

Should market participants care about P/E ratios?

Evidence from international stock indices

Preliminary results

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Abstract

We have investigated the regime-switching role of different price to earnings (P/E) variants. Two-regime asset pricing models allow us to estimate critical levels above and beyond markets exhibit different systematic risk and abnormal return. However, whether the regime switch is from a less risky to a riskier state is highly dependent on the P/E variant and on the specific market it has been employed. In developed markets P/E ratios are sentiment measures and high values do not necessarily indicate overpricing. Both in developed and in emerging markets the use of local P/E can be misleading, as alone, it cannot take into account the global sentiment and the local circumstances at the same time. The relative P/E (RPE); that is, the ratio of local to global P/E appears to be the best tool to detect underpriced/overpriced markets both in the developed and in the emerging world.

Keywords:

Regime dependent models; asset pricing; price-to-earnings ratio

JEL classification:

G11, G12, G15

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1. Introduction

It has been well documented in the literature that value stocks; that is, those having high fundamental ratios such as earnings yield, cash flow yield or book-to-market equity, outperform growth stocks that have low fundamental ratios in the US and also in international markets¹.

Our approach differs from previous studies in two distinct ways. First, our methodological framework allows us to let the market parameters, the Jensen alpha and the market beta to vary depending on the valuation level of the market. Our regime-switching model includes two regimes (see e.g., van Dijk, 2002; Christiansen, 2011) 1, a low regime that is characterized by a relatively low level of price-to-earnings (P/E) and 2, a high regime that is associated with a relatively high P/E valuation level. The model also accounts for a smooth transition from one regime to the other employing a logistic smoothing function. Secondly, we apply forward-looking and historical P/E ratios and a relative measure as well that takes into account the global sentiment and the local market conditions at the same time. This relative measure (relative P/E, RPE) is simply the ratio of local to global price-to-earnings. The regime-dependent estimates for the period January 1985 – September 2012 show that relatively high global P/E defines a market state when systematic risk tends to be lower and abnormal return is higher in both developed and emerging markets. Since higher valuation does not induce higher risk and lower alpha, the global P/E ratio is not a gauge of overpricing, but we interpret it as a measure of market sentiment. Favorable market sentiment comes with a high P/E and adverse sentiment with a low P/E. However, we have documented mixed results for local P/E ratios. In developed markets, local ratios work similarly to their global counterpart: high ratios are just a reflection for favorable market sentiment that comes with lower market risk. At low valuation level, however, the most stable developed markets are good buy: they provide significantly positive abnormal return at low or moderate systematic risk. Similarly, some of the emerging markets seem to be bargain at low P/E, as they produce higher alpha and lower market beta at lower valuation level. Nevertheless, applying RPE as the regime variable, the results are more consistent with economic theory and more robust than any of the other reviewed P/E measures both in

¹ See e.g., Basu, 1983; Jaffe et al., 1989; Chan et al., 1991; DeBondt and Thaler, 1985; Fama and French, 1992; 1998; 2012; Lakonishok et al., 1994; Rouwenhorst, 1998; van der Hart et al., 2003; Asness et al., 2009.

developed and emerging markets. A higher RPE is associated with higher market risk and lower alpha showing that RPE better suits the purpose of detecting overpriced markets. RPE only produces inverse results for the most stable markets, which can be interpreted as the result of the flying-to-quality effect (see e.g., Brunnermeier and Pedersen, 2005, Ericsson and Renault, 2006, or Caballero and Krishnamurthy, 2008).

The rest of the paper is organized as follows. Section 2 presents the dataset and the related descriptive statistics. Section 3 reviews the methodological approach and the complementary literature. Section 4 discusses the results and finally Section 5 concludes.

2. Data

The dataset includes total return value-weighted country indices for 25 developed and 30 emerging markets² provided by Datastream. The time span of our study stretches from January 1985 to September 2012. However, the actual lengths of the time series depend on data availability.

Each country index accounts for a minimum 75% of total market capitalization of the respective market. Index constituents are revised on a quarterly basis. Our data are not free of survivorship bias, first documented by Elton et al. (1996). However, our viewpoint is not to make direct investment in shares but in exchange traded funds or other index tracking investment vehicles, which, by definition, survive.

For the 55 country indices and for the Datastream world index that includes all the 55 countries we have downloaded the P/E ratios³ and the 12-month forward-looking P/E ratios as reported by the Institutional Brokers' Estimate System (I/B/E/S)⁴. The I/B/E/S forecasts rely on thousands of brokerage, independent and sell side analysts.

² There are two Chinese indices in the dataset, both are tracking the price development of mainland Chinese companies, but the constituents of China A index are traded on the Shanghai and Shenzhen exchanges (class A shares) in Chinese renminbi and are generally available only for Chinese investors; foreign investment is only allowed through a tightly-regulated structure known as the Qualified Foreign Institutional Investor (QFII) system. In contrast, the China index consists the shares of mainland Chinese companies traded in foreign currencies known as China B and H class shares. China B class shares have been available for both Chinese and foreign investors since 2001 and they are traded in Shanghai in USD and in Shenzhen in Hong Kong dollar. China H class shares are still Chinese mainland companies, but they are traded on the Hong Kong stock exchange.

³ $P/E = \Sigma(P \cdot N) / \Sigma(E/N)$, where N is the number of shares, E is the total corporate earnings and the summation refers to all the index constituents.

⁴ It is calculated as $(M \cdot F1 + (12 - M) \cdot F2) / 12$, where M is the number of month ends to end in the current fiscal year, F1 is the consensus earnings forecast for current fiscal year and F2 is the consensus earnings forecast for next fiscal year.

The earnings expectations can be upgraded anytime, but particularly if a company reports earnings for any period, or a corporate action occurs, or if there is any significant developments about the company, which may affect the company's future performance.

Although most of the indices are in US dollars and we have exchanged those, which are available only in local currency denomination to US funds at the WM/Reuters closing spot rates.

2.1 Descriptive statistics

The descriptive statistics are reported in Table 1-3. Cyprus and Greece have the lowest and New Zealand the highest mean daily return. Cyprus shows the highest, while Luxembourg and Norway the lowest return variation. Cyprus and Greece are the only two countries that have negative average return over the 1999-2012 period. In emerging market Russia exhibits both the highest average return and the highest standard deviation. In the 1999-2012 period Argentina had the lowest mean, while Peru the slightest and Turkey the highest standard deviation. The daily returns are negatively skewed for 18 out of the 25 developed and 14 out of the 30 emerging markets in the full sample period.

In the full sample period the average P/E is ranging between 12.482 (New Zealand) and 18.698 (US). Japan is out of this range with an outlying reading of 42.642. The standard deviation of the P/E ratio is the highest for Japan, and the lowest for France in the full sample and for Switzerland in the shorter period. In emerging markets China A index has the highest mean for both periods (27.603 and 27.125). The other countries have an average P/E between 9.959 (Russia) and 20.449 (Taiwan) in the full period and between 8.972 (Venezuela) and Peru (20.204) in the 1999-2012 period. The standard deviation is the highest for Peru and the lowest for Mexico in both periods.

Japan has the highest average forward P/E ratio of 27.968 and 20.229 in the two periods respectively. Other developed countries have a reading between 10.244 (Cyprus) and 15.504 (Italy) in the full sample and between 10.244 (Cyprus) and 16.869 (Finland) in the 1999-2012 period. Japan exhibits the highest variation in forward P/Es in both periods, while Australia and Norway the lowest in the two investigated periods, respectively. The forward P/E ratios of the emerging markets are between 7.106 (Bulgaria) and 17.217 (Taiwan) in the full sample and are in the range

of 6.219 (Sri Lanka) and 15.846 (China A) in the 1999-2012 period. South Africa has the lowest and Thailand the highest standard deviation of forward P/E ratios in both periods.

Table 1 Descriptive statistics of daily country index returns

Panel A - Developed Markets																
	January 1985 - September 2012								January 1999 - September 2012							
	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.
Australia	0.001	0.001	0.088	-0.261	0.014	-1.397	25.942	7239	0.001	0.001	0.088	-0.147	0.015	-0.682	11.743	3586
Austria	0.001	0.000	0.108	-0.116	0.013	-0.071	10.586	7239	0.000	0.001	0.108	-0.098	0.015	-0.127	9.877	3586
Belgium	0.001	0.001	0.102	-0.111	0.012	-0.116	9.887	7238	0.000	0.001	0.102	-0.089	0.014	-0.007	8.193	3586
Canada	0.000	0.001	0.100	-0.126	0.012	-0.703	16.037	7238	0.001	0.001	0.100	-0.126	0.014	-0.508	11.237	3586
Cyprus	0.000	0.000	0.375	-0.114	0.021	1.796	32.587	4004	0.000	0.000	0.375	-0.114	0.022	1.766	30.217	3586
Denmark	0.001	0.001	0.118	-0.129	0.013	-0.197	10.592	7239	0.000	0.001	0.118	-0.129	0.014	-0.134	9.882	3586
Finland	0.000	0.000	0.155	-0.169	0.019	-0.081	8.871	6395	0.000	0.000	0.155	-0.169	0.021	-0.070	7.949	3586
France	0.001	0.001	0.113	-0.101	0.014	-0.022	9.336	7239	0.000	0.000	0.113	-0.101	0.016	0.140	8.514	3586
Germany	0.000	0.001	0.177	-0.117	0.013	0.076	11.972	7239	0.000	0.001	0.177	-0.082	0.015	0.369	11.812	3586
Greece	0.000	0.000	0.167	-0.110	0.019	0.321	8.124	5934	0.000	0.000	0.147	-0.105	0.019	0.214	7.292	3586
Hong Kong	0.001	0.000	0.169	-0.347	0.016	-1.743	44.407	7239	0.000	0.000	0.112	-0.109	0.015	-0.049	8.717	3586
Ireland	0.001	0.001	0.098	-0.155	0.014	-0.562	11.422	7239	0.000	0.000	0.098	-0.135	0.016	-0.366	8.805	3586
Italy	0.000	0.001	0.119	-0.103	0.015	0.024	8.047	7239	0.000	0.000	0.119	-0.103	0.016	0.099	8.966	3586
Japan	0.000	0.000	0.122	-0.159	0.014	-0.003	9.715	7239	0.000	0.000	0.113	-0.085	0.014	-0.071	6.753	3586
Luxembourg	0.000	0.000	0.106	-0.076	0.012	0.004	7.695	4890	0.000	0.000	0.106	-0.076	0.013	-0.030	7.390	3586
Netherlands	0.001	0.001	0.108	-0.108	0.013	-0.152	11.370	7239	0.000	0.000	0.108	-0.108	0.015	-0.030	9.346	3586
Norway	0.000	0.000	0.097	-0.115	0.013	-0.130	10.301	6454	0.000	0.001	0.097	-0.083	0.012	-0.417	8.601	3586
New Zealand	0.001	0.001	0.149	-0.202	0.017	-0.429	12.764	7239	0.001	0.001	0.149	-0.127	0.019	-0.219	9.381	3586
Portugal	0.000	0.000	0.115	-0.120	0.012	0.000	10.982	5933	0.000	0.000	0.115	-0.120	0.013	0.030	11.096	3586
Singapore	0.000	0.001	0.151	-0.231	0.013	-0.769	24.971	7239	0.001	0.001	0.098	-0.082	0.013	-0.162	7.557	3586
Spain	0.000	0.001	0.142	-0.102	0.014	0.046	9.907	6674	0.000	0.000	0.142	-0.091	0.016	0.219	8.947	3586
Sweden	0.001	0.001	0.143	-0.098	0.017	0.153	8.471	7239	0.001	0.000	0.143	-0.098	0.020	0.207	7.157	3586
Switzerland	0.001	0.001	0.095	-0.105	0.011	-0.246	9.258	7239	0.000	0.000	0.095	-0.068	0.012	0.064	7.838	3586
United Kingdom	0.001	0.001	0.126	-0.135	0.012	-0.216	13.131	7239	0.000	0.001	0.126	-0.099	0.014	0.064	11.105	3586
United States	0.000	0.000	0.115	-0.187	0.011	-0.726	21.260	7239	0.000	0.000	0.115	-0.090	0.013	0.008	10.155	3586
Panel B - Emerging Markets																
	January 1985 - September 2012								January 1999 - September 2012							
	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.
Argentina	0.000	0.000	0.154	-0.286	0.018	-0.917	23.274	4999	0.000	0.000	0.154	-0.286	0.018	-1.400	32.305	3586
Brazil	0.001	0.001	0.158	-0.150	0.021	-0.067	9.337	4759	0.001	0.001	0.151	-0.150	0.021	-0.091	9.274	3586
Bulgaria	0.001	0.000	0.343	-0.268	0.020	0.191	49.353	3129	0.001	0.000	0.343	-0.268	0.020	0.191	49.353	3129
Chile	0.001	0.000	0.128	-0.100	0.012	-0.015	9.850	6064	0.001	0.001	0.128	-0.100	0.012	-0.272	12.902	3586
China A	0.001	0.000	0.348	-0.165	0.021	2.401	44.169	4803	0.000	0.000	0.099	-0.087	0.016	0.202	7.530	3586
China	0.001	0.000	0.170	-0.133	0.020	0.368	9.663	5004	0.001	0.000	0.170	-0.126	0.020	0.437	10.139	3586
Columbia	0.000	0.000	0.121	-0.097	0.013	-0.219	13.724	4640	0.001	0.001	0.121	-0.096	0.014	-0.282	12.273	3586
Czech Republic	0.001	0.001	0.225	-0.145	0.016	0.247	17.917	4645	0.001	0.001	0.225	-0.145	0.017	0.294	17.732	3586
Egypt	0.001	0.000	0.159	-0.245	0.016	-0.913	28.204	4174	0.000	0.000	0.102	-0.245	0.016	-1.634	25.417	3586
Hungary	0.001	0.001	0.202	-0.173	0.021	0.073	12.097	4890	0.000	0.001	0.202	-0.173	0.021	0.279	11.166	3586
India	0.000	0.000	0.199	-0.117	0.017	0.038	10.594	4890	0.001	0.001	0.199	-0.117	0.018	-0.059	10.443	3586
Indonesia	0.000	0.000	0.686	-0.411	0.027	2.839	117.81	5869	0.001	0.001	0.145	-0.150	0.021	-0.081	9.931	3586
Israel	0.000	0.001	0.081	-0.102	0.014	-0.296	6.257	4890	0.000	0.001	0.077	-0.092	0.014	-0.288	5.384	3586
Korea	0.001	0.000	0.308	-0.195	0.023	0.725	19.444	6537	0.001	0.001	0.280	-0.184	0.022	0.162	14.151	3586
Kuwait	0.000	0.000	0.065	-0.067	0.012	-0.424	7.756	2282	0.000	0.000	0.065	-0.067	0.012	-0.424	7.756	2282
Malaysia	0.001	0.000	0.259	-0.308	0.016	-0.148	53.690	6976	0.001	0.000	0.151	-0.102	0.011	0.965	22.697	3586
Mexico	0.001	0.001	0.147	-0.187	0.017	-0.163	13.991	6102	0.001	0.001	0.142	-0.095	0.015	0.077	9.138	3586
Pakistan	0.000	0.000	0.154	-0.136	0.017	-0.191	9.600	4890	0.001	0.000	0.123	-0.090	0.016	-0.063	6.937	3586
Peru	0.001	0.001	0.104	-0.100	0.012	0.017	12.643	4889	0.001	0.001	0.073	-0.083	0.011	-0.583	11.543	3586
Philippines	0.001	0.000	0.216	-0.113	0.016	0.786	15.707	6233	0.000	0.000	0.216	-0.113	0.014	1.280	27.942	3586
Poland	0.000	0.000	0.185	-0.117	0.021	0.034	7.961	4848	0.001	0.001	0.143	-0.117	0.019	-0.015	6.939	3586
Romania	0.000	0.000	0.195	-0.188	0.023	-0.128	10.958	4004	0.001	0.000	0.135	-0.137	0.022	-0.225	8.425	3586
Russia	0.001	0.001	0.369	-0.431	0.032	0.201	27.291	3828	0.001	0.001	0.262	-0.190	0.026	0.226	12.400	3586
Slovenia	0.000	0.000	0.089	-0.085	0.012	-0.245	9.187	3586	0.000	0.000	0.089	-0.085	0.012	-0.245	9.187	3586
South Africa	0.001	0.001	0.182	-0.150	0.017	-0.245	11.096	7239	0.001	0.001	0.129	-0.129	0.018	-0.187	7.662	3586
Sri Lanka	0.000	0.000	0.221	-0.155	0.012	0.881	41.005	4890	0.001	0.000	0.221	-0.155	0.013	0.695	43.318	3586
Taiwan	0.000	0.000	0.147	-0.116	0.019	0.112	6.189	6369	0.000	0.000	0.085	-0.103	0.017	0.039	5.407	3586
Thailand	0.001	0.000	0.178	-0.163	0.020	0.336	11.042	6715	0.001	0.000	0.128	-0.163	0.018	-0.019	9.473	3586
Turkey	0.001	0.000	0.248	-0.236	0.030	0.171	8.631	6079	0.001	0.001	0.248	-0.236	0.030	0.298	10.655	3586
Venezuela	0.001	0.000	0.402	-0.515	0.025	-1.839	78.580	5933	0.001	0.000	0.402	-0.486	0.021	-2.775	149.77	3586

