Does the Shiller-PE work in emerging markets?

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Abstract

We test the reliability of the Cyclically Adjusted PE (CAPE) or Shiller PE as a forecasting and valuation tool for 35 countries including emerging markets. We find that the Shiller-PE is a reliable long-term valuation indicator for developed and emerging markets and we use the indicator to predict real returns on local equity markets over the next five years.

The so-called Shiller-PE or cyclically adjusted PE (CAPE) is one of the most prominent measures of long-term valuation in equity markets. This measure divides the current price of a stock market or single stock by the average earnings over the last ten years. The intention behind this methodology is that conventional price-to-earnings ratios (PE) tend to get distorted by cyclically high or low current or projected earnings. Taking a ten-year average of the earnings removes these cyclical influences and provides a more accurate picture of the current valuation of stock markets. Campbell and Shiller [2001] have already shown that this measure is able to predict future ten-year average real returns for the US stock market very well. Consequently more and more practitioners use this methodology to assess the long-term return potential of the US stock market as well as other global stock markets.

While for some developed markets like the UK the necessary long-term historical data on prices, earnings and inflation is reasonably easy to get in order to check the validity of this approach outside the United States, it is less clear, whether this approach can also inform our understanding of equity market valuations in smaller developed countries or emerging markets where growth and inflation dynamics may differ significantly from the United States or the UK. In this report we use long-term historical data on equity market returns, earnings, inflation and growth to assess the validity of the Shiller-PE as a predictor of future long-term equity market returns. We use the same methodology as Campbell and Shiller and calculate the Shiller-PE as the ratio of current real price of a stock market (adjusted by inflation) by the average real earnings over the last ten years.[1] We use monthly data on stock market prices and earnings to predict real returns in local currencies over the future ten years and we check for potential variation of the Shiller-PE due to macroeconomic developments like inflation, growth or interest rates. Exhibit 1 below shows the 35 developed and emerging nations that we use for our investigation as well as the start date as of which the Shiller-PE is available to us. The separation into emerging and developed markets follows the separation used by MSCI, currently the most common index provider for global stock market indices. All data on stock markets and inflation have been collected from Global Financial Data while growth data has been collected from Maddison.

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[1] See the webpage of Prof. R. Shiller for details on the calculations.

Exhibit 1: Overview of markets under investigation

| Developed countries	Data since	Emerging Markets	Data since
Australia	July 1979	Brazil	January 1998
Austria	October 1991	Chile	January 1998
Belgium	July 1979	China	January 2005
Canada	December 1965	Colombia	January 2005
Denmark	December 1979	Hungary	January 2003
Finland	January 1998	India	December 1998
France	September 1981	Indonesia	January 2000
Germany	July 1979	Korea	March 1984
Greece	January 1987	Malaysia	December 1982
Hong Kong	December 1982	Mexico	December 1997
Ireland	May 2000	Peru	January 2003
Japan	January 1966	Phillippinnes	January 1992
Netherlands	July 1979	Poland	February 2002
New Zealand	January 1998	South Africa	January 1970
Singapore	December 1982	Thailand	April 1985
Sweden	July 1979	Turkey	January 1996
Switzerland	July 1979		
UK	December 1937		
USA	January 1910		
Developed Markets	January 1987	Emerging Markets	February 1998

Source: Wellershoff & Partners, Global Financial Data, Maddison.

Even with these extended data sources it is sometimes difficult to estimate long-term relationships between the Shiller-PE and future real returns. Take for example a country like Chile which is one of the most developed emerging markets and provides generally a lot of data with reasonably high quality that is not distorted by previous episodes of hyperinflation, nationalization or other external events. Yet, we can only calculate the Shiller-PE from 1998 onwards. If we want to assess the relationship of the Shiller-PE with future 10-year stock market returns this means we can only assess stock market returns achieved between 2008 and April 2012 when all our data series end. This means that all our return data has a significant overlap from one month to the next and do sometimes not even cover a full economic cycle. Thus the uncertainties around the results of our analysis is naturally bigger for emerging markets than for developed markets where longer time-series data is available. Also, because of the lack of data, we can only test for very simple relationships between the Shiller-PE and other factors because we simple do not have enough data points to fit more complex econometric models. Given these caveats, however, the results may still inform us about the possibility to use the Shiller-PE as a tool to assess future real returns of stock markets.

Shiller-PE and future real returns

As mentioned above the reliability of the Shiller-PE as a predictor of future equity market returns in the United States is well known. Exhibit 2 shows the historical relationship for the S&P500 stock market index. As we can see, high levels of the Shiller-PE have generally been followed by low real returns of the S&P500 over the next ten years and vice versa. Appendix 1 shows the same charts for all countries in our sample as well as the Shiller-PE with subsequent five-year real returns for emerging markets.

Exhibit 2: Shiller-PE and real stock market returns in the US
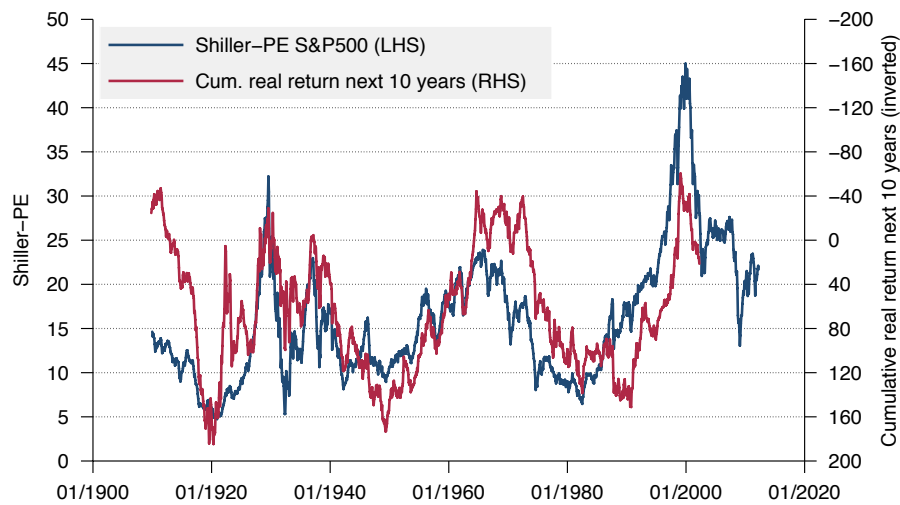
Source: Global Financial Data, Wellershoff & Partners.

Further investigation of the case of the United States shows, however, that the relationship between the Shiller-PE and future real returns is not linear. Exhibit 3 shows a scatter plot between the Shiller-PE and future real returns in the United States as well as a scatter plot of the natural logarithm of the Shiller-PE with future real returns. It is clear from this example that there is a logarithmic relationship between the Shiller-PE and future real returns. This logarithmic relationship also holds true for the other markets under investigation here.

Exhibit 3: Shiller-PE and real stock market returns in the US. Top: Shiller-PE vs. real returns. Bottom: Ln(Shiller-PE) vs. real returns.
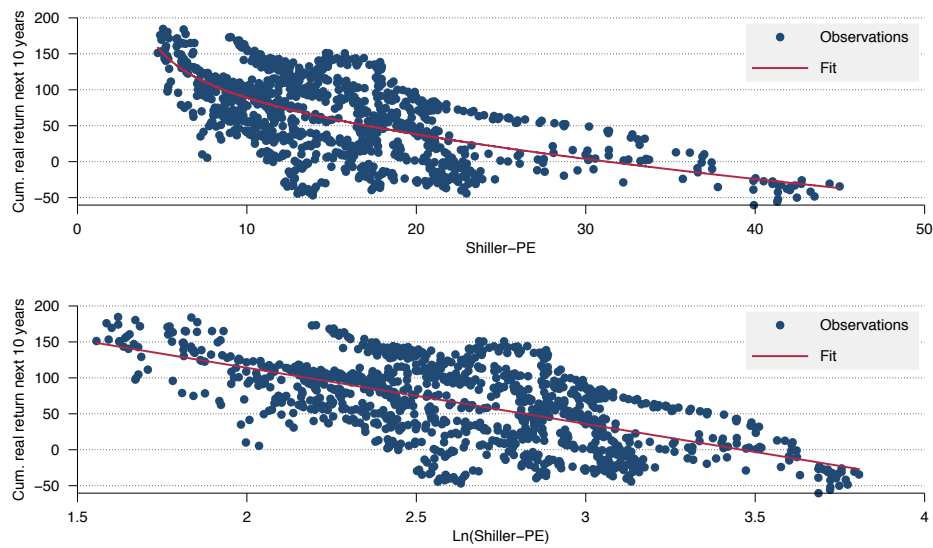
Source: Global Financial Data, Wellershoff & Partners

In order to assess the quality of the Shiller-PE as a predictor of future equity market returns we first calculate the correlation between the Shiller-PE at a given point in time and the subsequent real returns of the local equity market for different investment periods. The median correlation as well as the 95%-confidence interval for developed and emerging markets is shown in Exhibit 4.

Exhibit 4: Correlation between Shiller-PE and future stock market return for developed markets (left) and emerging markets (right)
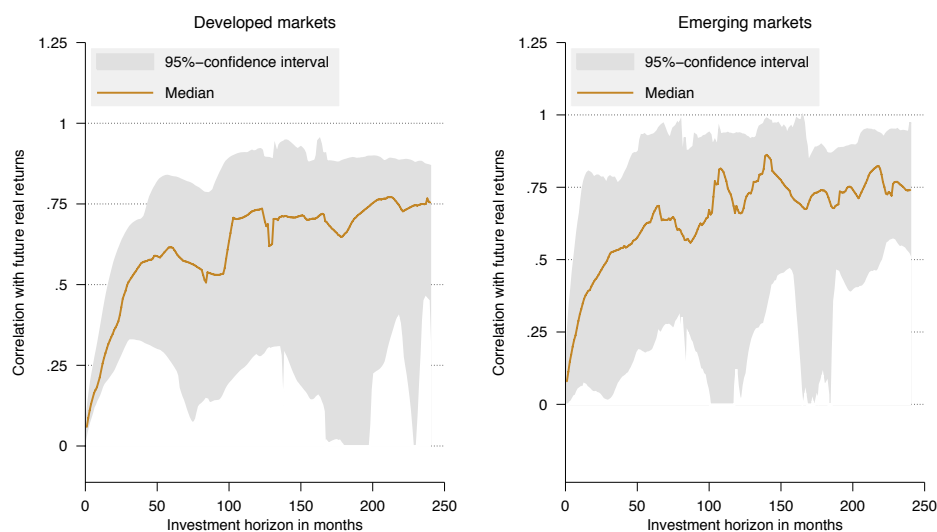
Source: Wellershoff & Partners

As we can see, the median correlation between the Shiller-PE and future real equity market returns is low for investment horizons below 60 months but generally remains around 0.7 for longer investment horizons up to 240 months. This correlation is similar for developed markets as well as emerging markets indicating that the Shiller-PE might be similarly valuable in assessing the future return prospects of emerging markets as for developed markets. The variation of the correlation within developed and emerging markets however, is high as can be seen from the large confidence intervals around the median value.

In order to provide an overview of the reliability of the Shiller-PE as a tool to assess future equity market returns we have performed a simple linear regression of the form

$$rr_{i,t} = \beta_i \cdot \ln CAPE_{i,t-10} + \alpha_i$$

for each country i in our sample. In this equation $rr_{i,t}$ symbolizes the real return per annum over the 10 years up to year t, while $CAPE_{i,t-10}$ symbolizes the Shiller-PE at the beginning of the 10 years. The use of ten-year forward returns limits the number of available countries to 31 because there is insufficient history for China, Colombia, Hungary and Peru to estimate the above linear regression. Exhibit 5 shows the amount of variation in future ten-year real returns of the local stock market that can be explained by the Shiller-PE (i.e. the adjusted-R^2 of the regression). We have also calculated results for a value weighted developed and emerging market index (similar to MSCI index weights) and an equal weighted developed and emerging market index.

Exhibit 5: Amount of variation in real stock market returns that can be explained by Shiller-PE.

