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Abstract

Panel analysis of 20 industrial countries shows evidence for pro-cyclicality of capital gains on domestic stock markets - in particular over a medium term horizon. Thus, with cross-border ownership of portfolio equity investments, potential for international smoothing of domestic output fluctuations by means of the capital gains channel is found. Individual country analysis reveals substantial heterogeneity of cyclical patterns. Evidence suggests that this cross-country variation can be explained by the level of economic development and the size of financial markets.

Keywords: International risk sharing, capital gains, cross-border investment

JEL Classification: F21, F30, G15

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1 Introduction

Following a capital market approach, we analyse the potential smoothing of domestic output and wealth fluctuations by means of cross-country ownership of foreign portfolio assets and liabilities. In times of increasing international financial integration, both investment income flows and capital gains are channels that can potentially provide international risk sharing.¹

Lane (2001) analysed the former channel using data on international investment positions, whereas the main innovation in this paper is to introduce the latter. This channel is of particular relevance to countries with large equity shares in their portfolios which make most of their returns in the form of capital gains (thus not affecting investment income flows). We focus in our analysis on capital gains on domestic financial markets (as a proxy for the foreign liability side).²

If domestic capital markets are partly owned by foreign investors, a pro-cyclical co-movement of capital gains on domestic capital markets with GDP growth brings about economic or wealth stabilisation.³ Faria et al. (2006) indeed find higher equity shares in the composition of foreign liabilities in the last decade. We analyse if this provides improved potential for international risk sharing, namely if pro-cyclicality of equity and bond markets is observable.⁴

Obstfeld (2004) provides a comparison between an idealised world of fully-enforceable state-contingent contracts and the world of asset trade in non-contingent contracts (i.e. bonds and loans). In the ideal world with complete Arrow-Debreu securities a country is fully insured against domestic output shocks. Securities that could in theory deliver the desired improved international risk sharing are bilateral GDP income swaps as proposed by Merton (1990) or GDP linked securities (Shiller, 1993).

Due to the lack of these instruments we use the following application: When domestic GDP grows faster, the domestic stock market performance should improve accordingly; that is delivering higher capital gains for domestic and foreign investors. The benefit for foreign investors from this economic up-swing is in the form of capital gains and dividend

¹See Lane and Milesi-Ferretti (2006) for a documentation of the rapid growth in cross-border financial holdings.

²An extended version of this paper also includes the analysis of rates of capital gains on foreign assets and liabilities using international investment position data. These are usually very similar to market rates, but often less accurate and poorer in terms of data availability.

³The realisation of capital gains and losses involves liquidation costs however, which increase with the extent of illiquidity. This applies to FDI in particular.

⁴Capital gains on foreign assets, on the other hand, are influenced by a broad range of global factors such that a satisfying analysis is beyond the scope of this paper.

payments which represents a “benign loss” for the domestic economy. This decreases domestic income and wealth commensurately, thus providing a smoothing or “hedging” of the economic performance across the different states of the world.⁵ Obviously, this smoothing mechanism also works when the economy performs poorly, since now there should be capital losses (due to falling share prices) and lower income outflows.

This paper will examine if this mechanism is empirically observable which is “essential” (Obstfeld) in order to evaluate the stabilising effects of international investments. Two main contributions are made: first the cyclicity of capital gains on equity and bond markets is analysed on panel and country level; second, cross-country variation in cyclicity patterns is treated formally in order to find the fundamental reasons for differing degrees of international risk sharing.⁶

This application is related to Davis, Nalewaik and Willen (2001) who develop a procedure to assess the gains to international financial trade in risky assets depending on the correlations of domestic and international equity returns and domestic output innovations.⁷

It is crucial to stress that the aim of this paper is not to provide an econometric model that explains capital gains. But the emphasis rather is on the co-movement of capital gains on different asset types and GDP growth in order to establish conclusions about cyclicity and the associated international risk-sharing properties.