This table shows the descriptive statistics (mean, median, maximum and minimum values, standard deviation, skewness and kurtosis) of daily country index returns in two periods (January 1985 – September 2012 and January 1999 – September 2012) for developed markets and emerging markets in Panel A and B, respectively.

Table 2 Descriptive statistics of P/E ratios

Panel A - Developed Markets																
	January 1985 - September 2012								January 1999 - September 2012							
	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.
Australia	16.710	16.700	25.900	8.500	3.793	0.094	2.245	7239	17.642	17.300	25.900	9.900	3.508	0.229	2.468	3586
Austria	17.590	17.000	34.100	5.000	5.150	0.607	3.511	7239	15.030	14.800	34.100	5.000	4.315	1.086	6.527	3586
Belgium	13.841	13.400	27.300	4.800	3.605	0.749	4.388	7239	13.567	12.900	27.300	4.800	4.198	0.800	4.017	3586
Canada	17.349	17.200	31.700	8.100	4.014	0.490	3.150	7239	17.806	17.500	28.400	8.100	3.260	0.150	3.615	3586
Cyprus	16.909	18.600	48.000	0.500	10.673	0.137	2.052	3928	16.710	18.400	48.000	0.500	11.145	0.184	1.902	3586
Denmark	17.921	17.400	36.100	5.300	5.562	0.391	3.308	7239	18.833	18.100	32.200	8.500	4.586	0.803	3.352	3586
Finland	15.684	14.300	78.600	4.900	10.059	3.328	16.169	6396	19.115	16.200	78.600	5.800	11.873	2.830	10.997	3586
France	14.318	13.900	27.300	6.800	3.367	0.701	3.381	7239	15.321	14.900	27.300	6.800	3.721	0.407	3.010	3586
Germany	16.184	16.000	27.400	8.600	3.613	0.374	2.613	7239	15.044	13.800	27.400	8.600	4.130	0.891	2.872	3586
Greece	16.311	14.100	37.200	6.000	6.678	0.920	3.123	5935	17.719	16.100	37.200	6.200	7.030	0.691	2.635	3586
Hong Kong	14.158	13.700	28.800	6.400	3.591	1.062	4.776	7239	15.465	14.900	28.800	6.400	4.034	0.794	3.769	3586
Ireland	14.153	14.000	26.300	3.700	3.928	-0.003	2.921	7239	14.703	14.900	26.300	3.700	4.429	-0.330	2.792	3586
Italy	17.433	16.500	44.800	5.000	5.295	1.092	5.432	6977	16.594	16.100	36.000	5.000	5.261	0.753	4.161	3586
Japan	42.642	41.100	85.200	12.700	16.713	0.130	2.233	7239	34.160	31.100	85.200	12.700	16.946	1.104	3.840	3586
Luxembourg	16.990	17.100	33.700	3.100	6.995	0.156	2.551	4891	15.915	15.500	33.700	3.100	7.652	0.462	2.423	3586
Netherlands	15.064	13.400	38.500	4.900	5.210	1.307	4.565	7239	16.028	14.000	38.500	4.900	5.979	1.111	3.755	3586
Norway	15.698	14.900	32.600	6.400	4.260	0.536	3.138	6455	17.353	16.300	32.600	10.300	3.780	0.801	3.542	3586
New Zealand	12.482	12.100	24.000	5.000	4.045	0.344	2.549	7239	13.714	13.300	24.000	5.400	4.156	0.232	2.062	3586
Portugal	17.170	16.200	43.600	4.300	6.268	1.005	4.915	5892	16.662	16.700	32.500	4.300	5.913	0.259	3.071	3586
Singapore	17.808	17.500	37.200	4.700	5.592	0.602	3.800	7239	15.214	14.400	36.100	4.700	5.508	1.247	5.318	3586
Spain	14.493	13.500	26.800	6.400	4.542	0.461	2.228	6675	15.326	15.500	26.100	6.400	4.769	0.004	1.806	3586
Sweden	16.802	16.300	44.400	6.400	5.375	0.663	3.397	7239	16.397	14.700	44.400	6.400	5.687	0.999	4.068	3586
Switzerland	16.351	16.100	29.700	9.200	3.908	0.538	3.084	7239	17.247	17.200	25.400	9.800	2.747	0.204	2.570	3586
United Kingdom	15.215	14.800	26.700	6.400	3.645	0.601	3.395	7239	15.349	14.600	26.700	6.400	4.423	0.559	2.792	3586
United States	18.698	18.000	32.900	9.300	4.895	0.654	2.974	7239	20.496	19.100	32.900	9.600	5.090	0.546	2.418	3586
Panel B - Emerging Markets																
	January 1985 - September 2012								January 1999 - September 2012							
	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.
Argentina	13.256	13.250	35.300	2.400	4.521	0.856	5.333	5110	12.326	12.200	25.600	2.400	4.044	0.124	2.883	3586
Brazil	11.661	11.100	22.500	5.100	3.153	0.960	3.688	3482	11.661	11.100	22.500	5.100	3.153	0.960	3.688	3482
Bulgaria	14.554	8.900	59.900	1.400	12.561	1.166	3.418	3023	14.554	8.900	59.900	1.400	12.561	1.166	3.418	3023
Chile	16.720	17.300	26.700	3.100	4.447	-1.074	4.555	6065	18.010	17.800	26.400	11.500	2.542	0.139	3.112	3586
China A	27.603	26.400	61.500	9.500	12.300	0.475	2.057	4827	27.165	26.100	52.700	10.600	11.437	0.364	1.870	3586
China	11.590	10.500	32.600	3.100	4.923	1.082	4.078	5005	11.657	9.900	32.600	3.100	5.381	1.045	3.668	3586
Columbia	13.515	14.400	37.200	3.400	6.565	0.258	2.370	4501	15.152	15.400	37.200	3.400	6.265	-0.053	2.763	3586
Czech Republic	15.487	13.900	39.100	7.200	5.624	1.109	3.881	4929	16.513	14.600	36.600	8.700	5.601	0.978	3.388	3586
Egypt	13.520	11.100	46.000	4.700	6.682	0.970	3.411	4175	12.835	10.000	46.000	4.700	6.730	1.251	4.069	3586
Hungary	14.905	14.000	44.500	6.000	4.619	1.379	7.070	5551	14.357	13.800	23.700	6.000	3.124	0.247	3.092	3586
India	19.158	17.700	68.800	8.100	7.798	1.875	7.868	5935	16.473	16.500	28.700	8.100	4.191	0.238	2.254	3586
Indonesia	16.367	16.600	33.700	6.300	4.921	0.259	3.015	5655	14.377	14.200	29.700	6.300	4.261	0.284	2.534	3586
Israel	11.084	10.800	36.300	2.700	5.337	0.807	4.738	5151	9.627	9.500	36.300	2.700	5.056	1.596	8.400	3586
Korea	15.721	14.600	39.400	6.100	5.777	1.101	4.187	6457	13.971	12.600	39.400	6.900	5.677	2.110	7.607	3586
Kuwait	15.653	14.700	25.500	6.700	3.698	0.661	3.159	2280	15.653	14.700	25.500	6.700	3.698	0.661	3.159	2280
Malaysia	18.535	17.200	43.200	7.000	5.624	0.768	3.402	6977	15.581	15.100	29.600	7.900	3.452	1.213	5.559	3586
Mexico	13.202	13.300	21.200	6.500	2.499	0.030	3.374	5805	14.205	14.000	21.200	8.700	2.113	0.473	3.471	3586
Pakistan	12.604	11.100	31.800	4.100	5.750	0.950	3.301	5272	9.865	9.800	20.100	4.100	2.834	0.147	2.537	3586
Peru	16.837	13.800	61.100	1.600	14.074	0.773	2.608	4890	20.204	16.900	61.100	1.700	14.598	0.443	2.146	3586
Philippines	17.155	16.000	37.600	6.600	5.588	1.063	4.410	6538	16.097	15.900	25.400	8.100	3.420	0.072	2.630	3586
Poland	15.294	15.100	28.900	6.200	5.349	0.384	2.188	4826	16.440	16.700	28.900	6.200	5.427	0.103	2.062	3586
Romania	11.855	9.800	37.200	2.300	7.230	0.911	3.176	3790	12.038	9.800	37.200	2.300	7.362	0.853	3.024	3586
Russia	9.959	9.500	38.400	2.500	4.505	0.852	4.443	3829	9.737	9.300	38.400	2.500	4.448	0.949	4.910	3586
Slovenia	16.855	16.300	45.700	7.200	6.400	1.354	5.269	3263	16.855	16.300	45.700	7.200	6.400	1.354	5.269	3263
South Africa	14.228	14.100	24.900	7.900	3.468	0.527	2.870	7239	13.414	13.700	19.100	7.900	2.541	-0.055	2.265	3586
Sri Lanka	12.876	12.200	33.200	3.800	5.745	0.624	2.857	6608	12.830	12.300	33.200	3.800	6.273	0.653	2.846	3586
Taiwan	20.449	20.300	40.600	6.900	6.733	0.440	2.490	5805	18.225	15.300	40.600	6.900	6.839	1.044	3.415	3586
Thailand	14.398	13.200	68.200	5.200	6.894	2.986	16.024	6716	12.057	11.700	59.700	5.200	4.643	4.033	34.515	3586
Turkey	13.735	13.200	42.600	4.300	4.626	0.851	5.200	5870	13.964	13.300	30.900	4.300	4.363	0.525	3.735	3586
Venezuela	12.226	10.200	44.000	0.300	8.415	1.054	3.842	5195	8.972	7.300	27.700	0.300	5.871	0.817	2.858	3586

This table shows the descriptive statistics (mean, median, maximum and minimum values, standard deviation, skewness and kurtosis) of P/E ratios in two periods (January 1985 – September 2012 and January 1999 – September 2012) for developed markets and emerging markets in Panel A and B, respectively.