Developed countries	Adjusted R^2	Emerging Markets	Adjusted R^2
Australia	0.37	Brazil	0.30
Austria	0.03	Chile	0.00
Belgium	0.53	India	0.48
Canada	0.11	Indonesia	0.93
Denmark	0.12	Korea	0.35
Finland	0.53	Malaysia	0.65
France	0.72	Mexico	0.30
Germany	0.53	Philippines	0.90
Greece	0.16	Poland	0.66
Hong Kong	0.61	South Africa	0.13
Ireland	0.90	Thailand	0.82
Japan	0.65	Turkey	0.05
Netherlands	0.77		
New Zealand	0.75		
Singapore	0.45		
Sweden	0.60		
Switzerland	0.28		
UK	0.25		
USA	0.38		
Developed Markets Value Weight	0.86	Emerging Markets Value Weight	0.06
Developed Markets Equal Weight	0.67	Emerging Markets Equal Weight	0.18

Source: Wellershoff & Partners

There is no clear trend in the amount of variation of stock market returns that can be explained by the Shiller-PE. Neither the degree of economic development nor the amount of data available for the analysis seems to tilt the results in either way. On the other hand we see that the amount of variation in future stock market returns explained by the Shiller-PE is typically above 0.2. Most traditional stock market prediction models can explain less than 20% of the variation in future stock market returns so that we may consider the Shiller-PE one of the more reliable forecasting tools available to practitioners. Exhibit 5 on the other hand also indicates that the explanatory power of the Shiller-PE for some emerging markets is similar to developed markets while for emerging markets as a whole the explanatory power of the Shiller-PE is much less than for developed markets as a whole.

The main problems with the above regression results is the fact that we used overlapping time periods to estimate the relationship between the Shiller-PE and subsequent ten-year real returns of stock markets. By using a ten-year rolling window that is rolled forward by one month in every step, we introduce a significant amount of autocorrelation into our country

specific regression that might distort the results and might lead to artificially high adjusted-R^2 values.

Single country estimations without overlapping time windows however, are not possible with our dataset so we ran panel regressions of the form

$$rr_{i,t} = \beta \cdot \ln CAPE_{i,t-10} + \alpha$$

where $rr_{i,t}$ is the real return of the ten-year period of country i up until time t and $CAPE_{i,t-10}$ is the Shiller-PE of country i at the beginning of the ten-year period. However, unlike in the individual country regressions above the time index t is not rolled by one month but by ten years to create independent observations for each country spaced ten years apart. For the full sample of 31 countries this leaves us with 85 observations between 1922 and 2012. We also ran separate panel regressions for the developed markets and the emerging markets. The results of these panel regressions are shown in Exhibit 6.

Exhibit 6: Panel regression with random effects of ten-year real stock market returns for all countries, developed markets and emerging markets.

	All countries	Developed markets	Emerging markets
Const	164.98	213.78	127.86
	(p=0.00)	(p=0.00)	(p=0.00)
Beta	-38.28	-56.03	-22.03
	(p=0.00)	(p=0.00)	(p=0.10)
Within markets R^2	0.36	0.31	0.64
Between markets R^2	0.12	0.42	0.02
Overall R^2	0.23	0.33	0.11
Wald test	25.05	30.64	2.66
	(p=0.00)	(p=0.00)	(p=0.10)

Source: Wellershoff & Partners

As we can see from Exhibit 6, the Shiller-PE remains a very reliable indicator of future real stock market returns for developed countries. For emerging markets however, the predictive power is weaker, mostly because of the big differences in the relationship between Shiller-PE and subsequent stock market returns in different emerging markets. However, this lower level of statistical significance for emerging markets might be due to the very limited number of observations available in our dataset that limit the accuracy of our estimation. In order to increase the number of data points in our sample we tried to run panel regressions with five-year real stock market returns instead of ten-year real returns. As Exhibit 4 above shows, the correlation between the Shiller-PE and subsequent five-year real stock market return is almost

as high as the correlation between the Shiller-PE and future ten-year real stock market return. Reducing the forecasting horizon by a factor two doubles the number of return observations in our regressions but re-introduces a small amount of autocorrelation since we have non-overlapping five-year real stock market returns, but the Shiller-PE is still calculated based on average trailing ten-year earnings. Nevertheless, the autocorrelation introduced by the Shiller-PE in this panel regression should be limited. Exhibit 7 shows the results of these panel regressions on five-year real stock market returns.

Exhibit 7: Panel regression with random effects of five-year real stock market returns for all countries, developed markets and emerging markets.

	All countries	Developed markets	Emerging markets
Const	145.06 (p=0.00)	185.43 (p=0.00)	105.64 (p=0.00)
Beta	-39.17 (p=0.00)	-52.85 (p=0.00)	-25.40 (p=0.00)
Within markets R^2	0.31	0.32	0.32
Between markets R^2	0.06	0.31	0.03
Overall R^2	0.23	0.28	0.18
Wald test	53.73 (p=0.00)	51.29 (p=0.00)	10.78 (p=0.00)

Source: Wellershoff & Partners

Comparing Exhibits 6 and 7 we see that emerging markets show similar predictability of future stock market returns within a single market, but differences in the relationship between the Shiller-PE and subsequent stock market returns seem to be much bigger in emerging markets than in developed markets. Developed markets seem to be rather fully integrated into the global market leading to similar relationships between levels of valuation and stock market returns.

Macroeconomic influences on the Shiller-PE
Of course the Shiller-PE does not exist in isolation of the macroeconomic environment. Growth, inflation and real interest rates all influence both corporate earnings as well as stock market prices. Given the current extreme situation in terms of weakening trend growth over the last decades as well as very low real interest rates in many countries one may wonder, whether this environment influences the current level of the Shiller-PE and thus may explain the differences in the relationship between the Shiller-PE and subsequent stock market returns in different countries. In order to identify the influence of the macroeconomic environment on the Shiller-PE we have performed linear regressions of the Shiller-PE on the average real GDP growth rate over the last ten years, as well as the average real GDP per capita growth

rate, the average inflation rate and the average real interest rate over the last ten years. These regressions take on the simple form

$$CAPE_{i,t} = \beta_{i,1} \cdot GDP_{i,t} + \beta_{i,2} \cdot CPI_{i,t} + \beta_{i,3} \cdot R\_RATE_{i,t} + \alpha$$

where $GDP_{i,t}$ denotes the average real growth rate of country i over the past ten years up to time t, $CPI_{i,t}$ the average inflation rate over the last ten years and $R\_RATE_{i,t}$ the average real interest rate. Exhibit 8 shows the results of these regressions for the countries in our sample.

Exhibit 8: Dependence of Shiller-PE on macroeconomic variables

Developed markets	$GDP_{i,t}$	$CPI_{i,t}$	$R\_RATE_{i,t}$	const	Adj. R^2
Australia	47.75***	-8.44***	-0.29***	7.91***	0.68
Austria	125.61***	47.11***	1.46***	-23.46***	0.65
Belgium	-10.57**	-2.49**	0.42***	17.66***	0.15
Canada	-9.64***	-13.06***	0.44***	29.29***	0.63
Denmark	93.2***	-20.83***	-0.74***	21.82***	0.76
Finland	-72.83***	45.46	7.41***	-0.49	0.63
France	33.62***	-5.98***	0.46***	14.57***	0.24
Germany	48.53***	-36.96***	0.8**	17.16***	0.24
Greece	14.57	4.79***	0.38***	4.29	0.35
Hong Kong	-23.41**	-13.06	1.24*	24.29***	0.13
Ireland	-3.79	41.98***	2.55***	-6.97*	0.48
Japan	-25.14***	12.3***	4.93***	29.29***	0.50
Netherlands	68.37***	-13.56***	-0.2	2.64	0.53
New Zealand	0.66	-56.99***	-0.36***	33.24***	0.39
Singapore	18.1***	-6.6	1.71**	0.15	0.21
Sweden	-31.9***	2.75***	2.16***	16.7***	0.47
Switzerland	-28.58**	-26.31***	0.62	31.08***	0.23
UK	1.0**	0.15	1.01***	11.98***	0.71
USA	1.81***	-1.63***	1.20***	14.21***	0.34
Emerging markets	$GDP_{i,t}$	$CPI_{i,t}$	$R\_RATE_{i,t}$	const	Adj. R^2
Brazil	-17.23***	31.72***	-0.75***	2.63	0.81
Hungary	-15.98	5.29	0.89	11.13***	0.03
India	18.79**	-0.13	0.84	2.39	0.17
Korea	11.5	-151.16**	0.62	65.68**	0.42
Malaysia	19.47***	-0.17	2.99***	-3.27	0.41
Mexico	-30.58	16.24	0.35	17.91	0.03
Peru	-41.71***	-314.97***	-5.04***	198.99***	0.42
Philippines	-32.7*	-23.46**	-0.12	54.62***	0.09
Poland	12.84	13.89	1.05***	-4.14	0.63
South Africa	8.82***	1.87***	0.7***	5.81***	0.51
Thailand	20.43***	-27.5***	0.89***	7.25***	0.73

Source: Wellershoff & Partners;

Note: *, **, *** denote statistical significance at the 10%, 5% and 1% level respectively.

The variation of the dependence on growth inflation and real interest rates varies dramatically from country to country as does the explanatory power of these macroeconomic variables. Notwithstanding these caveats we can still observe that on average higher GDP growth leads to higher Shiller-PE, higher inflation leads to lower Shiller-PE and higher real interest rates to higher Shiller-PE. However, the main influence of the Shiller-PE comes from GDP growth and inflation while real interest rates impact the Shiller-PE to a much smaller degree.

Exhibit 9 shows the Shiller-PE predicted from these regressions in comparison with the current Shiller-PE for developed markets.

Exhibit 9: Current Shiller-PE in comparison to macroeconomically derived Shiller-PE for developed markets.

Developed countries	Current Shiller-PE	Shiller-PE derived from macroeconomic variables	Deviation in %
Australia	14.1	17.6	24.8
Austria	9.7	10.4	7.2
Belgium	9.1	16.6	82.4
Canada	19.1	27.0	41.4
Denmark	19.6	18.4	-6.1
Finland	10.2	10.8	5.9
France	10.7	27.2	154.2
Germany	13.6	15.8	16.2
Greece	3.6	8.8	144.4
Hong Kong	15.7	15.3	-2.5
Ireland	12.1	10.2	-15.7
Japan	15.2	31.8	109.2
Netherlands	9.5	15.1	58.9
New Zealand	13.8	14.4	4.3
Singapore	13.3	13.6	2.3
Sweden	15.2	21.7	42.8
Switzerland	15.0	18.2	21.3
UK	13.3	14.0	5.3
USA	21.7	14.1	-35.0

Source: Wellershoff & Partners

In general we see that the Shiller-PE derived from the current macroeconomic environment should be higher for most countries and significantly higher for Eurozone countries. On the other hand the Shiller-PE should be significantly lower for the United States. We interpret these results in such a way, that there is a significant unexplained component of the current Shiller-PE that may be driven by market psychology and other non-economic factors that artificially depresses current Shiller-PE in crisis ridden countries in Europe while artificially lifting the Shiller-PE in the United States. These deviations of the current Shiller-PE from a

macroeconomically justifiable Shiller-PE may in turn lead to deviations of the estimated relationship between Shiller-PE and subsequent stock market returns in different countries.

Exhibit 10 shows the results of the regression of the Shiller-PE on macroeconomic variables for emerging market countries. We can see that the current Shiller-PE for most emerging markets on our list is higher than what can be justified by macroeconomic variables. In fact only in crisis-ridden Hungary and in Korea a significant discount to the macroeconomically derived Shiller-PE can be observed.

Exhibit 10: Current Shiller-PE in comparison to macroeconomically derived Shiller-PE for emerging markets.

Emerging countries	Current Shiller-PE	Shiller-PE derived from macroeconomic variables	Deviation in %
Brazil	12.3	11.7	-4.9
Hungary	11.0	12.6	14.5
India	19.4	14.4	-25.8
Korea	16.8	18.6	10.7
Malaysia	20.2	14.0	-30.7
Mexico	21.7	21.2	-2.3
Poland	13.6	13.5	-0.7
South Africa	16.9	16.0	-5.3
Thailand	16.5	8.0	-51.5

Source: Wellershoff & Partners

Current outlook on future stock market returns
Differences in the relationship between the Shiller-PE and subsequent stock market returns in single countries might be due to the different macroeconomic environment of different countries or the lack of integration of some emerging markets within the global financial system. Yet, as Exhibits 6 and 7 show, the Shiller-PE still is able to explain a reasonable amount of the variation in future stock market returns in both developed and emerging markets. Thus, we may use the current Shiller-PE of the countries in our sample to predict future five-year real stock market returns. Exhibit 11 shows the predicted future five-year real returns for developed markets using the panel regression results for all countries and developed countries only.

Exhibit 11: Estimated real return in the next five years for developed markets.