Accordingly, the rest of this paper is organised as follows: in the second section the data will be presented. The empirical analysis starts in the third section by investigating co-movements of domestic capital markets and GDP growth rates. Subsequently determinants of country heterogeneity will be approached in section four; eventually some concluding remarks will be made.

2 Data

In order to study the cyclical properties of capital markets we constructed a dataset of 20 industrial countries.⁸ This choice of the sample is very much determined by data availability both in length and scope. We are able to capture the time series from 1973

⁵If firms choose not to pay out dividends, but instead to keep retained earnings, the mechanism works as well, since this should be reflected in higher stock prices and thus capital gains.

⁶This two-step approach is adapted from Lane’s (2003) cyclicity analysis on fiscal policy.

⁷See their paper for a model of international trade in risky financial assets under incomplete markets.

⁸Australia, Austria, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and the United States.

to 2006.

We employ the Datastream domestic and global equity price indices in order to calculate annual rates of capital gains. These are available both in terms of domestic currency and US dollars and have the advantage of including only pure equity prices (thus without dividend payments). Hence these indices are appropriate in order to analyse the capital gains channel of international investments. For bond markets, data are provided by the Datastream benchmark indices on two-year and ten-year government bonds. These indices are available both in domestic currency as well as in US dollars. Furthermore we employ data provided by Datastream on domestic and global stock capitalisation, as well as data on bond market capitalisation provided by the Bank of International Settlements (BIS).

GDP (at constant prices) and CPI data for individual countries and the world economy are retrieved from the IMF's WEO database. Conventionally GDP growth rates measure the average growth rate in a given year; however, this is not appropriate for our analysis. As we are dealing with stock market rates of capital gains - which are essential year-end to year-end rates - one has to apply the same logic to real rates of GDP growth. Consequently we construct a year-end to year-end rate of GDP growth by considering real GDP in the last quarter of a given year relative to the last quarter of the year before. Thus we obtain a real GDP growth rate which is consistent with the other variables in our analysis. In the same way we construct appropriate inflation rates in order to calculate real rates of capital gains. Output per capita data are taken from the Penn World Tables.

Given the data availability and the empirical focus on cyclical factors, the data used are at annual frequency.

3 The Cyclical Properties of Domestic Capital Markets

3.1 Equity Markets

As outlined above the analysis starts by considering the co-movement of domestic output innovations (that is GDP growth rates) and the performance of domestic stock markets measured by rates of capital gains. We consider regression specifications with both all variables expressed in domestic currency (thus taking the perspective of a domestic investor in one of the sample's countries) and all variables expressed in terms of US dollars in order to have a common currency among all countries. This can be understood as

approaching the question from a foreign or international investor's point of view.

The regression estimation is by least squares. We employ a within-group fixed effects estimator with first-order autoregressive disturbances in order to adjust for persistence and auto-correlation in the error term as well as heteroskedasticity robust standard errors. We report panel estimations including country fixed effects and both country and time fixed effects. Time fixed effects have the property of controlling for common global shocks. Consequently, the domestic GDP growth rate reflects solely the idiosyncratic part of domestic growth, whereas in the country fixed effects estimation also global factors could drive the results. The panel regression specification is:

$$EQKG_{it} = \alpha_i + \delta_t + \beta g_{it} + e_{it} \quad (1)$$

$$e_{it} = \rho e_{it-1} + z_{it}$$

where $EQKG$ is the annual real rate of capital gains on the respective domestic stock market and g is the real annual rate of domestic GDP growth.

The regression analysis shows the following (Table 1): Both in terms of domestic currency and in US dollars we find pro-cyclicality of capital gains (significant at the 1% level). This implies that in our sample a one percentage point increase in the domestic GDP growth rate co-moves with a 1.3 percentage points increase in the rate of capital gains. However, the result changes significantly when time fixed effects are included: Insignificant beta coefficients suggests that global factors explained most of the pro-cyclicality observed before.

In terms of international risk-sharing, this has crucial implications, as we are interested in isolating the idiosyncratic component of GDP growth. Our results hence imply that there is only limited evidence for a significant contemporaneous risk sharing mechanism via domestic stock market capital gains for the period of 1973 to 2006. This means that in the short-run of one year the specific state of a national economy does not seem to be reflected in the idiosyncratic part of stock market returns.