Table 3 Descriptive statistics of forward-looking P/E ratios

Panel A - Developed Markets																
	January 1985 - September 2012								January 1999 - September 2012							
	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.
Australia	13.016	13.450	18.590	7.880	2.237	-0.444	2.742	6717	13.729	13.800	18.590	8.820	1.750	0.050	3.268	3586
Austria	13.284	13.090	27.090	5.160	3.139	0.975	5.997	6642	11.823	12.040	14.920	5.160	2.110	-0.893	3.535	3586
Belgium	12.635	12.205	23.760	6.920	2.899	1.414	5.508	6642	12.437	12.380	22.950	6.920	2.744	1.426	6.440	3586
Canada	12.826	13.260	19.160	6.920	2.470	-0.195	2.283	7239	14.260	14.420	17.760	8.530	1.517	-0.764	4.882	3586
Cyprus	10.244	10.860	20.060	1.500	4.289	-0.362	2.361	2577	10.244	10.860	20.060	1.500	4.289	-0.362	2.361	2577
Denmark	14.118	13.740	24.390	5.560	2.838	0.921	5.154	6682	14.865	14.370	24.390	9.140	3.016	1.173	4.440	3586
Finland	15.333	13.860	43.740	5.880	6.927	1.965	7.251	6396	16.869	14.400	43.740	8.460	7.104	2.063	6.890	3586
France	13.873	12.800	27.560	8.330	3.969	1.169	3.992	6717	14.014	12.780	27.560	8.370	4.379	1.375	4.168	3586
Germany	15.297	13.820	28.840	7.830	4.340	0.777	2.889	6682	14.170	12.620	28.840	7.830	4.594	1.313	3.917	3586
Greece	11.712	12.000	25.050	5.450	3.713	0.614	3.511	5097	12.676	13.310	25.050	5.450	3.731	0.399	3.638	3586
Hong Kong	12.536	12.660	21.480	6.850	3.069	0.302	2.646	6717	14.508	14.140	21.480	9.030	2.381	0.479	3.167	3586
Ireland	12.089	12.080	20.110	5.560	2.867	0.097	2.750	6717	13.185	13.090	18.550	7.300	2.124	-0.005	3.047	3586
Italy	15.504	14.000	36.020	7.290	5.013	1.014	4.143	6717	13.829	13.220	26.580	7.290	4.473	0.973	3.247	3586
Japan	27.968	27.140	56.080	10.360	11.610	0.344	2.032	6717	20.229	17.720	44.030	10.360	8.311	1.437	4.249	3586
Luxembourg	14.676	14.010	24.080	5.950	3.478	-0.029	2.711	3337	14.676	14.010	24.080	5.950	3.478	-0.029	2.711	3337
Netherlands	12.232	11.160	22.540	5.950	3.668	1.275	3.729	6717	12.810	11.590	22.540	5.950	3.889	1.076	3.221	3586
Norway	13.681	14.010	18.480	5.230	2.381	-1.571	6.005	6227	14.503	14.240	18.240	11.980	1.258	0.446	2.721	3586
New Zealand	11.206	11.030	17.630	5.230	2.459	0.129	2.609	6682	11.122	10.950	15.800	5.230	1.949	-0.002	3.225	3586
Portugal	13.550	13.030	26.150	6.810	3.554	0.835	3.876	5597	14.034	13.630	25.280	9.290	2.860	1.085	4.644	3586
Singapore	15.010	14.050	28.780	8.420	3.299	1.258	5.008	6717	14.210	13.840	21.810	8.420	2.309	0.777	4.497	3586
Spain	12.698	11.970	24.740	6.740	3.554	1.076	3.835	6675	13.036	12.310	21.570	7.510	3.470	0.943	3.188	3586
Sweden	14.307	13.300	31.180	7.990	4.446	1.172	4.147	6682	15.178	13.950	31.180	8.510	4.291	1.492	5.255	3586
Switzerland	14.114	13.770	23.320	8.160	2.872	0.757	3.750	6622	14.291	13.810	21.620	10.020	2.559	0.825	3.066	3586
United Kingdom	13.395	12.820	21.880	7.330	3.047	0.841	3.194	6195	13.497	12.750	21.880	7.330	3.441	0.835	2.758	3586
United States	15.170	14.530	25.510	8.640	3.783	0.849	3.115	7239	16.638	15.760	25.510	9.290	3.934	0.653	2.387	3586

Panel B - Emerging Markets																
	January 1985 - September 2012								January 1999 - September 2012							
	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.	Mean	Median	Max.	Min.	St. Dev.	Skew.	Kurt.	Obs.
Argentina	9.851	10.490	17.130	2.170	3.206	-0.315	2.232	5247	8.695	8.490	15.450	2.170	3.075	0.057	2.167	3586
Brazil	9.542	9.470	19.760	3.920	2.899	0.594	3.907	5207	8.992	9.070	13.820	3.920	2.368	0.028	2.119	3586
Bulgaria	7.106	5.570	23.730	2.870	4.340	2.298	7.868	1142	7.106	5.570	23.730	2.870	4.340	2.298	7.868	1142
Chile	14.052	14.230	21.990	7.830	2.710	-0.012	2.837	5207	13.652	13.710	19.630	8.120	2.519	-0.120	2.634	3586
China A	15.846	13.870	36.780	8.920	5.349	1.389	4.910	2902	15.846	13.870	36.780	8.920	5.349	1.389	4.910	2902
China	10.697	10.010	31.520	3.440	4.184	1.491	6.445	4987	10.185	9.920	23.040	4.650	3.415	0.937	3.696	3586
Columbia	9.685	8.130	21.090	1.520	5.380	0.298	1.926	4752	9.646	7.090	21.090	1.520	6.005	0.286	1.623	3586
Czech Republic	12.185	11.580	21.030	4.460	2.885	0.222	2.701	4512	12.787	12.140	21.030	6.700	2.750	0.259	2.362	3586
Egypt	9.220	9.120	15.570	5.030	2.473	0.220	2.138	3487	9.220	9.120	15.570	5.030	2.473	0.220	2.138	3487
Hungary	9.817	9.840	16.680	3.860	2.195	0.128	3.628	4512	9.800	9.840	16.680	4.930	1.795	0.340	4.575	3586
India	13.453	12.310	36.310	7.480	5.053	2.183	8.599	5117	12.284	12.080	19.970	7.480	2.691	0.335	2.638	3586
Indonesia	12.221	12.720	26.430	4.810	3.793	0.478	3.651	5727	10.679	10.140	15.990	4.810	2.966	-0.117	1.711	3586
Israel	10.507	10.840	15.780	3.440	2.998	-0.560	2.794	4382	10.554	11.010	15.780	3.440	3.222	-0.590	2.565	3586
Korea	10.628	9.960	22.070	2.930	3.655	0.676	3.718	6402	9.393	9.180	19.750	5.440	2.366	1.458	6.272	3586
Kuwait	11.616	12.380	20.170	2.250	5.066	-0.523	2.483	1902	11.616	12.380	20.170	2.250	5.066	-0.523	2.483	1902
Malaysia	16.013	15.060	27.070	7.930	3.107	0.737	3.603	6467	14.581	14.390	22.160	10.950	1.846	1.478	6.846	3586
Mexico	12.054	12.140	16.510	7.860	2.080	0.070	1.986	5292	12.588	12.620	16.510	8.720	1.947	-0.028	1.982	3586
Pakistan	8.741	8.150	22.850	3.790	3.559	1.912	7.383	5142	7.682	7.390	11.680	4.410	1.981	0.302	1.942	3586
Peru	8.451	8.530	21.090	1.380	4.298	0.835	3.943	4597	8.033	7.880	21.090	1.380	4.687	1.043	3.847	3586
Philippines	12.545	12.300	22.450	3.680	3.770	0.051	2.612	6532	12.853	12.610	18.680	7.150	2.274	0.341	2.868	3586
Poland	11.280	11.650	19.250	3.790	3.245	-0.242	2.678	4512	12.474	12.450	19.250	6.900	2.358	0.271	3.026	3586
Romania	7.567	6.000	28.290	1.360	5.964	1.279	4.143	3752	7.679	6.240	28.290	1.360	6.061	1.229	3.962	3586
Russia	7.280	7.120	17.660	2.220	2.342	0.603	4.024	3829	7.413	7.190	17.660	3.510	2.290	0.704	4.150	3586
Slovenia	14.623	14.160	29.080	7.720	4.310	0.905	3.992	3447	14.623	14.160	29.080	7.720	4.310	0.905	3.992	3447
South Africa	10.312	10.230	14.980	6.840	1.658	0.209	2.470	6422	9.991	10.170	13.150	6.840	1.445	-0.115	2.007	3586
Sri Lanka	7.557	6.090	20.700	1.100	3.689	0.941	3.978	5142	6.219	6.090	15.150	1.100	2.859	0.891	3.524	3586
Taiwan	17.217	15.360	32.080	10.110	5.366	0.850	2.741	5577	14.372	13.250	26.310	10.110	3.354	1.689	5.440	3586
Thailand	13.822	11.330	54.350	6.580	7.574	2.973	12.677	6487	13.372	10.800	54.350	6.580	8.711	3.057	11.814	3586
Turkey	8.528	8.600	26.240	2.610	3.172	1.464	8.685	5077	9.630	9.470	26.240	3.870	2.936	2.160	11.554	3586
Venezuela	10.293	8.920	47.920	1.660	6.583	1.731	8.062	4772	10.300	8.920	47.920	1.660	7.229	1.711	7.273	3586

This table shows the descriptive statistics (mean, median, maximum and minimum values, standard deviation, skewness and kurtosis) of forward-looking P/E ratios in two periods (January 1985 – September 2012 and January 1999 – September 2012) for developed markets and emerging markets in Panel A and B, respectively.

3. Methodology

In this section first we review the existing literature on regime dependent asset pricing models and then present our model. It is a stylized fact in the literature that beta is conditional and depends on economic conditions (see e.g., Ferson and Schadt, 1996). One strain of research does not explicitly define the root cause of regime-switching. These models mainly rely on Markov-switching processes. For instance, Schaller and Van Norden (1997) apply the price-to-dividend ratio to predict stock market returns after accounting for state-dependent switching. Guidolin and Timmermann (2008) have analyzed an unconditional four-moment capital asset pricing model that is able to distinguish between bear and bull markets.

Other studies try to identify so-called regime variables that are able to make distinctions between bear and bull markets. For instance, Woodward and Marisetty (2005) have found the 4-month lagged yield spread as the most appropriate regime forecaster.

The models of Woodward and Marisetty (2005) and Christiansen et al. (2011) are the closest to ours. Both studies have applied a logistic smooth transition regression (LSTR) model. The latter employs the LSTR model on currency carry trade strategies and finds that systematic risk increases with foreign exchange volatility.

3.1 Econometric model

The starting point is the market model that allows the parameters to depend on regimes.

$$r_{i,t} = \alpha_{i,s} + \beta_{i,s} r_{m,t} + \varepsilon_{i,t},$$

where $r_{i,t}$ is the risk premium of the country index i and $r_{m,t}$ is the market risk premium and s refers to state-dependency. The market is proxied by the Datastream World index that includes all the 55 countries in our dataset. The premiums are calculated over the risk-free rate, which is the one-month T-bill yield by Ibbotson Associates. The transition between the states is determined by the logistic functions that depend on regime variables. Formally the model is

$$r_{i,t} = G(s_{t-1})(\alpha_{i,1} + \beta_{i,1}r_{i,t}) + (1 - G(s_{t-1}))(\alpha_{i,2} + \beta_{i,2}r_{i,t}) + \varepsilon_{i,t}, \quad (1)$$

where

$$G(s_{t-1}) = \left(1 + \exp(-\gamma(s_{t-1} - c))\right)^{-1} \quad (2)$$

is the logistic smooth transition function (van Dijk et al. 2002 and Christiansen et al., 2011). The transition from Regime 1 to 2 is described by the logistic function whose parameters are γ and c , the steepness and location parameters, respectively. s_{t-1} is the one-day-lagged value of the regime function. As in this study we assume that P/E ratios have regime-determining role, the s_{t-1} will be different P/E variants. The location parameter is in our particular interest, since it can be regarded as a critical value if which is crossed by the regime variable, the market is proven to switch from one regime to another, possibly from a less risky to a more risky one. Around a location parameter in a small territory, the logistic function creates mixed transition regimes by the weighted parameters (alpha and beta) of the two states of the market. The critical values are market dependent, for instance, a higher average valuation level can be justified for less risky markets. Hence, without accounting for country risk, cross-sectional comparison of location parameters is economically meaningless. When we say that a market seems to be underpriced based on P/E, it means that the market exhibits a discount with respect to own historical valuation levels. Conversely, a market is considered expensive when the price to earnings level touches an unusual extreme level comparing to past P/E valuation grades.