Developed countries	Panel regression with all countries		Panel regression with developed markets only	
	Cumulative five-year real return in %	Standard error of forecast in %	Cumulative five-year real return in %	Standard error of forecast in %
Australia	41.5	3.6	45.7	4.4
Austria	56.0	4.7	65.3	6.1
Belgium	58.5	4.9	68.7	6.5
Canada	29.5	3.4	29.5	3.8
Denmark	28.5	3.4	28.1	3.9
Finland	54.1	4.5	62.7	5.9
France	52.0	4.3	59.9	5.6
Germany	42.9	3.7	47.6	4.5
Greece	95.3	9.3	118.3	12.8
Hong Kong	37.1	3.4	39.8	4.0
Ireland	47.5	4.0	53.7	5.0
Japan	38.4	3.5	41.6	4.1
Netherlands	56.9	4.8	66.5	6.3
New Zealand	42.4	3.6	46.8	4.4
Singapore	43.8	3.7	48.9	4.6
Sweden	38.5	3.5	41.6	4.1
Switzerland	39.0	3.5	42.3	4.2
UK	43.8	3.7	48.8	4.6
USA	24.5	3.5	22.8	4.0
Developed Markets Value Weight	31.9	3.3	32.7	3.8
Developed Markets Equal Weight	46.0	3.9	51.7	4.8

Source: Wellershoff & Partners

The results in Exhibit 11 show that estimated future real returns for developed markets are very similar whether they are estimated based on a panel of all countries in our sample or just developed markets (i.e. differences between forecasts are generally within one standard error).

Looking at the forecasts for different markets the following observations stand out:
- For all developed equity markets the expected real return in local currencies is positive and the probability of negative real returns after ten years is generally low.
- The market with the lowest expected future return is the United States which together with Canada and Denmark promises real returns that are quite a bit lower than developed markets overall.
- Because of the low expected returns for US stock markets, an equal weighted portfolio of developed market equities is expected to perform significantly better than a typical value weighted portfolio. The current debate about optimal sector and country weights in a

stock market index is still ongoing and there are many different rivaling approaches like equal weighting, fundamental weighting, GDP-weighting or equal risk contribution or minimum variance. The jury is still out which one of these approaches is the best for long-term investors, but our calculations indicate that an equal weighted portfolio should outperform a value weighted one.

- Looking at individual markets again, we see that the most attractive markets are generally the crisis-ridden European equity markets and in particular Greece which currently has such low valuations that real returns over the next five years could come close to 100%. But more stable markets like Finland, France or Germany also offer attractive long-term return possibilities.

Overall, then the future looks bright for equities outside the United States and investors can expect to earn significant positive real returns over the long run with equity market investments. Turning to emerging markets Exhibit 12 shows the results of five-year real return forecasts for emerging countries based on the panel regressions shown in Exhibit 7.

Exhibit 12: Estimated real return in the next five years for emerging markets.

Emerging countries	Panel regression with all countries		Panel regression with emerging markets only	
	Cumulative five-year real return in %	Standard error of forecast in %	Cumulative five-year real return in %	Standard error of forecast in %
Brazil	46.8	3.9	41.9	6.9
Chile	20.3	3.7	24.7	7.2
China	29.4	3.4	30.6	6.6
Colombia	3.9	5.1	14.1	9.0
Hungary	51.2	4.3	44.7	7.2
India	28.9	3.4	30.3	6.6
Indonesia	16.2	4.0	22.0	7.6
Korea	34.4	3.4	33.9	6.5
Malaysia	27.3	3.4	29.2	6.7
Mexico	24.6	3.5	27.5	6.9
Peru	7.4	4.7	16.4	8.6
Philippines	21.4	3.6	25.4	7.1
Poland	42.7	3.7	39.3	6.6
South Africa	34.3	3.4	33.8	6.5
Thailand	35.2	3.4	34.4	6.5
Turkey	40.0	3.5	37.5	6.6
Emerging Markets Value Weight	32.6	3.4	32.7	6.5
Emerging Markets Equal Weight	29.1	3.4	30.4	6.6

Source: Wellershoff & Partners

Similar to the results for developed markets estimated future real returns for emerging markets are very similar whether they are estimated based on a panel of all countries in our sample or just emerging markets (differences between forecasts are generally within one standard error).

While the forecasts for emerging markets generally have a somewhat higher forecast error associated with them we can still observe some general trends:

- Emerging market equities seem to be poised for significantly lower real returns than developed equities at the moment.

- Particularly smaller emerging countries like Peru, Colombia or Indonesia offer less attractive returns at the moment than more developed neighbors like Brazil or Thailand.

- Some currently fashionable investment countries like China or India offer only average return prospects.

- From a regional perspective it seems that Eastern European countries together with Turkey and South Africa offer the highest future equity markets while Asia overall should be only average and in Latin America only Brazil seems a worthwhile investment at the moment.

The picture might change for individual investors measuring stock market returns in their respective home currency. However, it is clear that emerging market stocks can only outperform developed market stocks if their respective currencies continue to appreciate versus the US Dollar or other developed market currencies. Given the already strong appreciation and the overvaluation of many emerging market currencies compared to their purchasing power parity this seems rather unlikely to us, though.

Return forecasts for different market regimes

Equity market returns depend heavily on the prevailing interest rate and growth environment and as we have seen above, this macroeconomic environment should also be reflected in the Shiller-PE itself. Still, the relationship between the Shiller-PE and future real stock market returns might change depending on the prevailing interest rate and growth environment. We typically differentiate between an environment of rising or falling interest rates and strong and weak trend growth. Using our panel regressions for all markets we can try to identify a varying relationship between the Shiller-PE and future real stock market returns. However, different countries and different markets might be in a different market regime at any given point in time. Since we are working with panel regressions it is impossible for us to differentiate between different market regimes in different countries. Instead we decided to

use the market regimes as they applied to the United States as the leading economy and by far the biggest financial market during the 20th century. Exhibit 13 shows the predicted five-year real returns for stock markets if the relationship between the Shiller-PE and equity markets holds, that historically prevailed during different macroeconomic regimes. For example, the predicted cumulative real return for US equities over the next five years is 24.5%. If we would enter a period of falling interest rates and weak trend growth the relationship between the Shiller-PE and future stock market returns conditional on this macroeconomic regime would lead to a predicted real return over the next five years for US equities 30.0% and in an environment of rising interest rates and weak trend growth a predicted real return of -26.4%.

Exhibit 13: Estimated real returns for the next five years if different market regimes materialize

Developed markets	Overall	Falling rates, weak growth	Falling rates, strong growth	Rising rates, weak growth	Rising rates, strong growth
Australia	41.5	48.0	n.a.	-2.2	37.3
Austria	56.0	63.5	n.a.	18.6	53.4
Belgium	58.5	66.1	n.a.	22.1	56.1
Canada	29.5	35.3	n.a.	-19.3	24.2
Denmark	28.5	34.2	n.a.	-20.8	23.0
Finland	54.1	61.4	n.a.	15.8	51.3
France	52.0	59.2	n.a.	12.9	49.0
Germany	42.9	49.5	n.a.	-0.2	38.9
Greece	95.3	105.1	n.a.	74.6	96.6
Hong Kong	37.1	43.4	n.a.	-8.4	32.6
Ireland	47.5	54.4	n.a.	6.3	43.9
Japan	38.4	44.8	n.a.	-6.6	34.0
Netherlands	56.9	64.4	n.a.	19.8	54.3
New Zealand	42.4	49.0	n.a.	-1.0	38.3
Singapore	43.8	50.5	n.a.	1.1	39.9
Sweden	38.5	44.8	n.a.	-6.5	34.0
Switzerland	39.0	45.4	n.a.	-5.8	34.6
UK	43.8	50.5	n.a.	1.1	39.9
USA	24.5	30.0	n.a.	-26.4	18.7
Developed Markets Value Weight	31.9	37.8	n.a.	-16.0	26.7
Developed Markets Equal Weight	46.0	52.8	n.a.	4.2	42.3
Emerging markets	Overall	Falling rates, weak growth	Falling rates, strong growth	Rising rates, weak growth	Rising rates, strong growth
Brazil	46.8	53.6	n.a.	5.3	43.2
Chile	20.3	25.5	n.a.	-32.6	14.0
China	29.4	35.2	n.a.	-19.5	24.0

Colombia	3.9	8.2	n.a.	-55.9	-4.0
Hungary	51.2	58.3	n.a.	11.6	48.0
India	28.9	34.6	n.a.	-20.3	23.4
Indonesia	16.2	21.2	n.a.	-38.4	9.4
Korea	34.4	40.6	n.a.	-12.3	29.6
Malaysia	27.3	33.0	n.a.	-22.5	21.7
Mexico	24.6	30.1	n.a.	-26.4	18.7
Peru	7.4	11.9	n.a.	-50.9	-0.2
Philippines	21.4	26.7	n.a.	-30.9	15.2
Poland	42.7	49.4	n.a.	-0.4	38.7
South Africa	34.3	40.4	n.a.	-12.5	29.4
Thailand	35.2	41.4	n.a.	-11.2	30.5
Turkey	40.0	46.5	n.a.	-4.3	35.7
Emerging Markets Value Weight	32.6	38.7	n.a.	-14.9	27.6
Emerging Markets Equal Weight	29.1	34.9	n.a.	-19.9	23.7

Source: Wellershoff & Partners

Exhibit 13 shows that there is a clear regime dependency in the relationship between Shiller-PE and future real equity market returns. Given our expectation of an environment of rising interest rates and weak trend growth the predicted real returns for stocks are negative in almost every country. Only the countries of the Eurozone as well as Brazil promise positive real returns in this environment. We emphasize however, that these estimates are based on a very limited dataset mostly based on the developments during the 1970s – a time when equity markets in general had negative real returns. Thus, the predicted negative real returns could well be too pessimistic. We think we can conclude however, that in an environment of weak trend growth and rising interest rates equity real equity market returns are likely going to be much lower than a naïve estimate based on the general relationship between Shiller-PE and future stock market returns would suggest.

Conclusion: The Good, the bad, and the ugly

In this analysis we have used long-term historic data for 35 developed and emerging markets to assess the validity of the Shiller-PE as a tool to assess the valuation of stock markets. Our results can be summarized in three sections.

The good:

- The Shiller-PE is a reliable indicator for future real stock market returns not only in the United States but also in developed and emerging markets in general.

- The correlation of the Shiller-PE with future real stock market returns is low for short investment horizons but averages around 0.7 for investment horizons of five years or more.

- Expected returns for developed markets are generally very high and the likelihood of negative real returns over the next five to ten years is low to nil for most countries. In particular European countries promise very high real returns over the coming years that should be significantly higher than historic averages.

- Compared to a fundamentally derived Shiller-PE, Shiller-PEs in Europe seem currently artificially depressed, possibly because of the Eurozone debt crisis.

The bad:

- Within developed markets Anglo-Saxon countries generally have lower expected returns. In particular the United States have the lowest expected real returns of all developed countries.

- Expected returns for emerging markets are lower than for developed markets. Within emerging markets European countries together with Turkey and South Africa seem to be the most attractive markets.

- Compared to a fundamentally derived Shiller-PE, current valuations in emerging markets seem to be priced for perfection and already include a significant premium for most countries.

- The relationship between the Shiller-PE and future real stock market returns seems to depend very much on the prevailing macroeconomic regime. Particularly an environment of rising interest rates seems to lead to generally lower real returns for stock markets given a specific level of the Shiller-PE.

The ugly:

- Particularly smaller emerging markets seem to be too expensive at the moment. Countries like Peru, Colombia, Indonesia have very low expected real returns and a higher likelihood of achieving negative real returns over the next five years.
- Given our current outlook of rising interest rates and weak trend growth over the coming years, low to even negative real returns on stocks over the coming five years seem possible despite the overall fair valuations.