In the individual country specification (2), we estimate similarly by general least squares with a correction for first-order serial correlation in the error term. Moreover, heteroskedasticity robust standard errors are employed.

$$EQKG_{it} = \alpha_i + \beta_i g_{it} + e_{it} \quad (2)$$

$$e_{it} = \rho e_{it-1} + z_{it}$$

The country by country analysis shows a diverse picture (Table 2, column (1)): in terms of domestic currency, we find countries exhibiting pro-cyclical co-movements between GDP growth and the stock market, namely Australia, Canada, the Netherlands, Sweden and the United States. Australia shows the highest coefficient (5.28), implying that a percentage point increase of the GDP growth rates moves along with a more than five percentage point increase in stock market capital gain rates. Hence an economic expansion is also reflected in higher share prices. The other countries in the sample do not show any significant co-movements in terms of domestic currency. When the data are denominated in US dollars (column (3)) coefficients and significance levels obtained are very similar (only Canada's coefficient turns insignificant, whereas Finland's coefficient is significant).

In the second specification the co-movement of the deviation of domestic GDP growth from global GDP growth and the deviation of domestic rates of capital gains from global rates (provided by the Datastream World Index of Share Prices) is analysed. Hence the question if the idiosyncratic part of domestic growth is reflected in the idiosyncratic part of the stock market performance is now also approached on an individual country level. Thus, we run

$$(EQKG_{it} - EQKG_{it}^*) = \alpha_i + \beta_i (g_{it} - g_{it}^*) + e_{it} \quad (3)$$

where $EQKG^*$ is the annual real rate of capital gains on the world stock market index and g^* is the annual real rate of world GDP growth. In domestic currency terms, Finland, New Zealand and Sweden show significant positive coefficients. Hence for these countries the idiosyncratic part of GDP growth is also reflected in the stock market performance. As this also holds in terms of US dollars, it implies that an international investor is able to reap exceptional economic expansion by means of excess stock market returns in these countries.

For Denmark, the United Kingdom and the United States, on the other hand, we find negative relations. Remarkably, the coefficients are in the range of -3. Applying this result means that an increase in the "excess" (relative to the world economy) GDP growth rate of one percentage point is associated with a decrease in the differential of the domestic to the world stock market of three percentage points. A possible explanation could be especially for the United States, that the domestic stock market performance is influenced to a great extent by global factors, for example as higher world economic growth is beneficial for large multinational corporations. The specification in terms of US dollars shows again very similar results indicating that exchange rate movements are a

minor concern in our analysis.

Furthermore it is very crucial to know if extended periods of economic growth are reflected in higher cumulative capital gains on the stock market. For this purpose we constructed five-year GDP growth rates and cumulative five-year rates of stock market capital gains. Since this evidently leaves fewer data points available, this question is only analysed in panel format (with and without country fixed effects).

$$EQKG5_{it} = \alpha_i + \beta g5_{it} + u_{it} \quad (4)$$

where *EQKG5* is the cumulative five year real rate of capital gains on the domestic stock market index and *g5* is the cumulative real rate of domestic GDP growth over five years. The empirical evidence is very striking (Table 3): In terms of domestic currency the coefficient is 7.58, in US dollar terms even 6.46 (both significant at the 1% level). When estimating without country fixed effects, the coefficients are also significant at the 1% level, but smaller in magnitude (4.95 and 4.39).⁹

Thus, there is strong pro-cyclical co-movement of domestic GDP growth and the stock market over a five year horizon. This points towards domestic equity being “a claim on GDP” possibly not in the short run (that is one year), but definitely in the medium run of five years. Hence, in this time framework the necessary cyclical properties of the stock market are satisfied in order to generate economic or wealth stabilisation as described above. This result is very appealing as it offers risk sharing potential on a global scale in particular when investments are made over a medium term horizon. Thus, equity capital gains can act as an effective risk sharing device, when the investment behaviour reaches the appropriate time frame. This result is in line with Giannone and Reichlin (2006) who find increasing risk sharing particularly over long horizons.