The g parameter drives how smooth the transition is between states and determines the diameter of the mixed regimes. A large steepness parameter results a less smooth transition. As g approaches infinity, the logistic function approaches the indicator function that takes the value one if the regime variable is below c and zero otherwise (see van Dijk et al, 2002). At very large steepness coefficients, the transition is almost immediate, whereas at low coefficients the transition is rather slow.

The estimation of Eq. (1) is conducted by non-linear least squares and the reported standard errors throughout the paper account for possible heteroskedasticity and autocorrelation in the residuals estimating the Newey and West (1987) covariance matrix.

4. Results

4.1 Forward P/E ratios as regime variables

4.1.1 The forward local P/E ratios as regime variables

First, we use the one-day-lagged forward local P/E ratios as regime variables. The results for Developed markets are reported in Table 4, Panel A. We fix the steepness parameter of the logistic function at 7 because in the unconstrained regressions it has turned out to be insignificant in all the cases⁵.

Regime 1 is characterized by low, whereas Regime 2 is by high P/E ratio. The interpretation of the regimes is not obvious. *Ceteris paribus*, when analysts had bullish view about the next year, the forward-looking P/E ratio would be low and conversely, when they were less optimistic the forward P/E would be high. But usually P/E works on the contrary, in normal market situations when analysts increase their earnings forecasts, P/E is high and in volatile times P/E is relatively low. This is due to the fact prices precede or co-move with analysts' forecast and high (low) ratios just reflect optimism (pessimism) about the market. Although analysts condition their forecasts on recent market performance, they can react to changed market situations faster than reported corporate earnings, thus forward-looking ratios might signal shift in market conditions faster (see Ramnath et al., 2008 for a review of related literature).

The estimates show that developed countries have higher market risk when the forward P/E ratio is low. It is evidence that high P/E is associated with optimistic market sentiment and conversely low P/E ratio reflects pessimistic sentiment. There are a few exceptions consisting of the most stable markets: Canada, Finland, Hong Kong, Japan, Luxembourg, Singapore and the US. These markets work conversely; they exhibit lower market risk when the related forward P/E ratios are low. It is likely that when the expected ratios are low for these markets, the valuation is low worldwide, which happens in volatile times. In recessions and under high uncertainty the demand is relatively high for the most established markets resulting in lower market risk. Except for the few countries mentioned above, the abnormal returns are also higher in Regime 1. When forward P/E is high none of the markets exhibit significant alpha, whereas in the low regime Denmark, Hong Kong, Luxembourg,

⁵ These results have been omitted because of space-saving considerations but they are available on request.

New Zealand, Norway and Switzerland post significant positive abnormal returns. Moreover, only the most crisis-hit euro countries show negative alphas in Regime 1. It means that the utility of the forward P/E for stock picking is limited in developed markets. Most countries offer higher abnormal returns when the forward P/E is low but only for those who bear higher market risk as well. Low forward P/E per se does not guarantee high abnormal returns, as the most crisis-hit countries like Cyprus, Greece, Italy and Spain offer negative abnormal returns when the forward P/E is low even if one takes substantially higher risk than when P/E is in normal territory. However, the results show that keeping an eye on the forward P/E is not completely useless. The most stable markets seem to be bargain when the P/E drops below a critical level. They have lower systematic risk than in Regime 2 and even lower than most of the other countries and on top of that they provide substantial abnormal return. Based on these results the best advice to practitioners is to invest in the most stable countries that have low P/E ratios.

Interestingly, most of the emerging markets show similar results to the most stable developed countries: they have lower systematic risk and higher abnormal returns when the forward P/E is relatively low. We have to note that the location parameters are substantially below the average P/Es in emerging markets. In contrast, in developed markets the critical levels are usually very close to the average P/E values. This indicates that emerging markets have to offer a considerable discount with respect to the average pricing level to become attractive. However, if the forward P/E drops below the critical level they offer great opportunity to investors: relatively low market risk and relatively high abnormal returns.

In Regime 2 there is only one country that posts significant positive alpha, the Czech Republic and as many as 14 countries have negative alphas, though only one is significantly negative (Bulgaria). Whereas, under Regime 1 there is no significant negative abnormal return and only two markets (Bulgaria and Kuwait) show negative alphas. Moreover, seven countries post significant positive alphas when the forward P/E appears to be low. Before we say that emerging markets are bargain when P/E shows low pricing, we have to mention that there are a few anomalies. The Czech Republic, Hungary, Korea, Kuwait, Taiwan and Turkey have significantly higher market risk when the forward P/E is low, similarly to developed countries. However, most of them (except for the Czech Republic and Kuwait) beckon investors with high

abnormal return potential. Tracking the forward P/Es in emerging markets seems to be more fruitful than in developed markets.

It would be an appealing question why most of the emerging markets exhibit relatively low betas when the P/E ratio is low. This is an opposite result what we have documented for developed markets but one possible explanation would be that institutional investors stay away from emerging markets as long as the global P/E ratio is not sufficiently high reflecting positive market sentiment. If high P/E is a good signal for investors when to turn to emerging markets it is not surprising that one can see higher betas when P/E is high. As higher valuation, which indicates more optimistic market participants attracts more investors to emerging markets, it leads to a more pronounced co-movement with global stocks that, in turn, results in higher market betas. Hence, theoretically, low alphas when local P/Es are low can be a consequence of neglecting these markets in bad investment climate.

Table 4 Forward local P/E ratios as regime variables (1985-2012)

Panel A - Developed Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	Obs.
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Australia	12.146	20.225	0.000	1.347	0.906	15.566	0.000	1.308	0.733	12.656	0.614	0.033	0.269	6716
Austria	10.408	65.657	-0.001	-1.458	1.236	26.916	0.000	1.780	0.667	12.136	0.047	0.000	0.369	6641
Belgium	13.990	25.618	0.000	1.461	0.940	29.958	0.000	-0.005	0.593	12.936	0.577	0.000	0.455	6641
Canada	13.590	53.435	0.000	0.009	0.867	15.156	0.000	1.456	1.033	42.063	0.346	0.007	0.530	7238
Cyprus	12.860	58.556	-0.001	-1.944	1.013	17.500	0.000	0.207	0.470	4.754	0.152	0.000	0.232	2576
Denmark	17.439	56.694	0.000	2.107	0.864	23.198	0.000	-0.375	0.474	8.943	0.330	0.000	0.361	6681
Finland	10.960	43.438	0.000	-0.369	0.945	15.579	0.000	0.665	1.390	36.817	0.511	0.000	0.373	6395
France	12.389	28.242	0.000	0.907	1.203	38.702	0.000	-0.034	0.984	28.184	0.446	0.000	0.558	6716
Germany	13.891	48.716	0.000	0.028	1.195	39.965	0.000	0.149	0.920	21.195	0.928	0.000	0.558	6681
Greece	11.211	36.043	0.000	-0.997	1.036	22.151	0.000	0.673	0.655	14.486	0.237	0.000	0.210	5096
Hong Kong	10.886	26.032	0.001	2.368	0.834	10.332	0.000	0.107	0.746	14.585	0.048	0.366	0.191	6716
Ireland	15.424	91.106	0.000	0.330	0.983	28.417	0.000	0.115	0.461	6.902	0.998	0.000	0.366	6716
Italy	11.392	74.090	0.000	-0.937	1.338	23.575	0.000	-0.500	0.887	22.980	0.539	0.000	0.439	6716
Japan	23.206	113.11	0.000	0.086	0.469	12.347	0.000	-1.427	1.197	24.165	0.308	0.000	0.310	6716
Luxembourg	10.730	31.442	0.002	2.332	0.237	3.172	0.000	0.305	0.597	19.778	0.032	0.000	0.187	3337
Netherlands	14.504	4.942	0.000	0.513	1.129	43.939	0.000	0.215	0.843	21.180	0.976	0.000	0.582	6716
Norway	14.261	77.430	0.000	2.518	0.596	21.525	0.000	-0.932	0.408	9.693	0.024	0.000	0.157	6227
New Zealand	13.105	74.411	0.000	2.211	1.264	31.957	0.000	-0.367	0.680	14.772	0.151	0.000	0.408	6681
Portugal	15.824	28.502	0.000	0.071	0.865	23.929	0.000	-0.257	0.680	13.551	0.793	0.003	0.369	5596
Singapore	21.519	32.057	0.000	1.627	0.697	27.155	0.000	-0.517	0.998	4.189	0.465	0.208	0.251	6716
Spain	12.046	77.527	0.000	-0.481	1.160	31.636	0.000	1.434	0.842	11.659	0.191	0.000	0.459	6674
Sweden	18.235	30.190	0.000	1.141	1.322	30.300	0.000	0.862	1.073	17.789	0.712	0.001	0.478	6681
Switzerland	16.060	30.764	0.000	2.053	0.885	41.295	0.000	0.449	0.687	13.452	0.769	0.000	0.472	6622
United Kingdom	13.534	132.21	0.000	1.406	1.130	46.613	0.000	-0.039	0.763	24.325	0.397	0.000	0.592	6194
United States	15.726	132.95	0.000	1.161	0.862	29.429	0.000	0.270	1.200	50.420	0.545	0.000	0.580	7238
Panel B - Emerging Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	Obs.
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Argentina	7.484	50.837	0.000	0.272	0.511	11.240	0.000	-0.518	0.971	17.409	0.645	0.000	0.152	4999
Brazil	7.615	14.924	0.001	0.992	1.169	9.234	0.000	0.892	1.421	31.756	0.570	0.051	0.379	4759
Bulgaria	8.917	29.190	-0.001	-1.005	0.519	9.411	-0.005	-2.295	0.581	7.167	0.045	0.552	0.161	1141
Chile	11.568	52.981	0.000	0.508	0.484	10.045	0.000	1.302	0.744	15.758	0.999	0.000	0.307	5206
China A	19.167	39.791	0.000	0.728	0.276	6.717	0.000	-0.027	0.532	4.233	0.785	0.052	0.044	2901
China	8.603	22.080	0.001	1.109	0.532	7.600	0.000	0.411	1.078	18.845	0.466	0.000	0.163	4986
Columbia	6.597	45.816	0.000	0.802	0.095	2.859	0.000	0.573	0.706	15.740	0.746	0.000	0.187	4751
Czech Republic	10.463	26.636	0.000	0.153	1.045	10.439	0.001	2.206	0.776	16.131	0.324	0.012	0.293	4511
Egypt	6.323	20.978	0.000	0.376	0.079	1.062	0.000	1.190	0.317	7.586	0.896	0.005	0.036	3486
Hungary	7.789	14.223	0.000	0.345	1.415	14.541	0.000	1.094	1.120	20.160	0.958	0.007	0.326	4511
India	9.673	56.127	0.001	2.132	0.287	4.640	0.000	-0.090	0.759	18.274	0.054	0.000	0.138	4890
Indonesia	7.453	14.307	0.001	0.644	0.132	1.348	0.000	0.442	0.718	16.358	0.639	0.000	0.065	5726
Israel	8.088	24.396	0.000	0.801	0.518	8.147	0.000	0.790	0.726	25.274	0.705	0.003	0.224	4381
Korea	11.182	28.954	0.001	1.804	0.915	17.156	0.000	-0.703	0.649	8.957	0.099	0.003	0.116	6401
Kuwait	15.981	11.889	0.000	-0.041	0.127	2.838	0.001	1.211	-0.050	-0.744	0.293	0.026	0.011	1901
Malaysia	10.634	24.308	0.001	0.230	1.064	2.076	0.000	1.720	0.406	13.612	0.869	0.196	0.068	6467
Mexico	8.463	67.503	0.004	1.662	-0.644	-1.389	0.000	0.540	1.126	39.085	0.111	0.000	0.357	5291
Pakistan	9.328	19.277	0.001	1.604	0.053	1.972	-0.001	-1.728	0.248	3.518	0.020	0.010	0.004	4890
Peru	5.385	13.191	0.001	4.064	0.097	2.359	0.000	0.393	0.511	15.887	0.003	0.000	0.163	4597
Philippines	7.314	29.362	0.003	1.952	0.646	3.619	0.000	0.761	0.382	12.622	0.067	0.147	0.051	6233
Poland	6.063	21.365	0.002	1.655	0.301	1.199	0.000	0.306	1.107	27.865	0.122	0.002	0.311	4511
Romania	3.326	19.034	0.002	2.814	0.211	2.215	0.000	-1.044	1.034	13.892	0.004	0.000	0.170	3751
Russia	11.451	53.415	0.001	1.513	1.260	16.501	0.005	1.352	2.430	3.497	0.236	0.094	0.176	3828
Slovenia	12.549	68.747	0.001	1.837	0.297	6.850	0.000	-0.833	0.574	10.163	0.054	0.000	0.170	3446
South Africa	10.237	62.059	0.001	2.446	0.847	16.467	0.000	-0.966	1.240	24.496	0.014	0.000	0.317	6422
Sri Lanka	4.618	13.457	0.001	2.623	0.053	1.353	0.000	-0.590	0.055	2.075	0.008	0.969	0.003	4890
Taiwan	21.046	20.400	0.000	0.628	0.553	16.662	0.000	-0.134	0.312	3.828	0.702	0.006	0.080	5577
Thailand	14.251	43.290	0.001	2.634	0.554	14.070	-0.001	-1.147	1.216	7.774	0.041	0.000	0.098	6486
Turkey	15.913	2.164	0.001	1.473	1.146	20.509	0.000	-0.182	-0.299	-0.643	0.687	0.002	0.116	5077
Venezuela	9.040	47.900	0.001	1.345	0.089	1.816	0.000	-0.230	0.298	5.264	0.250	0.005	0.005	4771

This table shows the estimated parameters of the two-regime logistic smooth transition regression model for the period January 1985 – September 2012. The regime variables are the one-day-lagged forward local P/E ratios. Panel A and Panel B present the results for developed and emerging markets, respectively. The steepness parameter of the logistic function is fixed at seven in all the regressions. The t-statistics account for possible heteroskedasticity and autocorrelation in the residuals applying the Newey and West (1987) consistent covariance matrix estimator. The reported p-values are in reference to Wald F-statistics that test the null hypothesis that the alphas and betas are different under the two regimes.