Appendix 1: Shiller-PE and ten-year real stock market returns
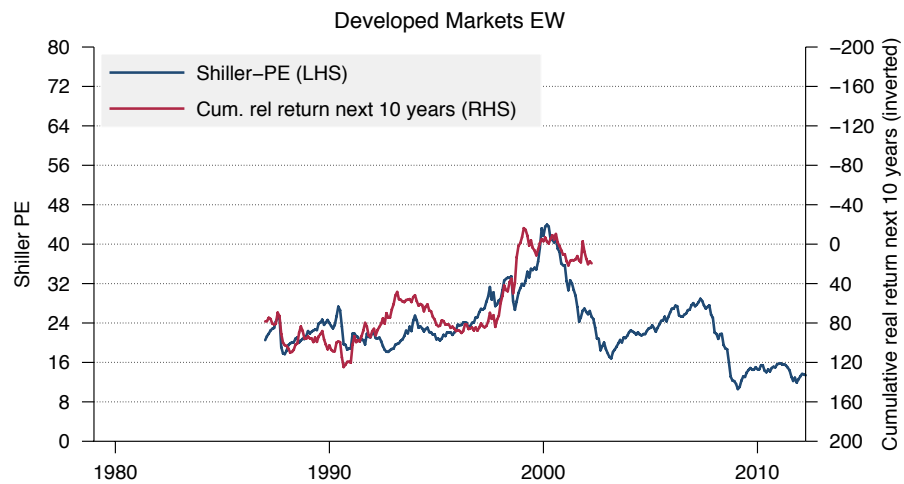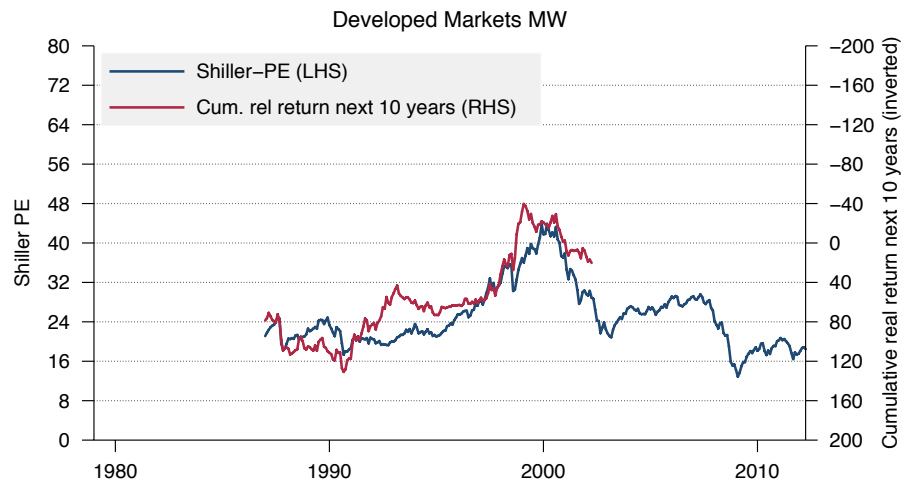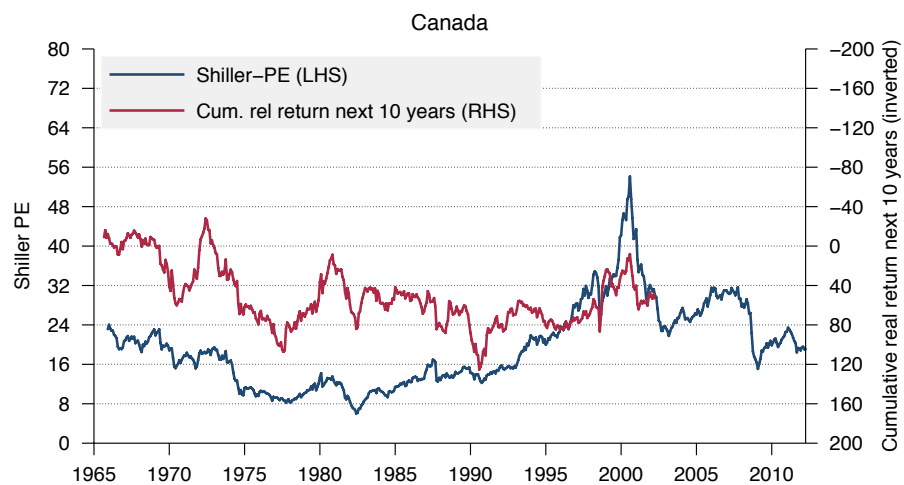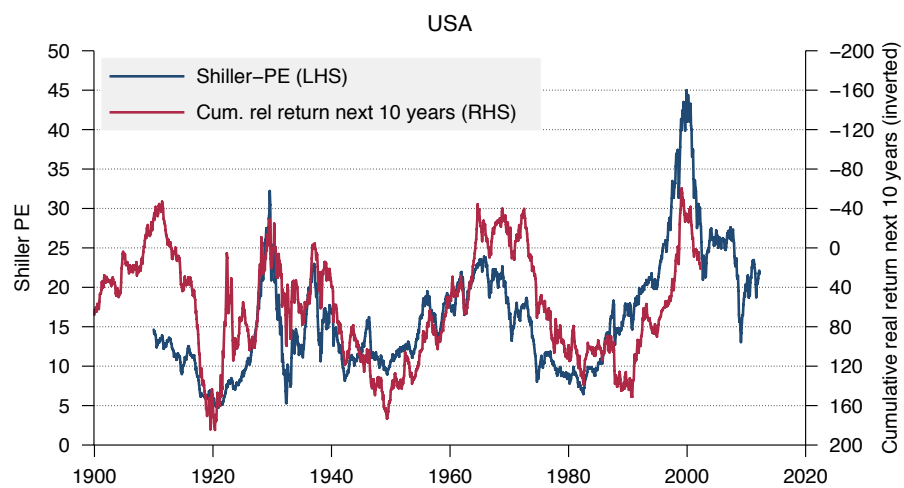
Developed Markets MW