Overall we found in this section that there is reasonable evidence on co-movement of GDP growth and stock markets. In particular over a horizon of five years pro-cyclicality of capital gains on equity is observable. This is driven by countries such as Australia, Canada and the Netherlands. However, one has to stress that some countries exhibit counter-cyclicality (in particular with regard to the idiosyncratic part of the domestic stock market), whereas other show no cyclical movement at all.

⁹The use of time fixed effects does not affect results in this analysis.

3.2 Bond Markets

In this subsection we look at potential co-movements of bond prices and real GDP growth. Again a positive co-movement of capital gains on bond markets and real GDP growth would facilitate international risk sharing. However, a negative coefficient implies that a short position in the bond market by foreign investors serves as a hedge against macroeconomic output fluctuations via foreign liability positions.

In order to account for a broad range of portfolio debt securities we construct a bond price index which includes two-year and ten-year government bonds. Then the un-weighted annual real rate of capital gains is calculated. The panel specification is in the same fashion as for equity:

$$BNDKG_{it} = \alpha_i + \delta_t + \beta g_{it} + u_{it} \quad (5)$$

$$e_{it} = \rho e_{it-1} + z_{it}$$

where $BNDKG$ is the constructed annual real rate of capital gains on the domestic bond market and g is the annual real rate of domestic GDP growth.

In terms of domestic currencies (Table 4) the coefficient -1.14 (-1 in US dollars) is significant (at the 1% level) and a coefficient of -0.57 is obtained with time fixed effects. In US dollars the coefficient is insignificant when we include time fixed effects. These results imply that higher domestic output growth moves in line with lower prices on the domestic bond market. Intuitively this relation has some appeal, when we suppose that periods of higher interest rates (and thus lower bond prices) occur contemporaneously with economic booms. In gloomy economic periods, on the other hand, lower interest rates in order to stimulate the economy could drive bond prices up. These relations are supported by the findings for individual countries, where we run

$$BNDKG_{it} = \alpha_i + \beta_i g_{it} + e_{it} \quad (6)$$

$$e_{it} = \rho e_{it-1} + z_{it}$$

We observe counter-cyclicity also for the majority of countries (Table 5). Exceptions are Australia, Canada, Sweden and the United Kingdom for whom no significant relation is found. The largest coefficient in absolute value terms is noticeable for Switzerland (-4.15). Consequently, there is no pro-cyclical (thus wealth stabilising) co-movement observable through bond markets. However, it holds true that short positions in bond holdings are useful hedging instruments as suggested above.

The non-significance in US dollar terms (column (2)) indicates the sensitivity of bond prices to exchange rate movements. For individual countries, this is the case for all countries except for the Netherlands where a coefficient of -4.49 (compared to -1.47 in domestic currency) indicates that bilateral exchange rate movements with the US dollar reinforce the negative relation. In this case it implies that higher economic growth for the Netherlands is accompanied by an exchange rate depreciation vis-a-vis the United States, thus leading to lower returns in US dollars than in domestic currency. Over a five year horizon there is only marginally significant evidence (refer to Table 3). When estimated without country fixed effects we find a positive coefficient (0.55) in terms of domestic currency with a significance level of 5% (Table 2).

4 Explaining Country Heterogeneity

The analysis revealed substantial heterogeneity in cyclicity patterns across countries. Consequently it is of interest to find as a second step explanations for the cross-country variation in the estimations run so far. For this we employ the cross-sectional specification

$$\hat{\beta}_i = \alpha + \lambda Z_i + \nu_i \quad (7)$$

where $\hat{\beta}_i$ are the set of estimated parameters from the country regressions above. Z_i is a set of control variables. It includes the domestic stock and bond market capitalisation (as shares of GDP) and output per capita in natural log form (in PPP terms, taken from the Penn World Tables).¹⁰ These control variables are chosen as indicators for the economic and financial development of the countries included in the sample. Weighted least squares estimation is used in order to take varying levels of accuracy for the (in the previous step) obtained dependent variable into account.¹¹

In Table 6 we see the results of this cross-sectional approach in order to find the determinants of cyclicity in rates of capital gains. In both domestic currency and in US dollars (columns (1) and (2)) we observe rather similar results for the $\hat{\beta}_i$ s of the real rate of capital gains on domestic equity markets.