As a robustness check and to ensure easier comparability of the estimates the smooth transition models are also reported for the period of January 1999 – September 2012 in Table 5⁶. The results for this shorter period are quite similar; developed markets usually have lower risk when P/E is high. Two of the exceptions in Table 4 have disappeared; however, Finland, Japan, Luxembourg and the US still produce different betas than all the other developed markets. They have higher systematic risk when P/E is high and lower when P/E is low. Curtailing the time series also does not result in substantial changes in emerging markets; most countries have lower market beta when they seem undervalued based on the P/E ratio. However, the Czech Republic, Hungary, Kuwait, the Philippines, Poland, Taiwan and Turkey behave like most of the developed economies: they exhibit higher market risk when the market sentiment is rather bad that is signaled by a low P/E.

⁶ This shorter sample size allows us to estimate almost all the regressions for the same interval with a few exceptions because of data availability issues.

Table 5 Forward local P/E ratios as regime variables (1999-2012)

Panel A - Developed Markets														
	Location		Regime 1			Regime 2			p-Value		Adj. R ²	Obs.		
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)			α	β
Australia	12.176	35.618	0.000	0.783	1.090	20.300	0.000	2.426	0.692	16.968	0.870	0.000	0.363	3586
Austria	10.391	66.440	0.000	-1.114	1.247	26.874	0.000	1.881	0.698	12.085	0.077	0.000	0.478	3586
Belgium	14.002	37.658	0.000	1.192	1.043	39.521	-0.001	-2.020	0.496	4.998	0.025	0.000	0.546	3586
Canada	10.391	69.503	0.001	0.307	1.448	15.494	0.000	2.549	1.023	48.601	0.889	0.000	0.642	3586
Cyprus	12.860	58.556	-0.001	-1.944	1.013	17.500	0.000	0.207	0.470	4.754	0.152	0.000	0.232	2576
Denmark	17.646	90.872	0.000	0.954	1.010	30.446	0.000	0.118	0.416	7.153	0.850	0.000	0.464	3586
Finland	10.220	63.415	0.000	-0.263	1.092	13.844	0.000	0.142	1.496	37.591	0.775	0.000	0.457	3586
France	16.409	92.481	0.000	-0.418	1.303	46.027	0.000	0.145	0.895	17.692	0.769	0.000	0.683	3586
Germany	18.004	48.291	0.000	0.244	1.236	41.598	0.000	-0.861	0.927	16.576	0.374	0.000	0.671	3586
Greece	11.211	37.808	-0.001	-2.232	1.104	20.706	0.000	0.466	0.640	14.382	0.033	0.000	0.262	3586
Hong Kong	11.259	16.544	0.000	0.649	0.806	6.594	0.000	1.441	0.673	21.109	0.756	0.285	0.252	3586
Ireland	15.394	103.11	0.000	-1.058	1.087	27.099	0.000	-0.655	0.452	4.644	0.800	0.000	0.451	3586
Italy	13.402	142.83	0.000	-0.897	1.308	30.589	0.000	-0.696	0.858	20.660	0.913	0.000	0.615	3586
Japan	13.385	19.527	0.000	0.238	0.411	5.815	0.000	-0.132	0.541	14.545	0.789	0.100	0.131	3586
Luxembourg	10.730	31.44	0.002	2.332	0.237	3.172	0.000	0.305	0.597	19.778	0.032	0.000	0.187	3337
Netherlands	15.121	157.33	0.000	-1.354	1.308	49.390	0.000	-0.905	0.716	14.784	0.786	0.000	0.683	3586
Norway	14.300	90.654	0.001	2.487	0.628	20.451	0.000	-0.072	0.367	7.854	0.109	0.000	0.225	3586
New Zealand	12.842	118.45	0.000	2.181	1.380	32.057	0.000	-0.840	0.656	8.804	0.084	0.000	0.510	3586
Portugal	15.664	44.329	0.000	-0.136	0.919	24.671	0.000	-1.349	0.602	11.246	0.256	0.000	0.446	3586
Singapore	20.109	26.685	0.000	1.769	0.684	25.239	0.002	1.197	0.342	1.581	0.301	0.117	0.307	3586
Spain	13.465	100.95	0.000	0.170	1.229	31.362	0.000	-0.932	0.849	15.541	0.422	0.000	0.572	3586
Sweden	18.226	32.525	0.000	1.416	1.499	36.358	0.000	0.005	1.087	13.535	0.657	0.000	0.584	3586
Switzerland	16.189	50.204	0.000	0.913	0.902	39.196	0.000	-0.948	0.492	9.908	0.234	0.000	0.544	3586
United Kingdom	15.645	97.254	0.000	-0.168	1.197	62.432	0.000	-0.896	0.732	18.981	0.474	0.000	0.672	3586
United States	19.391	24.649	0.000	-0.337	1.011	44.025	0.000	0.623	1.307	46.007	0.480	0.000	0.699	3586
Panel B - Emerging Markets														
	Location		Regime 1			Regime 2			p-Value		Adj. R ²	Obs.		
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)			α	β
Argentina	6.344	37.848	0.001	0.745	0.453	8.815	0.000	-0.947	0.788	16.613	0.297	0.000	0.146	3586
Brazil	7.584	16.989	0.001	1.655	1.147	7.972	0.000	1.459	1.449	32.605	0.307	0.039	0.456	3586
Bulgaria	8.917	29.190	-0.001	-1.005	0.519	9.411	-0.005	-2.295	0.581	7.167	0.045	0.552	0.161	1141
Chile	11.380	97.089	0.000	1.107	0.379	8.076	0.000	2.012	0.773	15.507	0.856	0.000	0.400	3586
China A	19.167	39.791	0.000	0.728	0.276	6.717	0.000	-0.027	0.532	4.233	0.785	0.052	0.044	2901
China	8.600	27.350	0.001	2.021	0.454	6.216	0.000	1.066	1.145	19.093	0.245	0.000	0.215	3586
Columbia	6.569	36.061	0.000	0.536	0.088	2.460	0.001	2.789	0.775	16.425	0.134	0.000	0.236	3586
Czech Republic	10.445	33.945	0.000	0.517	1.134	11.554	0.001	2.736	0.762	15.162	0.546	0.000	0.323	3586
Egypt	6.323	20.978	0.000	0.376	0.079	1.062	0.000	1.190	0.317	7.586	0.896	0.005	0.036	3486
Hungary	7.749	15.327	0.000	-0.285	1.429	13.754	0.000	0.941	1.095	18.690	0.645	0.004	0.371	3586
India	9.704	62.631	0.001	2.018	0.313	4.547	0.000	0.942	0.832	19.185	0.188	0.000	0.178	3586
Indonesia	7.741	42.846	0.001	1.013	0.134	1.425	0.000	1.236	0.711	16.097	0.624	0.000	0.101	3586
Israel	7.989	27.637	0.000	0.606	0.518	7.848	0.000	1.354	0.746	24.534	0.945	0.002	0.254	3586
Korea	7.938	16.703	0.001	0.990	0.747	7.377	0.000	1.512	0.969	18.556	0.908	0.050	0.190	3586
Kuwait	15.981	11.889	0.000	-0.041	0.127	2.838	0.001	1.211	-0.050	-0.744	0.293	0.026	0.011	1901
Malaysia	21.545	96.295	0.001	2.659	0.309	13.465	0.001	0.170	2.218	5.460	0.978	0.000	0.094	3586
Mexico	10.329	31.922	0.001	1.988	0.927	18.807	0.000	2.063	1.176	40.410	0.245	0.000	0.542	3586
Pakistan	11.254	53.948	0.001	2.440	0.052	2.084	-0.005	-3.028	0.316	1.741	0.001	0.151	0.004	3586
Peru	8.305	67.967	0.001	3.974	0.244	6.252	0.000	0.636	0.593	13.044	0.091	0.000	0.191	3586
Philippines	17.270	104.40	0.000	1.698	0.358	11.544	-0.002	-1.351	-0.099	-0.797	0.123	0.000	0.068	3586
Poland	16.819	60.431	0.000	1.213	1.125	26.682	-0.001	-0.509	0.456	2.304	0.518	0.001	0.358	3586
Romania	3.404	24.384	0.002	2.664	0.220	2.182	0.000	-0.228	1.128	17.229	0.019	0.000	0.195	3586
Russia	11.449	54.245	0.001	2.614	1.229	18.190	0.005	1.351	2.436	3.499	0.265	0.084	0.255	3586
Slovenia	12.549	68.747	0.001	1.837	0.297	6.850	0.000	-0.833	0.574	10.163	0.054	0.000	0.170	3446
South Africa	10.080	97.185	0.001	2.175	0.884	16.763	0.000	0.218	1.439	27.648	0.111	0.000	0.423	3586
Sri Lanka	4.504	11.372	0.001	2.535	0.048	1.174	0.000	0.348	0.052	1.752	0.033	0.950	0.003	3586
Taiwan	20.849	16.636	0.000	0.298	0.566	16.003	0.001	0.840	0.254	1.196	0.442	0.150	0.119	3586
Thailand	41.654	49.435	0.001	2.064	0.602	15.125	-0.003	-1.416	1.156	3.805	0.103	0.071	0.129	3586
Turkey	15.911	2.198	0.001	1.514	1.199	20.700	0.000	-0.183	-0.299	-0.644	0.673	0.001	0.170	3586
Venezuela	4.927	10.112	0.001	2.044	-0.037	-1.037	0.000	0.392	0.165	4.343	0.155	0.000	0.003	3586

This table shows the estimated parameters of the two-regime logistic smooth transition regression model for the period January 1999 – September 2012. The regime variables are the one-day-lagged forward local P/E ratios. Panel A and Panel B present the results for developed and emerging markets, respectively. The steepness parameter of the logistic function is fixed at seven in all the regressions. The t-statistics account for possible heteroskedasticity and autocorrelation in the residuals applying the Newey and West (1987) consistent covariance matrix estimator. The reported p-values are in reference to Wald F-statistics that test the null hypothesis that the alphas and betas are different under the two regimes.

4.1.2 The forward world P/E ratio as regime variable

The forward-looking P/E ratio of the world index suffers from less measurement error than similar quantities for smaller markets. It is upgraded more frequently and the too optimistic or pessimistic predictions about a local market might be cushioned. However, it is the disadvantage of the world P/E that it cannot take into account the characteristics of local markets such as growth potential and country risk. Therefore the interpretation of these models is different from the ones employing local P/E ratios. The forward world P/E can be regarded as a measure of global market sentiment. If the sentiment is great, stocks tend to be priced high with respect to analysts' earnings expectations and conversely, when the sentiment is rather fearful, P/E is low. Therefore, Regime 1 represents a bearish global sentiment, whereas Regime 2 a rather bullish sentiment. As before the steepness of the transition function is fixed at 7. Table 6 shows the results for the period January 15, 1987 – September 28, 2012⁷. The inference for developed markets has not changed a lot with respect to the previous model when forward local P/E ratios were employed. Most of the developed markets show higher systematic risk when global pricing is low. The exceptions are again Finland, Hong Kong, Japan and the US. The inference is almost identical either the local or the global P/E is applied, which means developed markets are priced consistently with global pricing. This conclusion is not striking in the virtue of the reported correlations between forward world P/E and forward local P/Es (see Table 7).

As before, the most-crisis hit countries such as Cyprus, Greece, Italy and Portugal post significantly negative alphas when the forward P/E is relatively low. The Netherlands is the only other country that has significantly negative alpha; however, it is significant only at a 10% level. It is worth mentioning that we have estimated negative but not significant alphas for all the other Eurozone countries except for Luxembourg. The most stable countries such as Australia, Canada, Finland, HK, Singapore, Switzerland and the US show substantial alphas when global stock markets are dominated by bearish sentiment. Usually these countries perform superior in the most distressed times and show market or even inferior performance under calm market conditions⁸.