Developed Markets EW

North America

USA

Canada

Europe

UK

Austria

Belgium

Switzerland

Germany

Denmark

Finland

France

Greece

24

Ireland

Netherlands

Sweden

APAC

Japan

Hong Kong

Singapore

Australia

New Zealand

Emerging markets

Emerging Markets MW

Emerging Markets EW

28

Latin America

Brazil

Chile

Mexico

Developing EMEA

South Africa

Turkey

Developing Asia

Korea

Malaysia

Philippines

Thailand
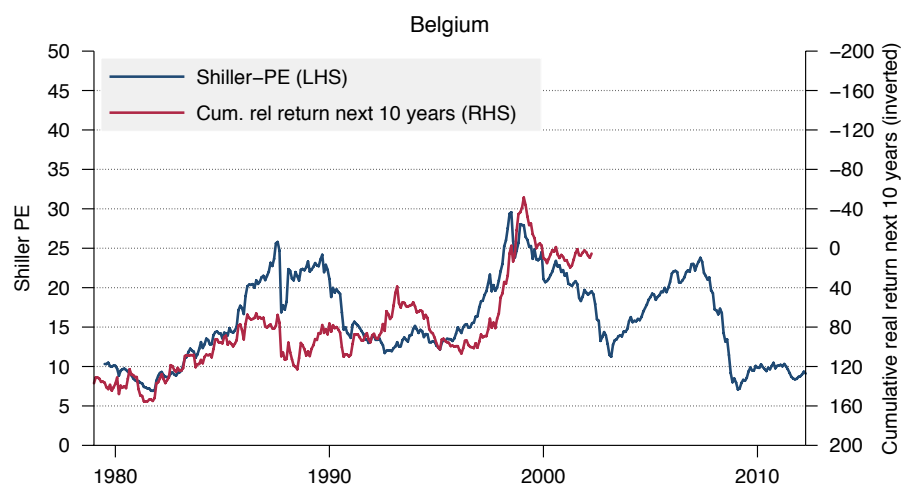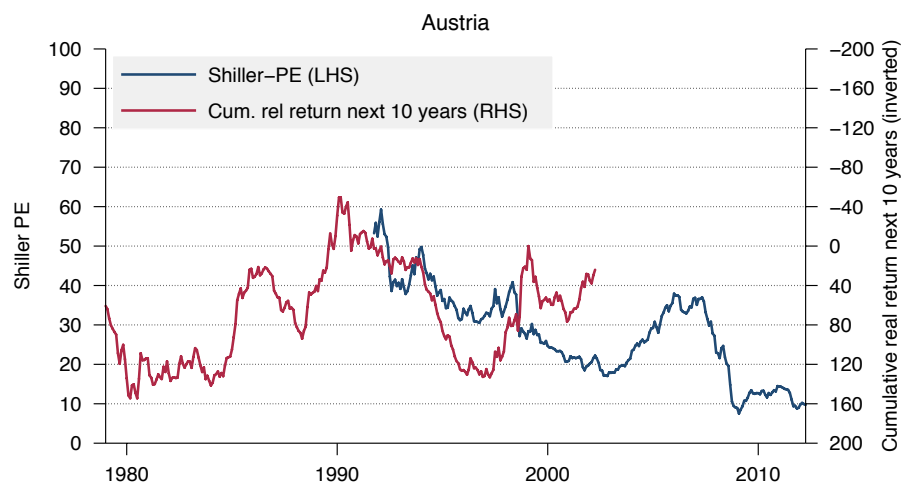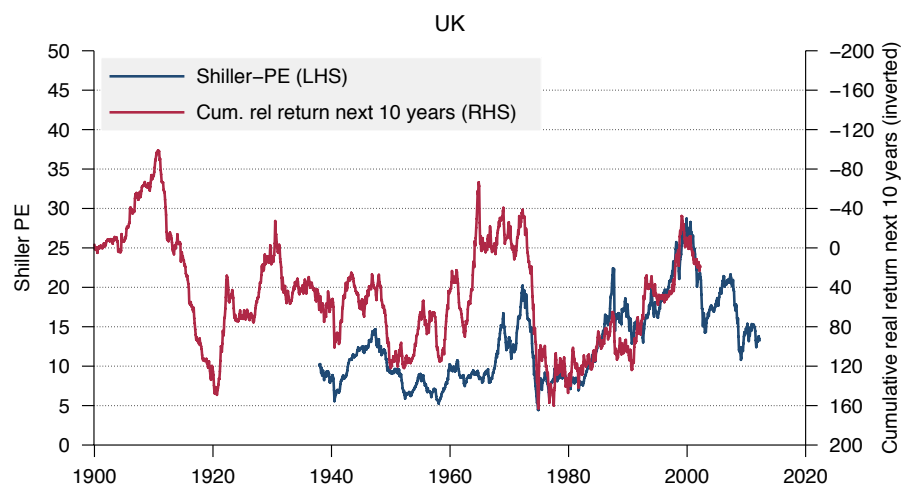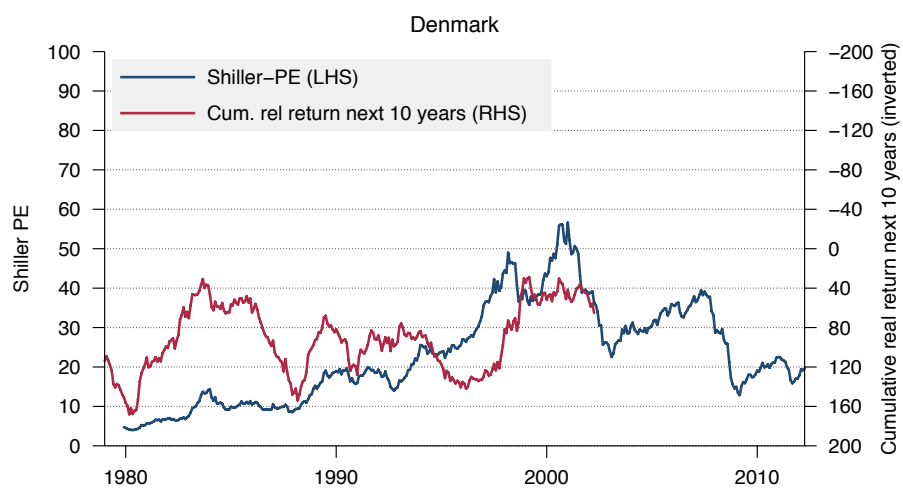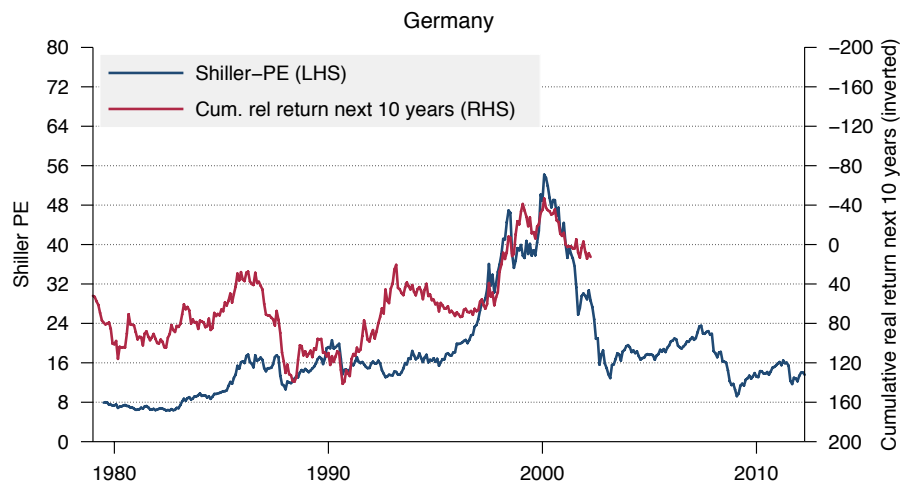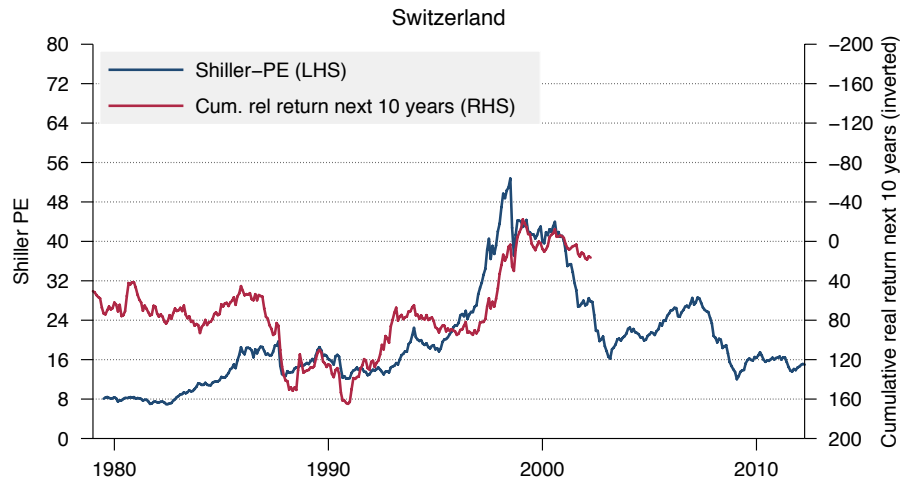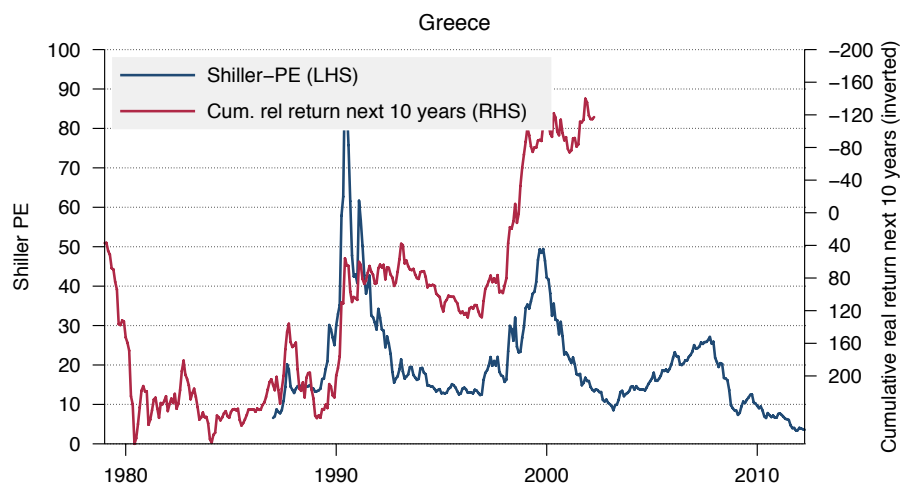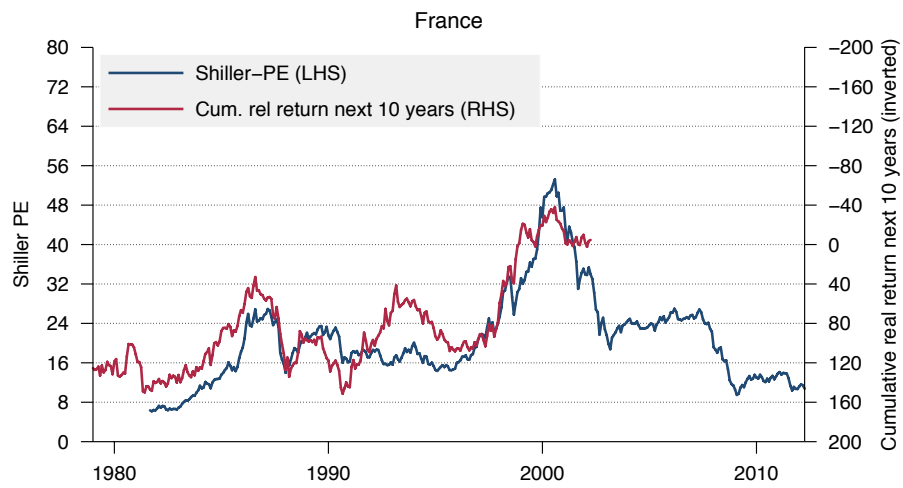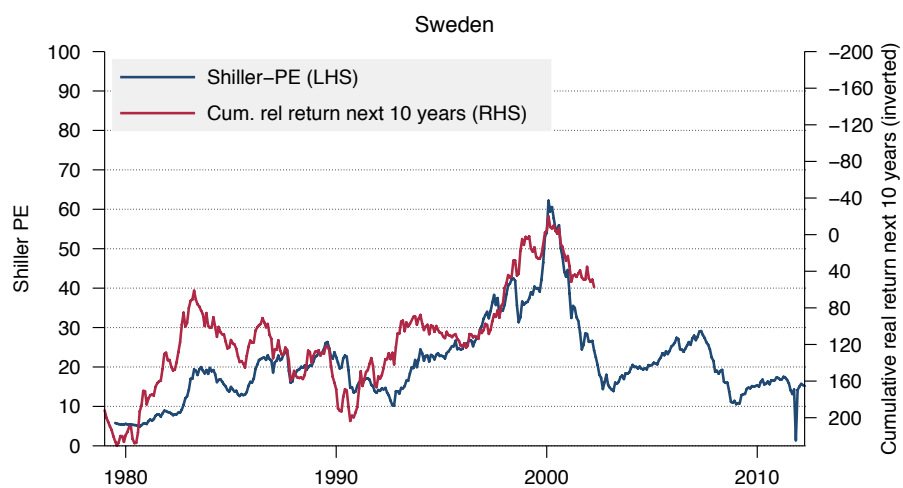