We find GDP per capita to be positively significant (at the 1% level) for the cyclicity of stock market capital gains. This allows the conclusion that a country's pro-cyclicity indicator is increasing with higher economic development. This suggests that higher de-

¹⁰We use average values by country for the explanatory variables over the period from 1975 to 2004. Unreported robustness tests with average values over different time periods confirm the results.

¹¹We weight by the (in the previous step) obtained t-statistics.

veloped countries are also more likely to benefit from international risk sharing. Moreover, deeper financial markets (as indicated by a higher stock market capitalisation) also leads to more pro-cyclicality of the beta coefficients.

Our interpretation of this result is that a higher stock market capitalisation implies a better coverage of the economy. Hence, business cycle fluctuations are more visible in the stock market performance. Specifically for the rate of capital gains in domestic currency a one percentage point increase in the ratio leads to 0.34 unit increase in $\hat{\beta}_i$. Hence, this result strengthens the proposition that also increasing equity shares in foreign liabilities facilitate economic smoothing.

For the bond market coefficient none of the explanatory variables is found to be significant in domestic currency. In US dollar terms we find a negative coefficient on bond market capitalisation which would imply that the risk-sharing via short positions would be increasing with more financial deepening in bonds.¹²

By and large, we find evidence for more risk sharing potential, the higher a country is developed - that is both in terms of output per capita as well as having more developed financial markets.

5 Conclusion

In this paper the ability of countries to smooth their economic performance across different states of the world is examined. When looking at capital gains on domestic stock markets, economic smoothing is especially feasible when the investment horizon amounts to five years. Country analysis reveals strong pro-cyclicality for Australia, the Netherlands and Sweden in terms of capital gains on domestic stock markets.

This suggests that economic smoothing through the capital gains channel is working for certain countries. In addition, this could be achieved for further countries with an increase in the level of GDP per capita and larger financial markets. Thus, we find that in times of financial globalisation with higher equity shares in international portfolios, economic smoothing and consequently enhanced international risk-sharing becomes more and more feasible. In terms of “optimal” risk sharing one could recommend based on our evidence to attract foreign investments into medium term equity investments and short positions in bond markets.

The extended version of this paper comprises the equivalent analysis of international

¹²The $\hat{\beta}_i$ s for this estimation were generally rather insignificant. Hence this results has only limited explanatory power.

investment positions data (using data from Lane and Milesi-Ferretti, 2006). The results obtained prove to be very comparable with our results which indicates that focusing on capital market data does not harm our analysis, but on the contrary is likely to achieve more accurate results with a longer data coverage.

For further research it would be interesting to extend the country coverage to developing countries for whom economic smoothing might be even more crucial in light of higher output volatility. Moreover, it would be interesting to know if international risk sharing has increased over time and which role in this regard is played by the capital gains channel. The role of financial deepening and home bias appears to be important as well.

Furthermore it is obvious that economic smoothing is only one part of international investment decisions. Findings on gravity models of international asset trade prove to be very significant (e.g. Aviat and Coeurdacier, 2006). Besides, the complete picture of international portfolios also incorporates foreign assets and exchange rate considerations. Obstfeld (2006) points out the importance of developing a consistent general equilibrium portfolio-balance model. These models also have attracted a lot of attention recently, in particular notably by Tille and van Wincoop (2007) as well as Devereux and Sutherland (2007). It would be interesting to link their models to data on foreign assets and liabilities in order to further evaluate the extent and potential of international risk sharing in times of financial globalisation.