⁷ I/B/E/S has reported forward P/E only since January 15, 1987.

⁸ The estimated positive alphas in Regime 1 and the negative ones in Regime 2 might be due to the appreciation and the depreciation of their respective currencies. The currencies of the most stable

Although the results for developed markets have remained almost identical to the results obtained from world P/E ratio models, emerging markets now show a completely different picture. Most of the countries have lower market risk when forward P/E is high. It is an indication that local and global P/Es have a different meaning. Local ratios can detect over/underpricing in certain cases, whereas global P/E is rather a sentiment measure. If the investment climate is not favorable, a low local P/E alone is not a reason to step in a market. Furthermore, there are a few anomalies that have lower betas when global P/E is relatively low; these are Argentina, Israel, Kuwait, Malaysia, Mexico, the Philippines, Sri Lanka and Venezuela. Although some frontier markets like Kuwait, Sri Lanka and Venezuela could be ignored because of the very low explanatory power of their models; the other countries' inverse behavior is striking. It is very likely that some omitted local factors can stand behind the results.

As most of the emerging markets behave like developed markets when global P/E is applied and behave differently when local P/E is applied it means that local pricing levels in emerging markets, at least sometimes are not consistent with global pricing. Indeed, as it is reported in Table 7, in certain cases we have measured very low correlations between world and local forward P/Es.

economies experience appreciation in their currencies in volatile times when the safe haven demand is high and depreciation in normal times due to carry trade movements. It is not true for Hong Kong as the city state's central bank, the Hong Kong Monetary Authority pegs the Hong Kong dollar to the US dollar and allows a very narrow fluctuation in a band of 7.75 – 7.85 HKD per USD. The resource-rich nations with very stable economy such as Australia and Canada can enjoy better than market performance even under calm market conditions as commodity currencies tend to appreciate in economic booms. The role of Japan is interesting: the yen is a safe haven currency; however the Japanese stock market posted one of the worst performance in the investigated period.

Table 6 Forward world P/E ratio as regime variables (1987-2012)

Panel A - Developed Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	Obs.
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Australia	12.992	72.862	0.000	1.042	1.086	23.938	0.000	1.806	0.648	11.171	0.948	0.000	0.285	6706
Austria	14.438	120.00	0.000	-1.237	1.204	30.667	0.000	1.238	0.453	8.855	0.088	0.000	0.396	6706
Belgium	15.202	111.114	0.000	-0.180	1.071	36.104	0.000	1.182	0.588	17.933	0.349	0.000	0.473	6706
Canada	12.790	49.647	0.000	0.438	1.188	26.658	0.000	1.672	0.814	23.198	0.803	0.000	0.556	6706
Cyprus	14.425	107.29	-0.001	-2.228	0.946	16.209	0.001	0.948	0.214	3.277	0.042	0.000	0.133	4004
Denmark	13.953	123.38	0.000	0.078	1.113	32.127	0.000	2.273	0.577	19.492	0.296	0.000	0.388	6706
Finland	17.701	63.177	0.000	-0.046	1.170	33.879	0.001	1.510	1.564	15.774	0.153	0.000	0.369	6395
France	14.194	116.16	0.000	-1.008	1.297	33.693	0.000	1.195	0.926	22.182	0.139	0.000	0.568	6706
Germany	14.590	77.002	0.000	-1.357	1.221	34.944	0.000	0.908	0.931	21.555	0.115	0.000	0.555	6706
Greece	14.010	95.006	-0.001	-2.072	1.091	21.297	0.000	1.736	0.625	12.676	0.010	0.000	0.187	5934
Hong Kong	17.298	32.174	0.001	3.224	0.730	17.738	0.000	-0.752	0.923	9.202	0.078	0.076	0.193	6706
Ireland	14.430	86.298	0.000	-1.420	1.161	23.939	0.000	1.589	0.650	16.698	0.041	0.000	0.380	6706
Italy	14.143	135.58	0.000	-1.997	1.303	26.530	0.000	-0.040	0.830	20.704	0.122	0.000	0.441	6706
Japan	14.037	114.24	0.000	0.260	0.498	9.606	0.000	-1.355	1.042	22.268	0.349	0.000	0.285	6706
Luxembourg	13.890	68.832	0.000	1.613	0.586	15.445	0.000	0.808	0.299	6.604	0.495	0.000	0.141	4890
Netherlands	14.149	116.43	0.000	-1.875	1.275	36.651	0.000	2.033	0.888	29.936	0.010	0.000	0.593	6706
Norway	16.105	43.505	0.000	1.583	0.594	23.303	0.000	0.025	0.357	8.207	0.420	0.000	0.149	6454
New Zealand	12.954	73.444	0.000	0.317	1.547	28.661	0.000	2.171	0.950	18.559	0.539	0.000	0.417	6706
Portugal	13.906	93.551	-0.001	-2.156	1.023	24.834	0.000	1.025	0.578	17.430	0.022	0.000	0.378	5933
Singapore	18.450	46.745	0.000	1.641	0.747	17.953	0.000	-0.635	0.557	8.956	0.279	0.012	0.251	6706
Spain	14.153	117.90	0.000	-0.656	1.257	26.489	0.000	1.097	0.830	14.285	0.280	0.000	0.467	6674
Sweden	14.185	126.77	0.000	0.738	1.495	26.735	0.000	1.090	1.071	21.131	0.986	0.000	0.485	6706
Switzerland	20.311	89.856	0.000	2.033	0.877	43.265	0.000	-0.562	0.524	8.038	0.291	0.000	0.472	6706
United Kingdom	14.001	115.56	0.000	-0.484	1.199	47.409	0.000	1.357	0.866	26.901	0.269	0.000	0.584	6706
United States	18.123	115.83	0.000	1.660	0.903	36.150	0.000	1.080	1.256	38.670	0.892	0.000	0.580	6706
Panel B - Emerging Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	Obs.
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Argentina	16.869	54.566	0.000	1.205	0.618	16.233	-0.001	-1.226	1.034	10.966	0.101	0.000	0.149	4999
Brazil	15.468	29.582	0.001	2.386	1.420	23.494	0.000	-0.199	1.152	14.876	0.162	0.006	0.380	4759
Bulgaria	13.202	44.858	-0.001	-1.922	0.544	11.793	0.002	3.739	0.142	2.511	0.000	0.000	0.053	3129
Chile	13.208	40.764	0.001	1.962	0.783	10.381	0.000	2.175	0.531	19.830	0.467	0.002	0.240	6064
China A	17.307	60.129	0.001	1.651	0.320	7.152	0.000	-0.291	-0.065	-1.567	0.221	0.000	0.016	4803
China	13.227	43.528	0.000	0.339	1.053	10.008	0.000	1.305	0.636	11.835	0.651	0.000	0.156	5004
Columbia	15.498	102.38	0.001	3.603	0.692	14.001	-0.001	-1.668	0.125	4.010	0.000	0.000	0.181	4890
Czech Republic	13.673	82.525	0.000	0.831	1.147	17.237	0.000	1.492	0.620	13.328	0.938	0.000	0.305	4645
Egypt	13.774	63.999	0.000	0.281	0.377	8.838	0.000	1.318	0.063	1.657	0.595	0.000	0.031	4174
Hungary	13.882	74.243	0.000	-0.134	1.478	22.739	0.000	1.154	0.918	15.622	0.480	0.000	0.324	4890
India	15.873	63.543	0.000	1.365	0.788	18.852	0.000	-0.257	0.266	4.694	0.329	0.000	0.143	4890
Indonesia	20.541	19.366	0.000	1.148	0.633	13.881	-0.001	-0.925	0.376	2.674	0.258	0.081	0.045	5869
Israel	23.517	92.635	0.000	0.587	0.647	21.665	0.001	0.285	1.357	6.280	0.820	0.001	0.195	4890
Korea	10.974	28.156	0.001	1.088	1.060	10.155	0.000	0.928	0.727	14.390	0.368	0.004	0.110	6537
Kuwait	10.077	32.402	-0.006	-1.236	0.088	0.653	0.001	2.343	0.112	3.401	0.178	0.865	0.018	2282
Malaysia	14.899	48.976	0.000	2.790	0.380	12.289	0.000	0.490	0.595	7.039	0.419	0.016	0.076	6706
Mexico	18.610	35.837	0.001	2.493	0.999	31.691	0.000	0.427	1.386	19.244	0.614	0.000	0.319	6102
Pakistan	23.048	69.373	0.000	0.045	0.091	3.479	0.004	2.825	-0.119	-0.940	0.005	0.102	0.004	4890
Peru	15.596	23.041	0.001	3.456	0.474	12.518	0.000	-0.380	0.373	7.010	0.016	0.122	0.127	4889
Philippines	18.601	53.379	0.001	3.024	0.389	11.812	-0.002	-2.342	0.416	5.670	0.002	0.736	0.052	6233
Poland	14.553	42.246	0.000	0.605	1.261	23.955	0.000	-0.517	0.806	13.649	0.459	0.000	0.255	4848
Romania	13.996	145.66	0.000	-0.629	1.203	16.608	0.000	0.628	0.224	3.426	0.402	0.000	0.163	4004
Russia	13.335	28.065	0.000	-0.399	1.414	13.192	0.001	2.002	1.137	9.550	0.088	0.081	0.176	3828
Slovenia	13.824	137.12	-0.001	-3.364	0.648	14.093	0.001	3.049	0.126	3.480	0.000	0.000	0.196	3586
South Africa	14.540	58.134	0.000	0.889	1.132	29.567	0.000	0.688	0.734	14.998	0.885	0.000	0.297	6706
Sri Lanka	18.632	35.524	0.001	2.176	0.046	1.856	-0.001	-2.203	0.077	1.949	0.003	0.511	0.003	4890
Taiwan	18.032	58.577	0.000	1.101	0.623	14.615	-0.001	-1.144	0.349	4.130	0.138	0.004	0.073	6369
Thailand	18.778	23.745	0.001	2.861	0.616	14.196	-0.001	-1.707	0.613	4.952	0.016	0.983	0.085	6706
Turkey	21.291	47.436	0.001	1.382	1.119	21.095	0.002	1.127	0.090	0.397	0.429	0.000	0.106	6079
Venezuela	16.890	47.385	0.001	2.675	0.100	2.934	-0.001	-1.257	0.411	5.433	0.011	0.000	0.007	5933

This table shows the estimated parameters of the two-regime logistic smooth transition regression model for the period January 1987 – September 2012. The regime variable is the one-day-lagged forward world P/E ratio. Panel A and Panel B present the results for developed and emerging markets, respectively. The steepness parameter of the logistic function is fixed at seven in all the regressions. The t-statistics account for possible heteroskedasticity and autocorrelation in the residuals applying the Newey and West (1987) consistent covariance matrix estimator. The reported p-values are in reference to Wald F-statistics that test the null hypothesis that the alphas and betas are different under the two regimes.

Table 7 Correlation between world and local forward P/E ratios

Correlations between world and local forward P/Es					
Developed markets			Emerging markets		
	Levels	Growth rates		Levels	Growth rates
Australia	0.969	0.904	Argentina	0.403	0.333
Austria	0.960	0.897	Brazil	0.914	0.808
Belgium	0.736	0.719	Bulgaria	0.078	0.295
Canada	0.887	0.879	Chile	0.768	0.453
Cyprus	0.767	0.423	China A	0.702	0.419
Denmark	0.848	0.694	China	0.757	0.766
Finland	0.915	0.874	Columbia	0.304	0.170
France	0.945	0.864	Czech Republic	0.503	0.558
Germany	0.968	0.919	Egypt	0.743	0.497
Greece	0.849	0.635	Hungary	0.847	0.764
Hong Kong	0.956	0.857	India	0.905	0.778
Ireland	0.721	0.718	Indonesia	0.594	0.737
Italy	0.951	0.800	Israel	0.839	0.689
Japan	0.738	0.787	Korea	0.543	0.768
Luxembourg	0.651	0.724	Kuwait	0.392	0.202
Netherlands	0.967	0.876	Malaysia	0.674	0.643
Norway	0.683	0.605	Mexico	0.501	0.672
New Zealand	0.872	0.825	Pakistan	0.521	0.423
Portugal	0.954	0.705	Peru	-0.062	0.217
Singapore	0.811	0.836	Philippines	0.283	0.613
Spain	0.908	0.808	Poland	0.924	0.745
Sweden	0.919	0.881	Romania	0.404	0.650
Switzerland	0.829	0.848	Russia	0.921	0.754
United Kingdom	0.977	0.965	Slovenia	0.530	0.474
United States	0.963	0.945	South Africa	0.760	0.847
			Sri Lanka	-0.247	-0.021
			Taiwan	0.694	0.775
			Thailand	0.556	0.740
			Turkey	0.542	0.765
			Venezuela	0.251	0.344

Finally in this subsection we report the results for the period January 1999 – September 2012 in Table 8. In developed markets now only Finland, Japan and the US show lower market beta at lower P/E. In emerging markets the picture has got a bit clearer: not taking into account Kuwait and Venezuela, only Argentina, Israel and Mexico have higher market risk when the expected P/E is high. Conversely, all the other emerging markets exhibit lower market risk if global sentiment is favorable.