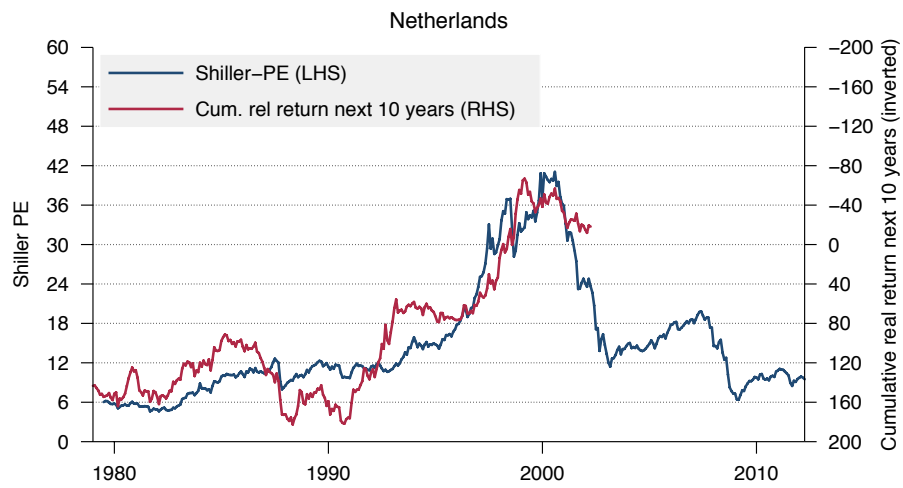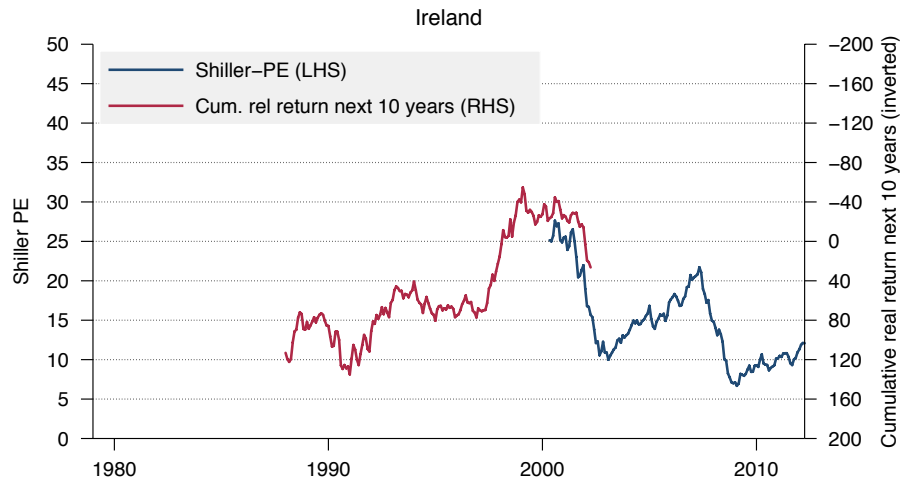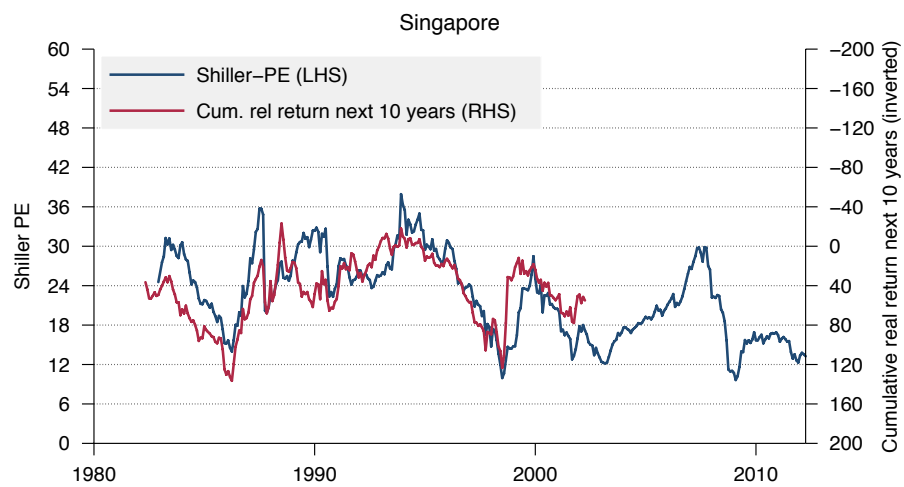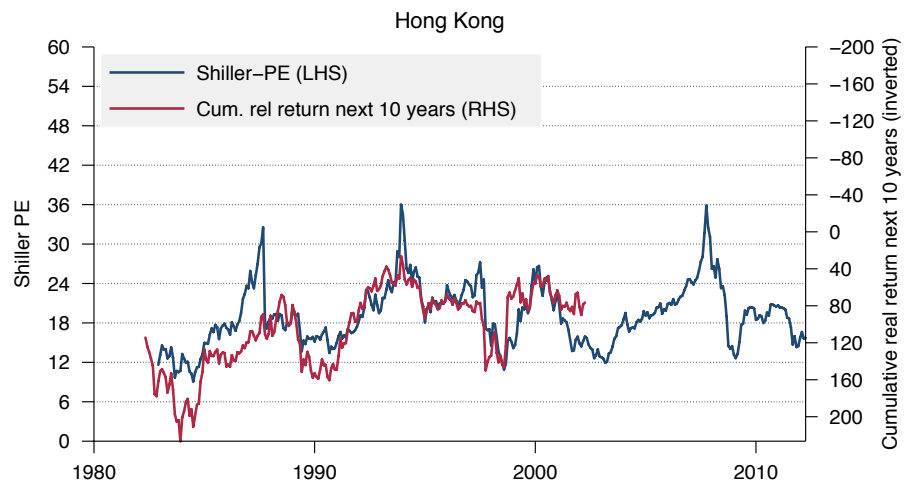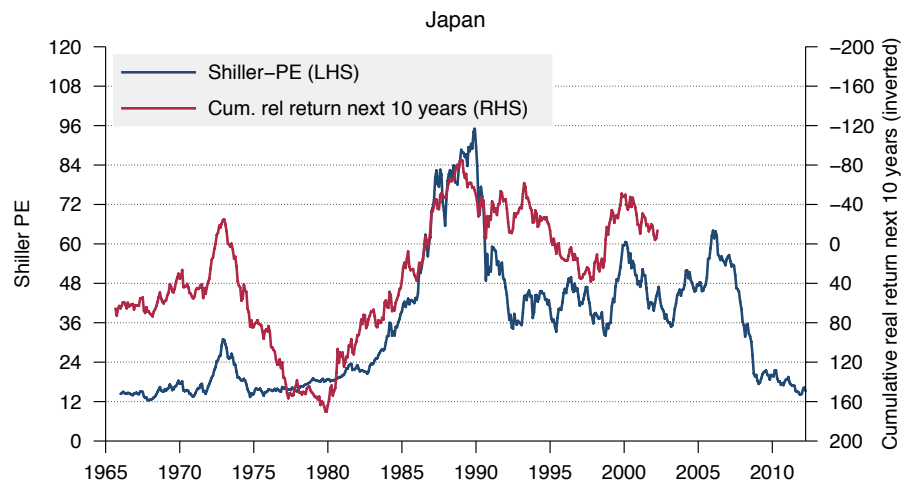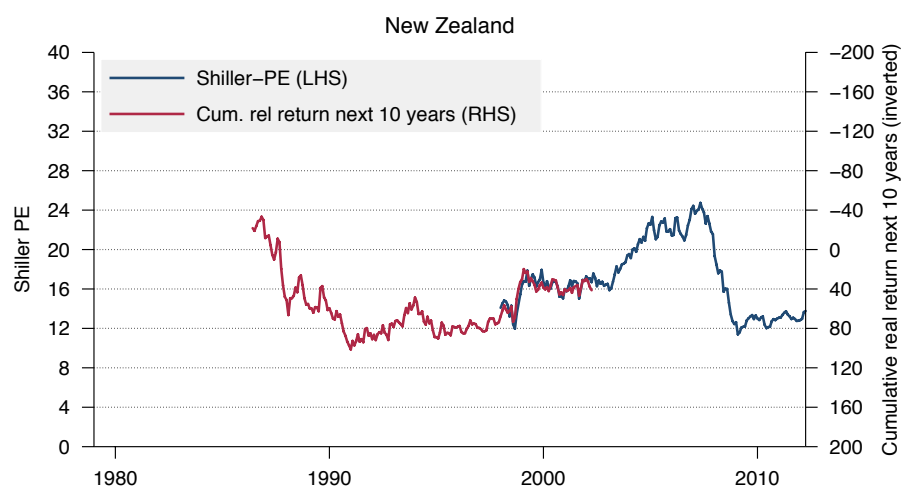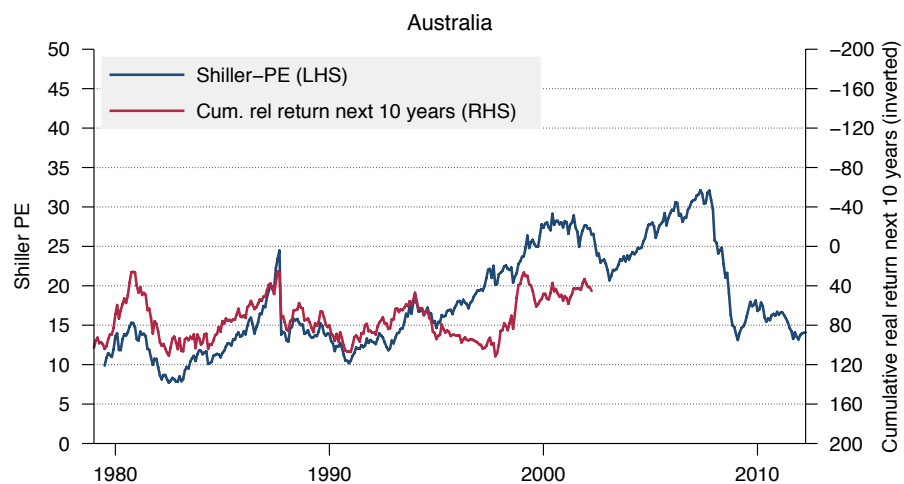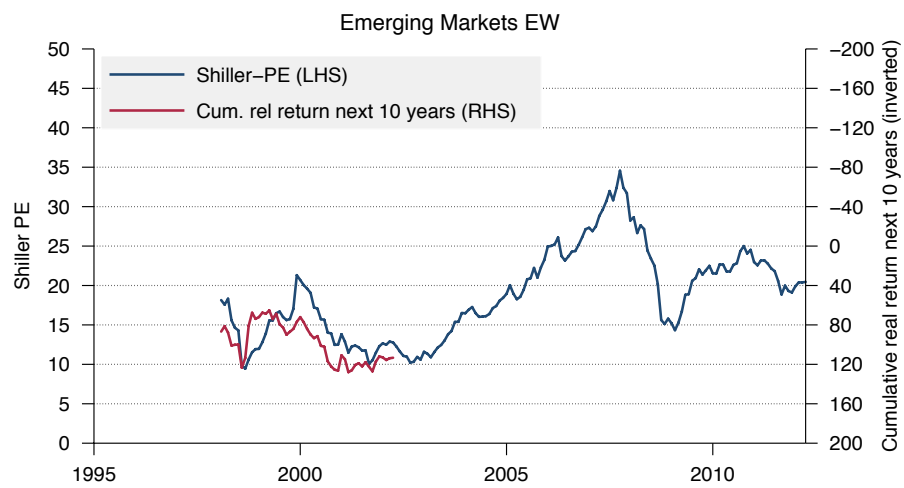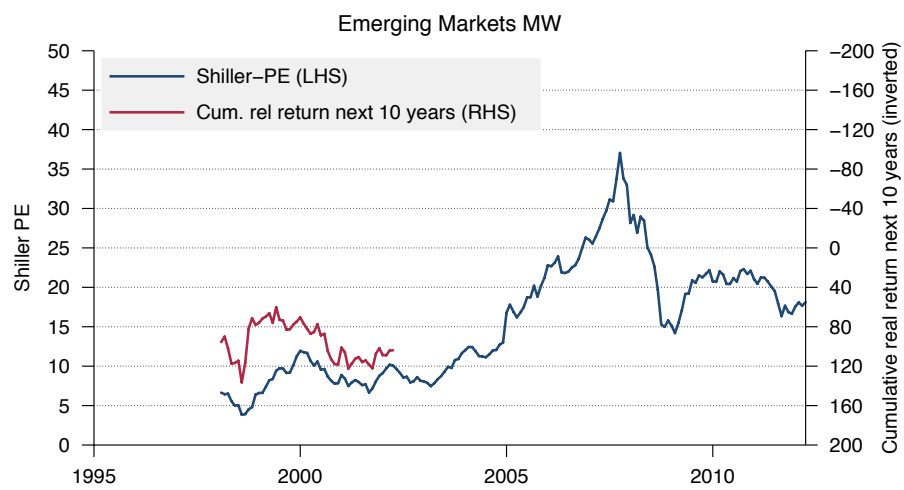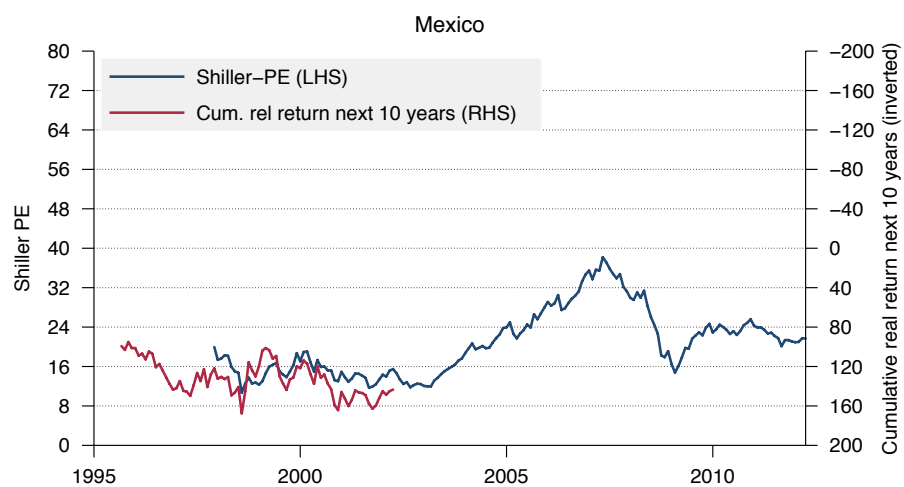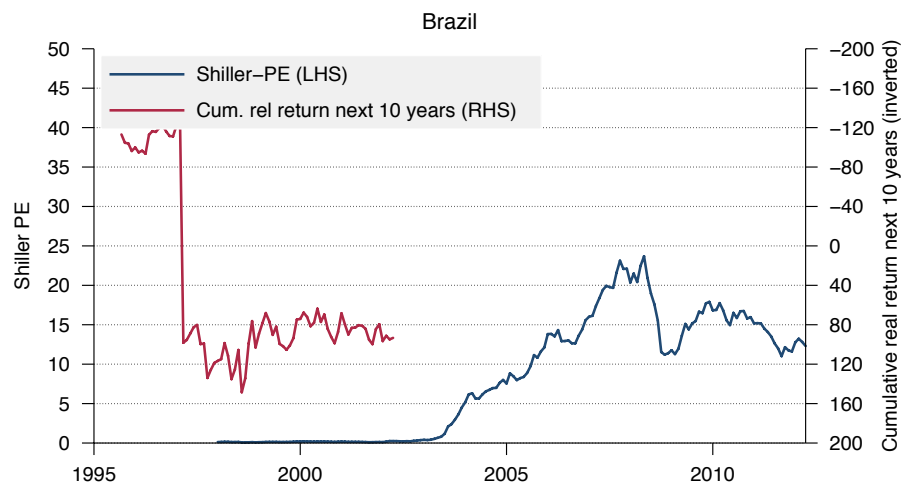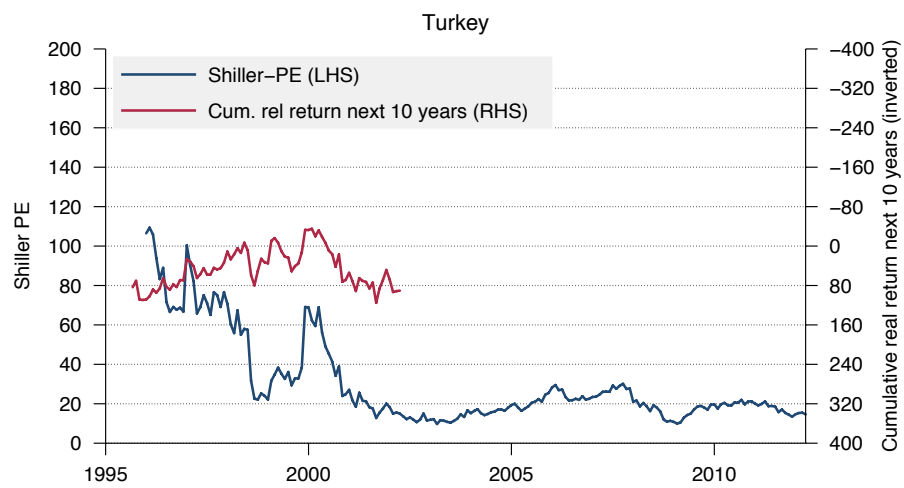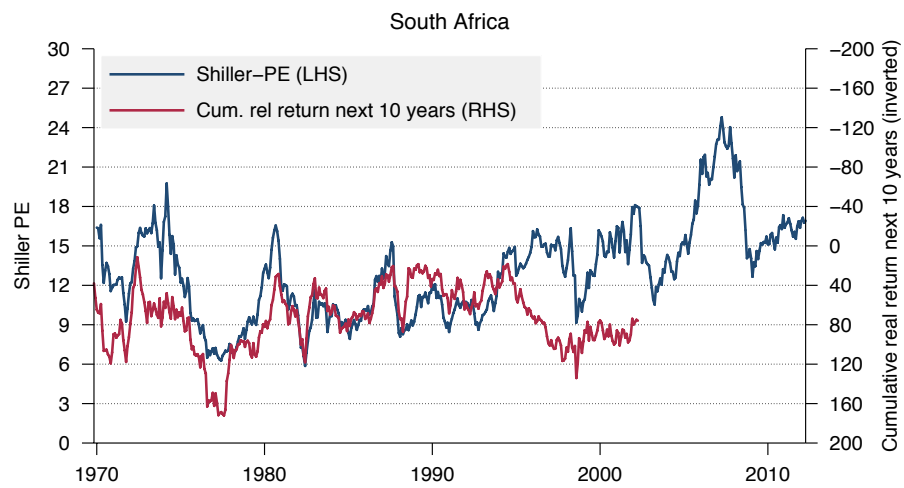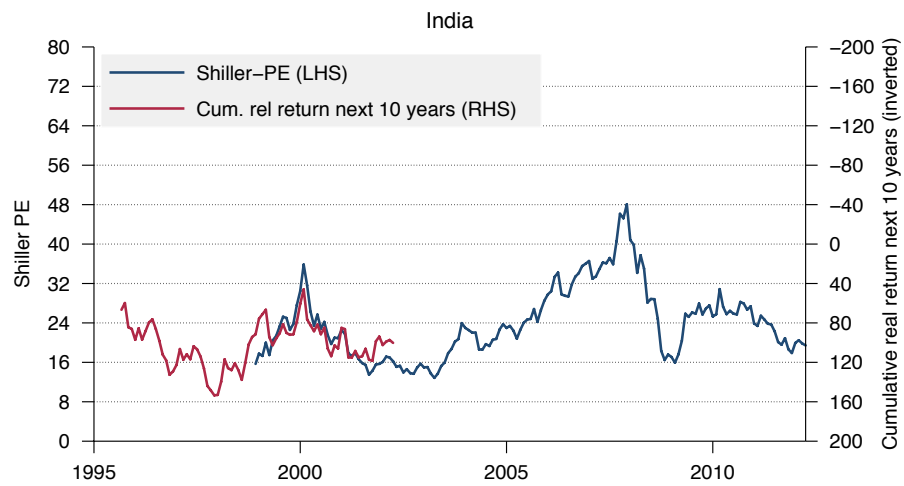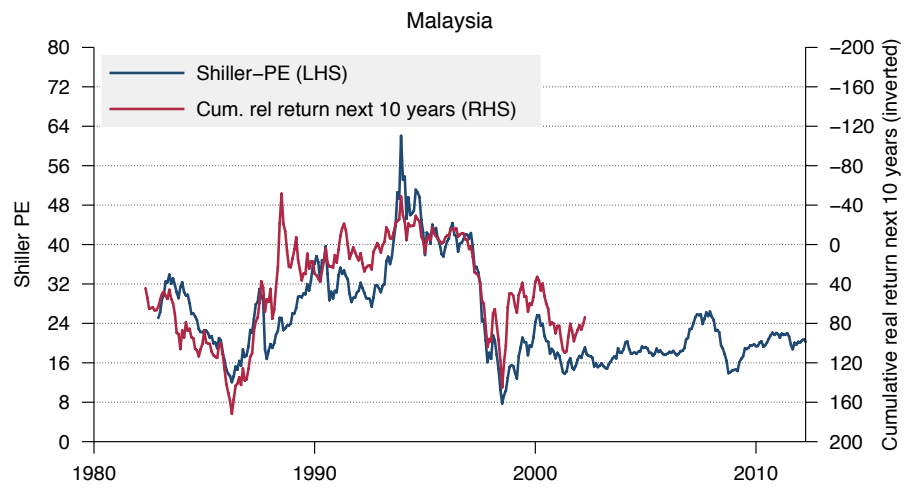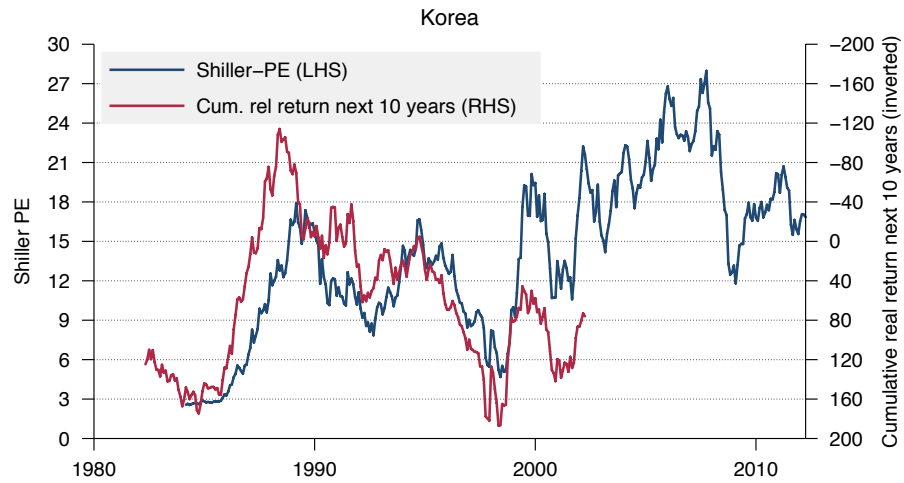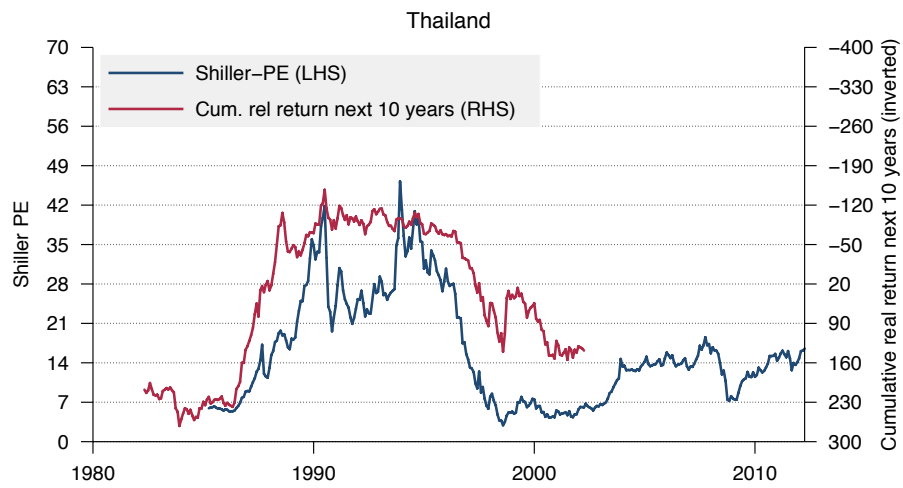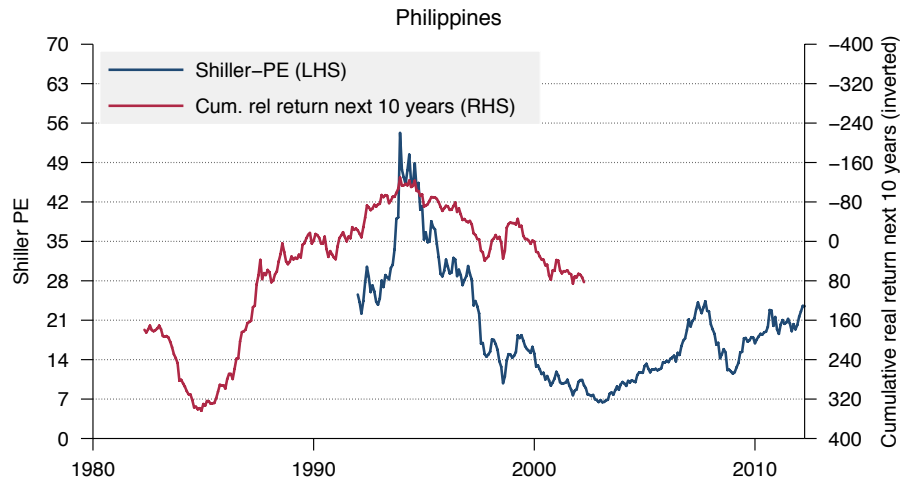
Appendix 2: Shiller-PE and five-year real stock market returns in emerging markets