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Table 1: Cyclicalities of capital gains on domestic stock market

	Domestic Currency		US Dollar	
	FE	FE + TE	FE	FE + TE
	(1)	(2)	(3)	(4)
Real rate of capital gains on domestic stock market	1.33 (0.61)***	-0.56 (0.57)	1.59 (0.65)***	-0.10 (0.60)

Notes:

The explanatory variable is the real GDP growth rate. See text for definitions of all variables. Estimation by generalised least squares with AR(1) correlated disturbances, heteroskedasticity robust standard errors (in parentheses) and involving country fixed effects ((1) and (3)) and country and time fixed effects ((2) and (4)), Time period: 1973-2006. Data availability varies by country. ***, **, * denote significance at the 1, 5 and 10 percent levels respectively. Full regression outputs are available upon request.

Table 2: Cyclicalities of capital gains on domestic stock market

	Dependent Variable			
	Domestic Currency		US Dollar	
	(1)	(2)	(3)	(4)
	Real rate of capital gains on domestic stock market	Deviation of rate of capital gains on domestic stock market from global stock market	Real rate of capital gains on domestic stock market	Deviation of rate of capital gains on domestic stock market from global stock market
Australia	5.28 (1.74)***	2.13 (2.60)	4.85 (1.99)**	1.37 (2.65)
Austria	-1.24 (2.41)	-7.09 (5.28)	-0.85 (2.84)	-8.43 (6.67)
Canada	1.71 (1.00)*	0.44 (1.51)	1.34 (1.19)	-0.43 (1.36)
Denmark	0.65 (2.87)	-3.23 (1.90)*	1.71 (2.23)	-3.05 (1.92)*
Finland	3.59 (2.35)	5.61 (2.34)**	4.41 (2.04)**	5.09 (2.32)**
France	4.97 (3.65)	-2.44 (2.88)	5.21 (3.89)	-1.99 (2.79)
Germany	3.08 (5.00)	-0.26 (1.91)	1.18 (2.53)	-0.23 (1.97)
Greece	0.65 (7.02)	0.51 (8.04)	2.68 (7.41)	0.69 (8.01)
Italy	1.88 (2.70)	-1.38 (2.24)	1.73 (2.79)	-0.79 (2.14)
Ireland	-2.14 (1.24)	-1.59 (1.46)	0.20 (1.91)	-0.23 (1.55)
Japan	2.31 (1.79)	-0.57 (1.89)	2.13 (2.23)	-0.68 (1.84)
Netherlands	3.69 (1.96)*	1.68 (1.36)	3.75 (1.66)**	1.91 (1.28)
New Zealand	0.92 (1.63)	3.25 (1.50)**	3.64 (2.36)	3.52 (1.47)**
Norway	4.26 (3.62)	-1.03 (2.27)	2.86 (3.40)	-1.09 (2.07)
Portugal	0.09 (0.07)	-0.31 (1.82)	1.28 (2.05)	-0.56 (1.84)
Spain	-0.39 (3.95)	1.51 (2.79)	1.10 (3.57)	1.79 (2.54)
Sweden	5.05 (2.43)***	3.09 (1.65)*	6.34 (1.76)***	2.89 (1.63)**
Switzerland	1.65 (2.09)	-1.79 (1.73)	1.22 (2.24)	-1.37 (1.79)
UK	-0.44 (2.57)	-3.71 (0.80)***	0.28 (2.65)	-3.90 (0.75)***
US	2.51 (1.45)*	-1.83 (0.59)***	2.51 (1.45)*	-1.83 (0.59)***

Notes:

The explanatory variables are the real GDP growth rate ((1) and (3)) and the deviation of the real domestic GDP growth rate from global GDP growth ((2) and (4)), respectively. See text for definitions of all variables. Estimation by generalised least squares with AR(1) correlated disturbances and semi-robust standard errors (in parentheses). Time period: 1973-2006. Data availability varies by country. ***, **, * denote significance at the 1, 5 and 10 percent levels respectively. Full regression outputs are available upon request.