Table 8 Forward world P/E ratio as regime variables (1999-2012)

Panel A - Developed Markets														
	Location		Regime 1			Regime 2			p-Value		Adj. R ²	Obs.		
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)			α	β
Australia	15.934	106.49	0.000	1.865	0.997	24.789	0.000	0.143	0.339	7.892	0.433	0.000	3586	
Austria	14.592	129.80	0.000	-0.079	1.206	29.885	0.000	0.265	0.310	6.763	0.804	0.000	3586	
Belgium	16.944	36.542	0.000	0.456	1.114	38.106	-0.001	-1.397	0.442	7.755	0.143	0.000	3586	
Canada	10.205	85.717	0.000	0.215	1.415	15.838	0.000	2.576	1.012	45.017	0.977	0.000	3586	
Cyprus	14.065	94.648	-0.002	-2.816	0.967	16.008	0.001	1.218	0.367	5.084	0.009	0.000	3586	
Denmark	16.282	136.75	0.000	0.956	1.067	33.841	0.000	-0.011	0.367	7.900	0.676	0.000	3586	
Finland	9.671	40.214	0.001	0.322	1.029	9.879	0.000	0.224	1.446	33.146	0.769	0.000	3586	
France	18.000	75.308	0.000	-0.382	1.304	46.000	0.000	0.085	0.886	19.311	0.821	0.000	3586	
Germany	18.465	76.835	0.000	0.076	1.235	41.593	0.000	-0.674	0.898	17.494	0.511	0.000	3586	
Greece	14.440	75.109	-0.001	-1.823	1.058	22.576	0.000	-0.055	0.581	10.447	0.309	0.000	3586	
Hong Kong	10.579	15.767	0.000	0.174	0.828	4.485	0.000	1.649	0.672	21.336	0.922	0.403	3586	
Ireland	15.926	179.90	0.000	-0.975	1.144	26.255	0.000	-0.776	0.462	7.109	0.784	0.000	3586	
Italy	14.015	145.51	0.000	-1.360	1.350	25.873	0.000	-0.183	0.918	20.965	0.365	0.000	3586	
Japan	13.903	60.571	0.000	-0.098	0.409	8.906	0.000	0.177	0.634	12.316	0.854	0.001	3586	
Luxembourg	13.008	51.155	0.000	0.441	0.604	14.138	0.000	0.935	0.370	7.972	0.780	0.000	3586	
Netherlands	17.971	105.76	0.000	-1.386	1.308	49.483	0.000	-0.795	0.690	15.718	0.874	0.000	3586	
Norway	16.112	27.703	0.000	1.730	0.605	21.960	0.000	0.316	0.250	4.859	0.675	0.000	3586	
New Zealand	15.848	133.96	0.000	1.003	1.455	33.893	0.000	0.999	0.585	11.684	0.786	0.000	3586	
Portugal	13.945	105.40	0.000	-1.520	1.049	25.717	0.000	0.194	0.553	15.381	0.213	0.000	3586	
Singapore	16.216	26.258	0.000	1.950	0.718	23.674	0.000	0.620	0.523	10.184	0.951	0.001	3586	
Spain	14.010	99.911	0.000	-0.572	1.282	25.808	0.000	0.244	0.913	24.240	0.565	0.000	3586	
Sweden	20.205	64.475	0.000	1.088	1.494	37.915	0.000	0.869	0.955	10.537	0.586	0.000	3586	
Switzerland	18.205	84.546	0.000	0.718	0.912	38.433	0.000	-0.871	0.496	10.568	0.283	0.000	3586	
United Kingdom	17.206	112.60	0.000	-0.174	1.197	62.436	0.000	-0.891	0.731	19.048	0.478	0.000	3586	
United States	16.439	148.62	0.000	-0.192	1.010	43.542	0.000	0.442	1.305	44.487	0.632	0.000	3586	
Panel B - Emerging Markets														
	Location		Regime 1			Regime 2			p-Value		Adj. R ²	Obs.		
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)			α	β
Argentina	9.852	40.015	-0.001	-0.391	0.333	5.806	0.000	-0.131	0.679	17.231	0.706	0.000	3586	
Brazil	15.812	36.108	0.001	2.171	1.426	24.532	0.000	0.683	1.067	10.968	0.862	0.002	3586	
Bulgaria	13.202	44.858	-0.001	-1.922	0.544	11.793	0.002	3.739	0.142	2.511	0.000	0.000	3129	
Chile	15.773	38.175	0.001	2.666	0.763	14.866	0.000	-0.015	0.462	11.125	0.197	0.000	3586	
China A	15.558	45.176	0.000	0.592	0.336	8.246	0.000	0.356	-0.045	-1.004	0.985	0.000	3586	
China	16.055	47.228	0.000	1.546	0.965	12.685	0.001	1.391	0.300	3.794	0.476	0.000	3586	
Colombia	15.649	103.43	0.001	3.746	0.693	14.384	-0.001	-1.194	0.077	1.832	0.004	0.000	3586	
Czech Republic	13.278	47.057	0.000	0.374	1.164	17.256	0.001	3.011	0.656	13.671	0.205	0.000	3586	
Egypt	13.754	53.284	0.000	0.239	0.377	8.708	0.000	0.999	0.093	1.982	0.679	0.000	3586	
Hungary	13.945	107.32	0.000	-0.097	1.478	22.751	0.000	0.717	0.792	14.262	0.638	0.000	3586	
India	16.183	39.810	0.001	1.813	0.798	19.264	0.000	0.250	0.301	3.709	0.645	0.000	3586	
Indonesia	17.127	21.595	0.001	1.797	0.669	15.157	0.000	0.270	0.236	2.096	0.768	0.000	3586	
Israel	23.516	88.625	0.000	1.584	0.657	19.814	0.000	0.266	1.355	6.127	0.917	0.002	3586	
Korea	10.852	13.614	0.001	0.438	1.071	8.684	0.000	1.847	0.851	19.371	0.928	0.087	3586	
Kuwait	10.077	32.402	-0.006	-1.236	0.088	0.653	0.001	2.343	0.112	3.401	0.178	0.865	0.018	2282
Malaysia	16.119	19.921	0.000	2.205	0.356	13.493	0.001	1.276	0.147	2.744	0.508	0.001	3586	
Mexico	21.022	40.513	0.000	2.365	1.063	37.478	0.001	1.304	1.465	15.967	0.445	0.000	3586	
Pakistan	23.069	61.052	0.000	1.196	0.067	2.685	0.004	2.719	-0.112	-0.856	0.014	0.175	0.003	3586
Peru	15.700	52.278	0.001	3.070	0.476	12.855	0.000	0.354	0.181	3.474	0.158	0.000	3586	
Philippines	15.541	32.205	0.001	2.742	0.375	10.735	-0.001	-1.276	0.232	4.494	0.022	0.022	0.069	3586
Poland	14.581	52.770	0.000	0.537	1.262	24.524	0.000	0.544	0.703	10.355	0.870	0.000	3586	
Romania	13.960	141.39	0.000	-0.809	1.206	16.759	0.001	1.690	0.258	3.851	0.084	0.000	3586	
Russia	13.380	39.218	0.000	-0.425	1.415	13.289	0.002	3.427	1.048	11.959	0.011	0.008	0.257	3586
Slovenia	13.824	137.12	-0.001	-3.364	0.648	14.093	0.001	3.049	0.126	3.480	0.000	0.000	0.196	3586
South Africa	15.541	64.422	0.000	1.682	1.199	32.944	0.001	1.218	0.689	10.945	0.759	0.000	0.415	3586
Sri Lanka	11.218	32.755	-0.002	-2.387	0.051	1.051	0.001	2.898	0.047	1.914	0.002	0.940	0.004	3586
Taiwan	18.425	37.586	0.000	0.774	0.589	15.511	0.000	-0.233	0.342	2.740	0.659	0.058	0.121	3586
Thailand	24.419	38.821	0.001	1.978	0.610	15.398	-0.014	-0.728	-0.544	-0.369	0.450	0.433	0.130	3586
Turkey	21.075	26.121	0.000	0.978	1.253	21.196	0.002	1.286	0.060	0.272	0.315	0.000	0.175	3586
Venezuela	15.014	22.992	0.001	2.507	0.040	1.322	-0.001	-1.041	0.167	2.867	0.022	0.050	0.002	3586

This table shows the estimated parameters of the two-regime logistic smooth transition regression model for the period January 1999 – September 2012. The regime variable is the one-day-lagged forward world P/E ratio. Panel A and Panel B present the results for developed and emerging markets, respectively. The steepness parameter of the logistic function is fixed at seven in all the regressions. The t-statistics account for possible heteroskedasticity and autocorrelation in the residuals applying the Newey and West (1987) consistent covariance matrix estimator. The reported p-values are in reference to Wald F-statistics that test the null hypothesis that the alphas and betas are different under the two regimes.

4.1.3 The forward RPE as regime variable

As we have seen the use of forward looking local and world P/E ratios as regime variables have led in remarkably different results in emerging markets. Local ratios in a few cases could detect underpriced markets both in developed and emerging markets. However, high global P/E is just a reflection of favorable investors' sentiment. In this subsection we take into account both measures, even though they are not independent. In fact, emerging market pricing is not always consistent with global pricing. Thus, we use the forward-looking RPE; that is, the ratio of forward local P/E to the forward world P/E as the regime variable. The RPE is sensitive to extreme cases, for instance, assuming that a local market is underpriced based on its P/E and investors' sentiment is favorable at the same time, it would induce a very low RPE. Conversely, when bullish local sentiment couples with global pessimism the RPE is very high. Probably, the latter extreme case is less likely; however, the most stable countries might show similar pattern. Regime 1 is thus the situation when investors' are more pessimistic about a local market than about the global stock market and Regime 2 is when they are more optimistic. We have fixed the steepness of the transition function at 100. Table 9 summarizes the results for the period January 1987 – September 2012.

Generally speaking, investors' overoptimism is a risky habit: high RPEs suggest that higher optimism about a certain market results in higher market risk and lower abnormal return in the developed world. Investors price a certain market higher than global stocks if they are more confident about the certain market than about the global stock market. Although, it seems that when they are extremely confident about the future of a market, they are overconfident. Not ignoring the merits of stock pickers there are a few cases when they are right: first we have to mention Germany and Hong Kong. Two stories can be imagined here, but none of them are mutually exclusive. One is that investors are not overconfident about these markets. The other possibility is related to the flying-to-quality effect. RPE is relatively high for these countries in recessions, because low global valuation level coincides with a relatively high local valuation, which is driven by the high demand for stable markets in downturns. Other stable markets such as Norway, Singapore and Switzerland produce similar results: the difference between the estimated betas is the smallest for these

countries, hence they are less sensitive to bad investors' sentiment. We have intentionally left out from the discussion Cyprus, Greece, Italy and Spain so far. Seemingly, they show similar results to Germany and Hong Kong; however, the reason is different. These are the most crisis-hit countries and it seems investors were unable to foresee their struggles. Possible overoptimism in these markets is still less risky than overpessimism, which has been ongoing since the break of the euro crisis. Why could not investors envisage that they should have been less optimistic about some of the euro countries? Investors tend to frame countries, hence they priced these countries as other developed markets.

When investors are too optimistic about a developed market the abnormal return drops. However, when investors price a local market low with respect to the global market not just its risk profile is favorable but it shows attractive abnormal returns. In Regime 2 none of the markets post significant positive alphas, whereas under Regime 1 Australia, Denmark, New Zealand, the UK and the US all exhibit significant positive abnormal returns.

Ignoring the confidence level of the results for a second, the inference for emerging markets seems to be unambiguous: almost all the countries have higher systematic risk when investors are more optimistic. Kuwait is the only exception that shows significantly lower beta when RPE is relatively high, but its market risk is very low in both regimes and the explanatory power of the model is low. Unfortunately, it distorts the picture that for many countries the results are not significant. Brazil, Bulgaria, Egypt, Israel, Korea, Malaysia, Mexico, Pakistan, the Philippines, Sri Lanka, Taiwan, Turkey and Venezuela do not show statistically different betas under the two regimes. However, Brazil, Bulgaria, Pakistan, Sri Lanka and Turkey are not entirely indifferent about the evolution of the RPE: they exhibit significantly higher abnormal return when RPE is low. Furthermore, alphas tend to be higher in Regime 1 than in Regime 2 and there are only two countries, Columbia and Russia where the alpha is significantly higher in Regime 2.

Excluding the few anomalies which are rather insignificant, RPE can predict stock regimes correctly especially in emerging markets. The question is why the forward RPE is a better regime forecaster than the forward local and world P/E ratios? Owing to its construction, it is able to capture local conditions and market sentiment at the same time. High local P/E alone is not inconvenient, but if it couples with poor

market sentiment, a high RPE signals high chance for overoptimism that has been shown to be risky. On the contrary, low local P/E in itself should not encourage investors to step in to the market. However, if the RPE is still low despite positive overall market sentiment, it might indicate a high chance of overpessimism about the local market that usually offers a bargain.