Emerging Markets MW

33

Emerging Markets EW

Latin America

Brazil

Chile

Mexico

Developing EMEA

South Africa

Hungary

Poland

Turkey

Developing Asia

China

Hong Kong

Indonesia

India

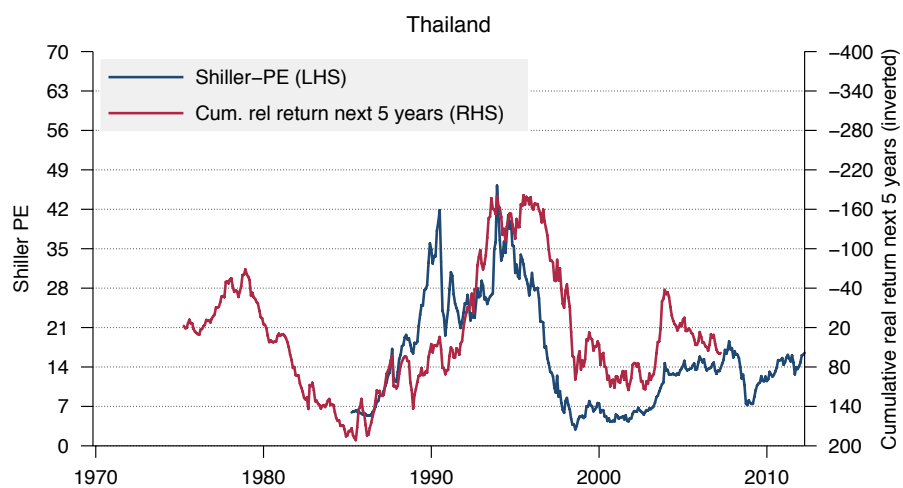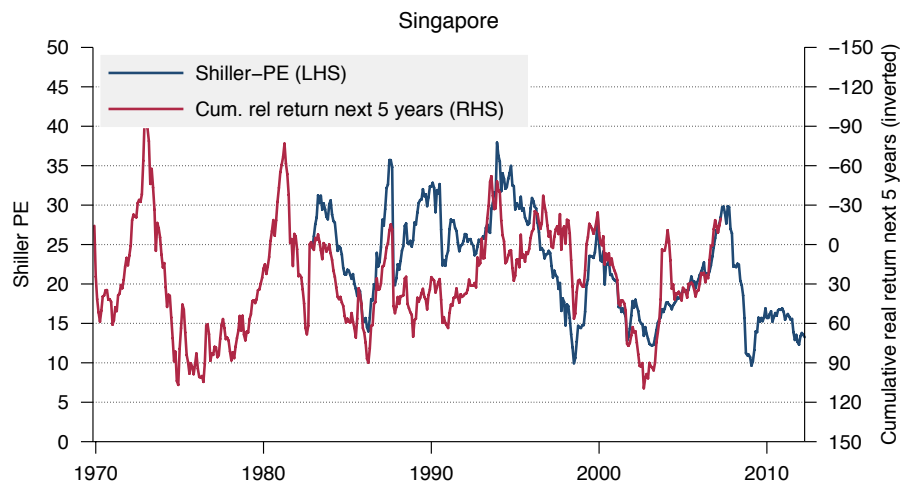
Korea

