* | -0.019 | 0.008 | 0.005 | 0.009 | -0.056* | 0.071* | -0.003 | -0.018 | -0.017 | -0.059* | 0.070* | 0.006 | 0.047* | -0.059* |
| | (0.038) | (0.327) | (0.713) | (0.805) | (0.589) | (0.043) | (0.030) | (0.909) | (0.456) | (0.531) | (0.032) | (0.026) | (0.769) | (0.064) | (0.035) |
| $R^2$ | 0.463 | | | | | | 0.592 | | | | | 0.610 | | | |
| MAPE | 0.018 | | | | | | 0.014 | | | | | 0.014 | | | |
| RMSE | 0.006 | | | | | | 0.005 | | | | | 0.005 | | | |

**Table D.3 – (continued)**

Subtable III. Emerging

| | World CAPM | | Fama-French three-factor | | | | Carhart | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | IPE | MKT | SMB | HML | IPE | MKT | SMB | HML | WML | IPE |
| Premium | 0.085* | | 0.078* | 0.005 | 0.024 | | 0.082* | 0.005 | 0.012 | 0.051 | |
| | (0.029) | | (0.053) | (0.843) | (0.399) | | (0.044) | (0.854) | (0.679) | (0.191) | |
| $R^2$ | 0.467 | | 0.497 | | | | 0.509 | | | | |
| MAPE | 0.027 | | 0.025 | | | | 0.024 | | | | |
| RMSE | 0.009 | | 0.009 | | | | 0.008 | | | | |
| Premium | 0.081* | 0.074 | 0.063* | 0.021 | 0.036 | 0.086* | 0.067* | 0.021 | 0.025 | 0.059 | 0.085* |
| | (0.036) | (0.126) | (0.099) | (0.413) | (0.210) | (0.078) | (0.084) | (0.430) | (0.377) | (0.134) | (0.082) |
| $R^2$ | 0.569 | | 0.721 | | | | 0.785 | | | | |
| MAPE | 0.023 | | 0.019 | | | | 0.016 | | | | |
| RMSE | 0.008 | | 0.006 | | | | 0.005 | | | | |

| | Fama-French five-factor | | | | | | ICAPM | | | | | ICAPM Redux | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MKT | SMB | HML | CMA | RMW | IPE | MKT | EUR | GBP | JPY | IPE | MKTLC | Dollar | Carry | IPE |
| Premium | 0.068* | 0.003 | 0.029 | -0.008 | 0.009 | | 0.086* | 0.010 | 0.027 | -0.013 | | 0.053 | 0.035* | 0.097* | |
| | (0.075) | (0.912) | (0.299) | (0.743) | (0.757) | | (0.030) | (0.768) | (0.416) | (0.722) | | (0.143) | (0.091) | (0.029) | |
| $R^2$ | 0.517 | | | | | | 0.495 | | | | | 0.524 | | | |
| MAPE | 0.025 | | | | | | 0.026 | | | | | 0.022 | | | |
| RMSE | 0.008 | | | | | | 0.008 | | | | | 0.008 | | | |
| Premium | 0.066* | 0.022 | 0.045 | 0.017 | -0.018 | 0.091* | 0.078* | 0.023 | 0.016 | -0.012 | 0.075 | 0.052 | 0.035* | 0.083* | 0.064 |
| | (0.085) | (0.359) | (0.109) | (0.460) | (0.523) | (0.062) | (0.044) | (0.496) | (0.623) | (0.752) | (0.118) | (0.148) | (0.095) | (0.038) | (0.176) |
| $R^2$ | 0.732 | | | | | | 0.589 | | | | | 0.535 | | | |
| MAPE | 0.019 | | | | | | 0.022 | | | | | 0.022 | | | |
| RMSE | 0.006 | | | | | | 0.007 | | | | | 0.008 | | | |

## Table D.4 – Risk premia on the P-CAPM using the ICRG factor

This table reports the premia $\lambda_k$ (cf. eqn. 2) on the factors of the P-CAPM with the univariate ICRG factor replacing the bivariate P-factor for the global (Panel A), developed (Panel B), and emerging (Panel C) markets models, using cross-sectional OLS regressions on monthly observations. $R^2$ is adjusted for the number of regressors. Standard errors are Shanken corrected. MAPE is the annualized cross-sectional mean absolute pricing error and RMSE is the annualized cross-sectional root mean square error. p-values are in parenthesis and the asterisk (*) denotes $p < 0.10$. The sample spans 1992–2016.

|  | (a) Global | | | (b) Developed | | | (c) Emerging | | |
|---|---|---|---|---|---|---|---|---|---|
|  | MKT | Dollar | IPG | MKT | Dollar | IPD | MKT | Dollar | IPE |
| Risk premium | 0.065* | 0.010 | 0.041 | 0.072* | 0.008 | -0.058* | 0.072* | 0.031 | 0.075 |
|  | (0.044) | (0.617) | (0.224) | (0.030) | (0.721) | (0.037) | (0.058) | (0.151) | (0.121) |
| $R^2$ | 0.432 | | | 0.545 | | | 0.601 | | |
| MAPE | 0.023 | | | 0.015 | | | 0.022 | | |
| RMSE | 0.008 | | | 0.005 | | | 0.008 | | |
| Factor mean | 0.057* | 0.010 | 0.052 | 0.059* | 0.008 | -0.046* | 0.057* | 0.023 | 0.110* |
|  | (0.090) | (0.462) | (0.137) | (0.079) | (0.679) | (0.041) | (0.090) | (0.106) | (0.008) |