Table 3: Cyclicity of capital gains on domestic financial market

	Domestic Currency		US Dollar	
	FE	No-FE	FE	No-FE
	(1)	(2)	(3)	(4)
Real rate of capital gains on domestic stock market (over five years)	7.58 (2.02)***	4.95 (1.77)***	6.46 (2.11)***	4.39 (1.64)***
Real rate of capital gains on domestic bond market (over five years)	0.38 (0.29)	0.55 (0.31)*	0.84 (0.83)	0.42 (0.62)

Notes:

The explanatory variable is the cumulate real GDP growth rate; the dependent variables are the cumulative real rates of returns and capital gains, respectively, over five years. See text for definitions of all variables. Estimation by generalised least squares with AR(1) correlated disturbances, heteroskedasticity robust standard errors (in parentheses) and involving country fixed effects (1) and (3). ***, **, * denote significance at the 1, 5 and 10 percent levels respectively. Full regression outputs are available upon request.

Table 4: Cyclicalities of capital gains on domestic bond market

	Domestic Currency		US Dollar	
	FE	FE + TE	FE	FE + TE
	(1)	(2)	(3)	(4)
Real rate of capital gains on domestic bond market	-1.14 (0.25)***	-0.57 (0.24)***	-1.00 (0.49)**	0.26 (0.36)

Notes:

The explanatory variable is the real GDP growth rate. See text for definitions of all variables. Estimation by generalised least squares with AR(1) correlated disturbances and robust standard errors (in parentheses), involving country and time fixed effects. Panel (1984 – 2004). Data availability varies by country. ***, **, * denote significance at the 1, 5 and 10 percent levels respectively. Full regression outputs are available upon request.

Table 5: Cyclicalities of capital gains on domestic bond market

	Dependent Variable	
	Domestic Currency	US Dollar
	(1)	(2)
	Real rate of capital gains on domestic bond market	Real rate of capital gain on domestic bond market
Australia	-0.52 (1.33)	-0.69 (1.21)
Austria	-1.83 (0.74)**	-3.31 (2.76)
Canada	-0.73 (0.64)	-0.84 (0.97)
Denmark	-1.64 (0.83)*	-2.57 (2.01)
France	-2.16 (0.79)**	-3.45 (2.24)
Germany	-1.50 (0.62)**	-0.84 (1.29)
Italy	-2.05 (0.99)*	-4.16 (2.51)
Japan	-0.69 (0.40)*	-0.63 (1.34)
Netherlands	-1.47 (0.72)*	-4.49 (2.39)*
Sweden	-0.46 (0.76)	0.92 (1.83)
Switzerland	-4.15 (2.01)*	-2.52 (3.29)
UK	-0.79 (0.66)	2.88 (2.16)
US	-1.11 (0.53)**	-1.11 (0.53)**

Notes:

The explanatory variable is the real GDP growth rate. See text for definitions of all variables. Estimation by generalised least squares with AR(1) correlated disturbances and robust standard errors (in parentheses). Time period 1984 – 2004. Data availability varies by country. ***, **, * denote significance at the 1, 5 and 10 percent levels respectively. Full regression outputs are available upon request.

Table 6: Determinants of variation in country cyclicity

	Cyclicity coefficient on			
	Equity capital gains in domestic currency	Equity capital gains in US dollars	Bond capital gains in domestic Currency	Bond capital gains in US dollars
	(1)	(2)	(3)	(4)
GDP-PC	6.00 (1.66)***	3.05 (1.55)**	1.96 (1.26)	2.08 (1.35)
Stock market capitalisation	3.39 (1.80)*	3.51 (1.66)**		
Bond market capitalisation			-0.61 (0.44)	-2.46 (0.69)***
R²	0.29	0.25	0.15	0.18

Notes:

The dependent variables are the estimated beta-coefficients from the individual country analysis; the explanatory variables are country averages of GDP per capita in natural log form, domestic stock market capitalisation (as ratio to GDP) and domestic bond market capitalisation (as ratio to GDP). See text for definitions of all variables. Estimation by weighted least squares (weighting by t-statistics of “first-step” estimation). Standard errors in parentheses. Switzerland excluded from analysis. ***, **, * denote significance at the 1, 5 and 10 percent levels respectively.