Malaysia

Philippines

Singapore

Thailand

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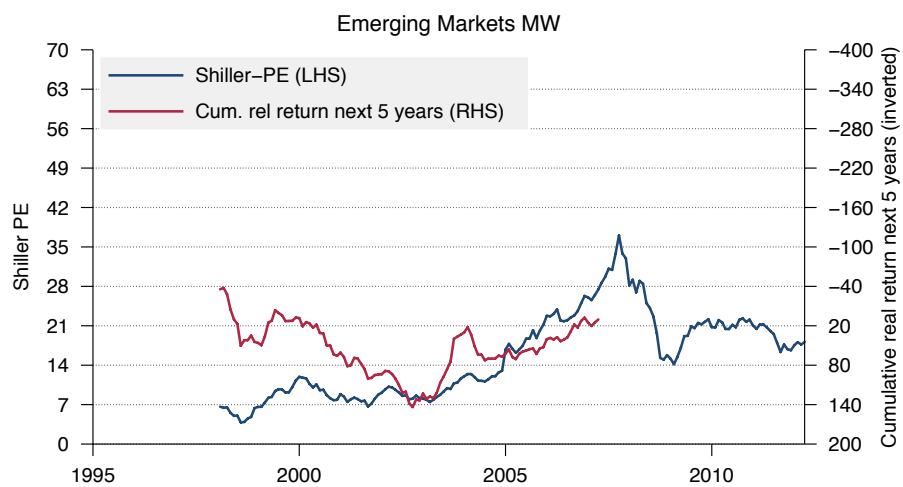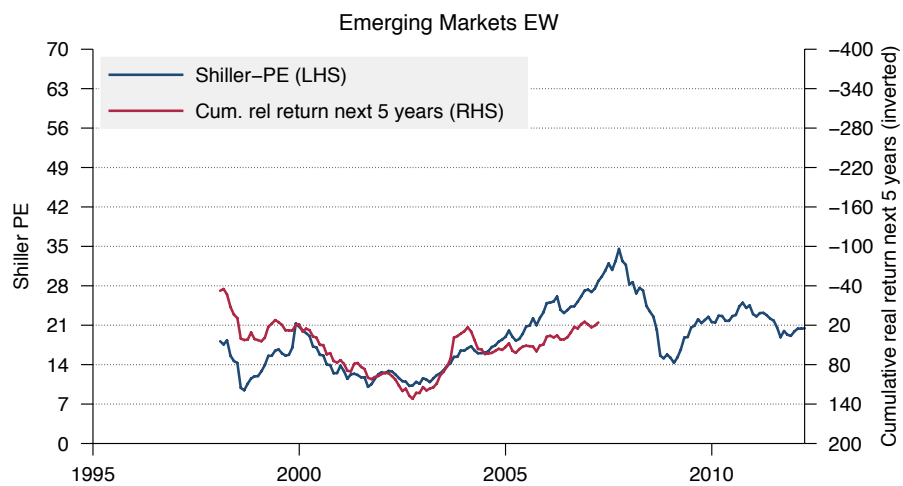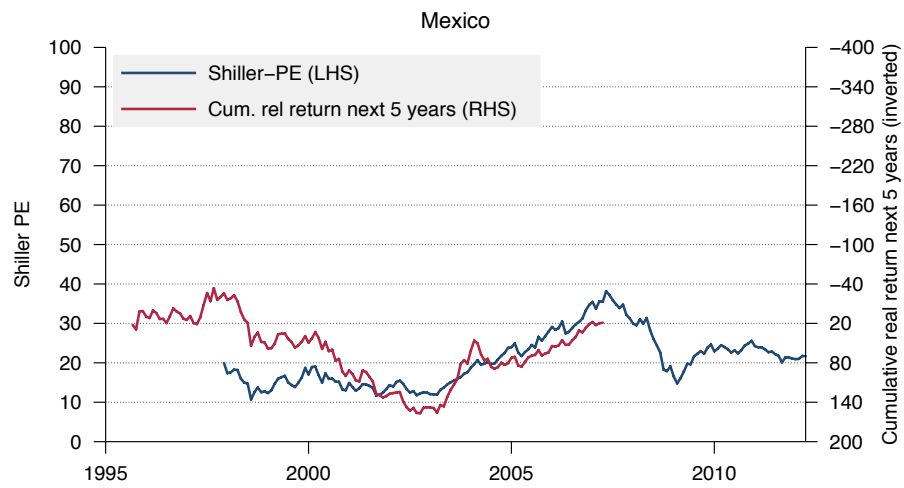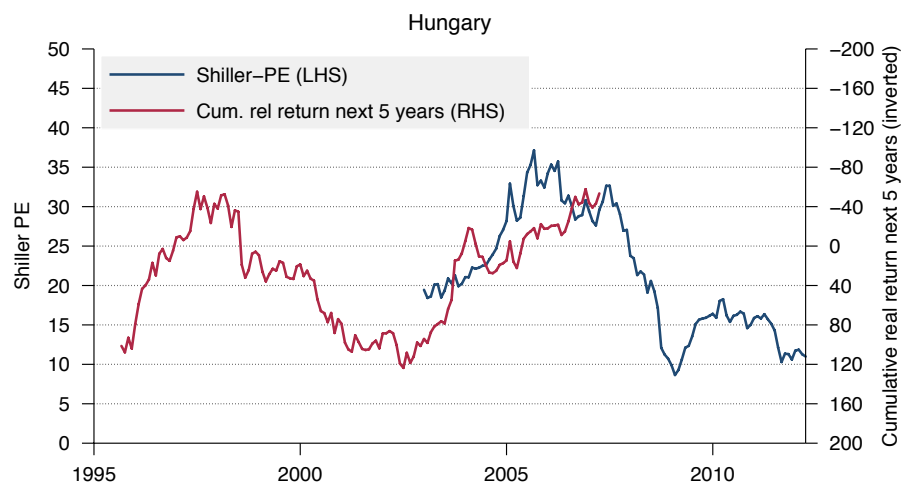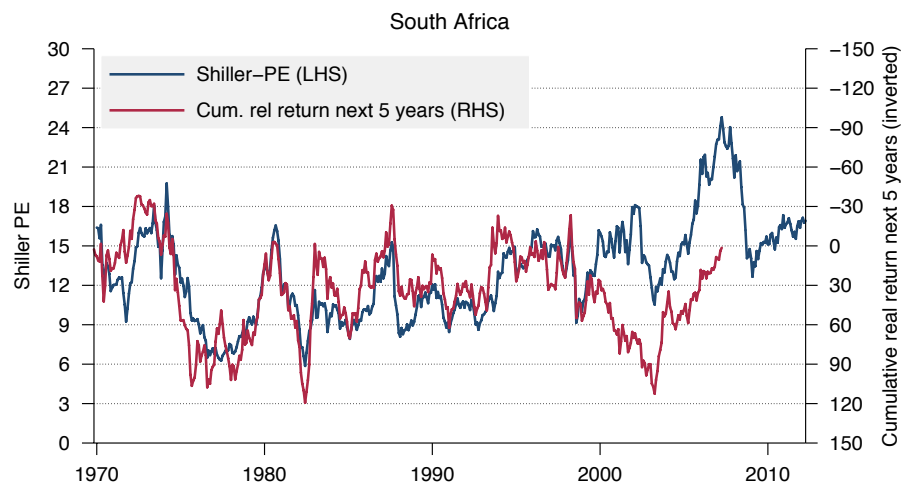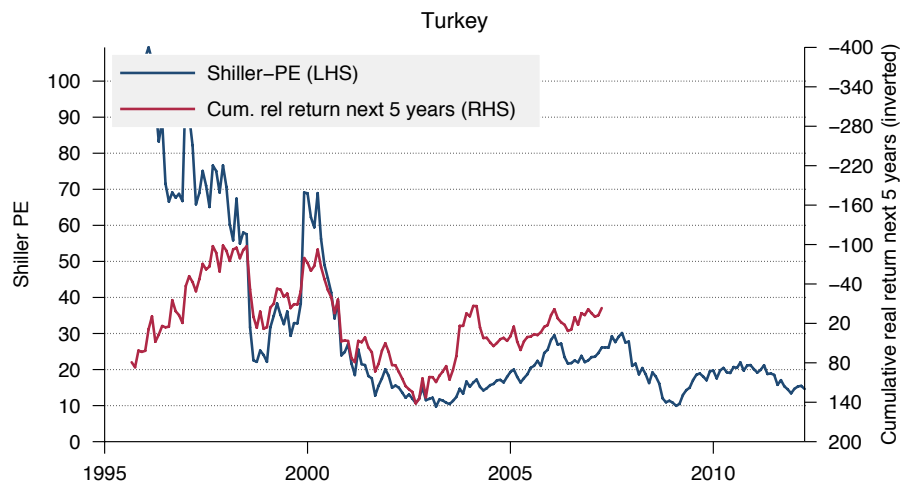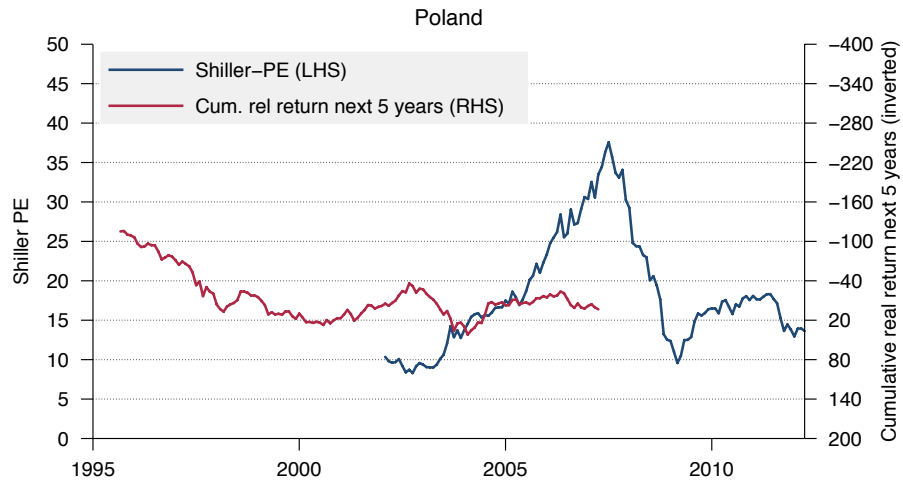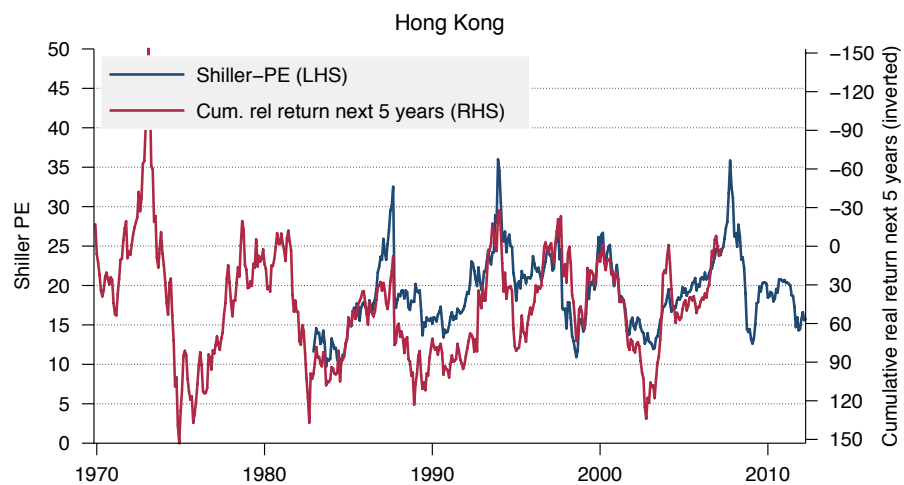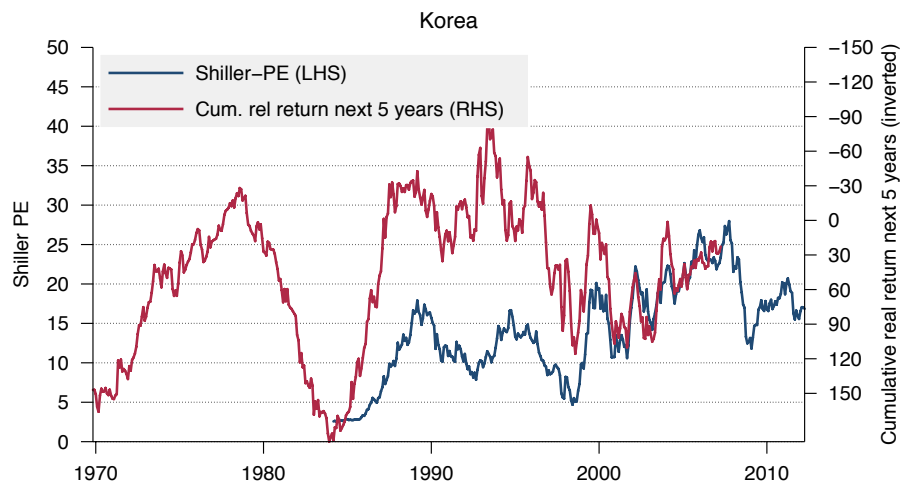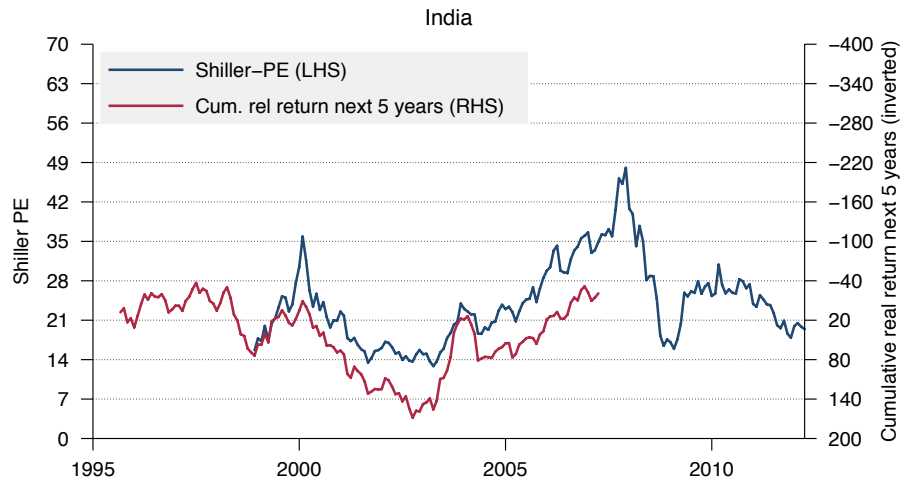
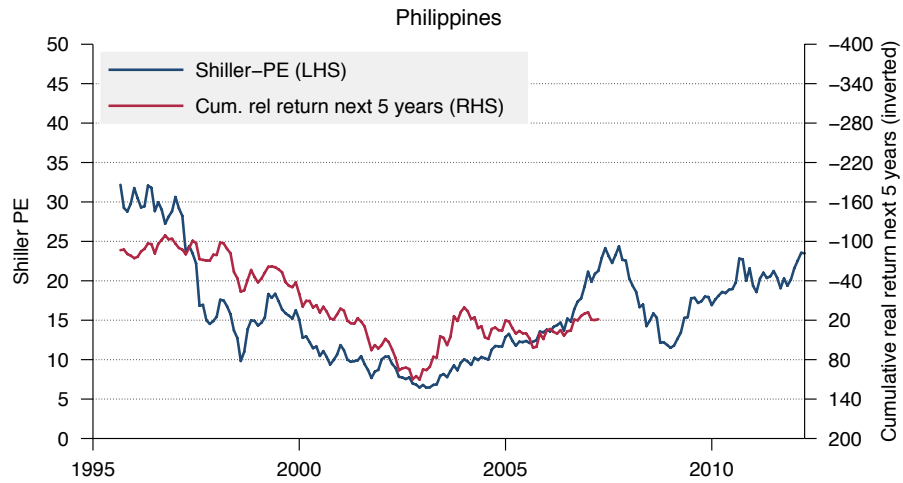**Bibliography**

- Campbell, J. Y. and R. J. Shiller "Valuation Ratios and the Long-Run Stock Market Outlook: An Update", Cowles Foundation Discussion Paper No. 1295 (2001).

- Credit Suisse, "Credit Suisse Global Investment Returns Yearbook 2012", January 2012.

- Goyal, A. and I. Welch, "A Comprehensive Look at the Empirical Performance of Equity Premium Prediction," NBER Working Paper 10483 (2004).