Table 9 Forward RPE as regime variable (1987-2012)

Panel A - Developed Markets														
	Location		α	Regime 1			α	Regime 2			p-Value		Adj. R ²	Obs.
	c	t(c)		t(α)	β	t(β)		t(α)	β	t(β)	α	β		
Australia	0.970	114.54	0.000	1.901	0.564	7.656	0.000	0.588	1.082	26.405	0.446	0.000	0.294	6706
Austria	0.670	39.878	0.000	0.114	0.536	5.898	0.000	0.837	0.937	14.231	0.821	0.000	0.349	6641
Belgium	0.914	68.959	0.000	1.139	0.821	24.372	0.000	-0.208	1.110	22.236	0.476	0.000	0.455	6641
Canada	0.930	76.080	0.000	0.778	0.735	14.080	0.000	1.250	1.153	38.498	0.686	0.000	0.562	6706
Cyprus	0.986	86.196	-0.001	-1.651	0.990	18.279	0.000	0.121	0.212	1.621	0.413	0.000	0.233	2576
Denmark	0.964	116.58	0.000	3.046	0.510	18.518	0.000	-0.064	1.087	32.880	0.050	0.000	0.394	6681
Finland	0.784	69.684	0.000	1.029	0.598	8.658	0.000	0.477	1.342	34.016	0.577	0.000	0.377	6395
France	0.803	67.158	0.000	0.761	0.810	10.415	0.000	-0.045	1.187	52.210	0.467	0.000	0.564	6706
Germany	0.986	78.308	0.000	0.319	1.161	28.536	0.000	0.179	0.897	23.950	0.965	0.000	0.556	6681
Greece	0.843	17.678	0.000	-0.264	0.913	22.274	0.000	0.312	0.736	11.870	0.686	0.016	0.202	5096
Hong Kong	0.681	16.807	0.001	1.513	0.927	11.750	0.000	0.908	0.740	15.307	0.343	0.043	0.192	6706
Ireland	0.895	85.724	0.000	1.339	0.743	22.024	0.000	-1.251	1.259	31.439	0.071	0.000	0.376	6706
Italy	0.904	50.387	0.000	0.624	1.143	21.212	0.000	-1.483	0.898	18.784	0.153	0.001	0.426	6706
Japan	1.687	87.35	0.000	-0.921	0.527	15.204	0.000	-1.696	1.422	19.499	0.602	0.000	0.324	6706
Luxembourg	0.776	81.131	0.001	1.035	0.072	1.296	0.000	0.783	0.585	18.276	0.508	0.000	0.192	3337
Netherlands	1.045	65.054	0.000	0.910	1.081	45.837	-0.001	-1.157	0.671	2.479	0.219	0.130	0.576	6706
Norway	1.041	73.211	0.000	1.509	0.412	13.420	0.000	0.373	0.664	22.575	0.515	0.000	0.160	6227
New Zealand	0.920	62.250	0.000	2.147	1.198	30.929	0.000	-0.240	0.598	6.711	0.441	0.000	0.399	6681
Portugal	0.888	141.99	0.000	1.076	0.413	9.866	0.000	-0.963	0.995	29.569	0.157	0.000	0.402	5596
Singapore	1.038	65.092	0.000	1.373	0.648	18.000	0.000	0.183	0.849	9.636	0.491	0.033	0.252	6706
Spain	0.893	41.367	0.000	0.471	1.096	30.392	0.000	0.470	0.908	7.654	0.866	0.123	0.452	6674
Sweden	0.835	54.092	0.000	1.554	0.863	12.655	0.000	0.784	1.408	40.315	0.338	0.000	0.489	6681
Switzerland	0.880	36.727	0.000	1.220	0.749	12.286	0.000	1.477	0.899	39.524	0.770	0.019	0.471	6622
United Kingdom	0.925	98.002	0.000	1.993	1.070	40.149	0.000	-1.301	0.766	7.364	0.073	0.004	0.582	6194
United States	0.971	82.758	0.000	2.086	0.675	10.132	0.000	-0.040	1.052	53.376	0.061	0.000	0.586	6706
Panel B - Emerging Markets														
	Location		α	Regime 1			α	Regime 2			p-Value		Adj. R ²	Obs.
	c	t(c)		t(α)	β	t(β)		t(α)	β	t(β)	α	β		
Argentina	0.682	37.556	0.000	-0.084	0.638	13.664	0.000	-0.112	1.009	14.968	0.997	0.000	0.146	4999
Brazil	0.917	48.046	0.001	2.055	1.326	21.377	-0.001	-1.625	1.417	23.346	0.017	0.314	0.377	4759
Bulgaria	1.056	0.003	-0.001	-1.116	0.523	9.599	-0.005	-2.504	0.574	7.064	0.031	0.620	0.161	1141
Chile	0.914	40.550	0.000	-0.368	0.519	16.385	0.000	2.191	0.782	14.289	0.103	0.000	0.311	5206
China A	0.981	57.068	0.000	0.533	0.131	3.060	0.000	0.424	0.375	7.413	0.942	0.000	0.045	2901
China	0.890	85.785	0.000	1.055	0.595	12.056	0.000	0.750	1.270	11.970	0.942	0.000	0.169	4986
Columbia	0.880	37.824	0.000	0.048	0.271	4.677	0.001	2.505	0.723	17.041	0.070	0.000	0.175	4751
Czech Republic	0.884	57.943	0.000	0.971	0.674	13.575	0.001	2.282	1.145	15.136	0.344	0.000	0.306	4511
Egypt	0.977	2.514	0.000	1.421	0.266	7.370	-0.001	-0.428	0.328	2.126	0.515	0.697	0.033	3486
Hungary	0.758	67.983	0.001	1.947	1.125	18.119	-0.001	-1.760	1.692	14.639	0.015	0.000	0.332	4511
India	0.887	52.098	0.000	0.929	0.315	6.263	0.000	0.386	0.851	19.930	0.692	0.000	0.147	4890
Indonesia	0.754	16.559	0.000	0.123	0.495	5.007	0.000	1.072	0.701	16.716	0.729	0.055	0.061	5726
Israel	0.906	13.578	0.000	1.213	0.673	18.575	0.000	-0.085	0.613	9.159	0.624	0.428	0.220	4381
Korea	1.038	8.070	0.000	0.943	0.834	19.603	0.000	0.162	1.024	5.855	0.909	0.286	0.114	6401
Kuwait	0.994	30.324	0.000	0.581	0.157	3.995	0.000	-0.289	0.056	0.742	0.000	0.000	0.010	1901
Malaysia	1.039	21.992	0.000	0.454	0.373	6.266	0.000	2.279	0.476	12.046	0.540	0.149	0.064	6467
Mexico	0.909	12.485	0.000	0.535	1.075	21.109	0.000	1.139	1.142	35.693	0.844	0.261	0.352	5291
Pakistan	0.627	24.181	0.001	1.941	0.083	2.306	-0.001	-1.752	0.084	2.227	0.009	0.977	0.003	4890
Peru	0.337	27.239	0.001	3.705	0.128	2.500	0.000	0.258	0.533	16.286	0.007	0.000	0.164	4597
Philippines	0.988	19.206	0.000	1.441	0.363	8.915	0.000	0.399	0.448	9.572	0.558	0.167	0.050	6233
Poland	0.814	65.873	0.000	0.956	0.723	10.825	0.000	0.007	1.347	24.883	0.439	0.000	0.331	4511
Romania	0.261	30.526	0.001	2.037	0.058	1.004	0.000	-1.116	1.117	15.781	0.021	0.000	0.191	3751
Russia	0.812	47.076	0.001	1.753	1.255	16.416	0.002	0.541	2.507	5.222	0.000	0.000	0.176	3828
Slovenia	0.867	127.71	0.001	1.859	0.144	3.349	0.000	-0.975	0.638	13.541	0.041	0.000	0.195	3446
South Africa	0.739	64.469	0.000	1.646	0.680	14.586	0.000	0.020	1.270	31.735	0.233	0.000	0.332	6422
Sri Lanka	0.890	20.410	0.000	1.766	0.060	2.682	-0.001	-1.428	0.036	0.749	0.057	0.645	0.002	4890
Taiwan	0.967	12.130	0.000	0.984	0.566	9.819	0.000	-0.290	0.504	14.174	0.343	0.362	0.079	5577
Thailand	1.011	65.212	0.000	1.827	0.558	13.434	0.000	-0.486	1.144	8.322	0.244	0.000	0.096	6486
Turkey	0.880	62.492	0.001	1.667	1.126	18.645	-0.002	-1.648	0.602	1.535	0.045	0.187	0.112	5077
Venezuela	1.073	27.089	0.000	1.166	0.158	4.466	-0.001	-0.651	0.211	1.882	0.341	0.657	0.004	4771

This table shows the estimated parameters of the two-regime logistic smooth transition regression model for the period January 1987 – September 2012. The regime variable is the one-day-lagged forward RPE. Panel A and Panel B present the results for developed and emerging markets, respectively. The steepness parameter of the logistic function is fixed at 100 in all the regressions. The t-statistics account for possible heteroskedasticity and autocorrelation in the residuals applying the Newey and West (1987) consistent covariance matrix estimator. The reported p-values are in reference to Wald F-statistics that test the null hypothesis that the alphas and betas are different under the two regimes.

The estimates are repeated for the period January 1999 – September 2012; Table 10 shows the results. There are a few changes in the results. First of all, France has joined other eurozone countries and it shows less risk when it is in investors' favor; that is when RPE is relatively high. Hong Kong and New Zealand now exhibit similar pattern to most of the other countries: high valuation in these markets are more risky and provide lower abnormal returns for investors. Japan has lower systematic risk when RPE is high differently from the result for the longer estimation period. As before none of the markets post significant positive abnormal returns when their relative valuations are high, but in the low regime Australia, Canada, Denmark, Finland, HK, Norway and Singapore show significantly better performance than the market.

Table 10 Forward RPEs as regime variables (1999-2012)

Panel A - Developed Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	Obs.
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Australia	0.963	178.24	0.000	2.137	0.373	9.530	0.000	0.945	1.089	26.762	0.385	0.000	0.391	3586
Austria	0.733	34.238	0.000	0.289	0.625	7.499	0.000	0.075	1.197	25.855	0.819	0.000	0.480	3586
Belgium	0.805	88.647	0.000	1.002	0.769	14.961	0.000	-1.384	1.153	30.862	0.115	0.000	0.549	3586
Canada	0.933	40.103	0.000	1.831	0.908	20.598	0.000	1.194	1.156	40.373	0.425	0.000	0.637	3586
Cyprus	0.986	86.196	-0.001	-1.651	0.990	18.279	0.000	0.121	0.212	1.621	0.413	0.000	0.233	2576
Denmark	0.959	116.82	0.001	1.927	0.435	9.620	0.000	0.547	1.093	34.120	0.207	0.000	0.482	3586
Finland	1.074	113.34	0.000	1.708	1.283	26.920	-0.001	-1.305	1.699	17.396	0.065	0.000	0.458	3586
France	0.946	90.944	0.000	-0.532	1.317	50.832	0.000	0.645	0.991	14.488	0.464	0.000	0.679	3586
Germany	0.970	68.999	0.000	0.025	1.230	39.465	0.000	-0.662	0.965	13.365	0.533	0.001	0.669	3586
Greece	0.806	74.833	-0.001	-1.159	1.014	17.641	0.000	-0.194	0.748	13.269	0.392	0.001	0.249	3586
Hong Kong	1.093	100.78	0.000	1.874	0.637	15.572	0.000	-0.177	0.953	10.047	0.363	0.002	0.258	3586
Ireland	0.810	139.85	0.000	0.485	0.518	9.669	0.000	-1.366	1.192	26.570	0.269	0.000	0.465	3586
Italy	0.915	119.86	0.000	-0.405	1.285	31.205	0.000	-0.731	0.843	15.990	0.800	0.000	0.611	3586
Japan	1.357	38.815	0.000	0.412	0.557	12.879	0.000	-0.412	0.369	9.185	0.585	0.001	0.133	3586
Luxemburg	0.776	81.131	0.001	1.035	0.072	1.296	0.000	0.783	0.585	18.276	0.508	0.000	0.192	3337
Netherlands	0.863	52.369	0.000	-0.443	1.266	40.697	0.000	-0.607	1.051	14.461	0.820	0.005	0.664	3586
Norway	1.033	95.972	0.001	2.180	0.298	7.511	0.000	0.344	0.664	22.334	0.172	0.000	0.234	3586
New Zealand	0.726	66.228	0.000	1.156	1.054	12.035	0.000	0.761	1.565	41.030	0.566	0.000	0.511	3586
Portugal	0.884	168.55	0.000	0.778	0.346	9.575	0.000	-1.700	1.012	29.462	0.138	0.000	0.479	3586
Singapore	1.022	70.721	0.000	2.023	0.579	15.629	0.000	0.763	0.813	23.448	0.367	0.000	0.314	3586
Spain	0.870	61.052	0.000	0.457	1.227	24.367	0.000	-0.976	1.028	20.853	0.336	0.003	0.565	3586
Sweden	0.956	60.745	0.000	1.426	1.241	27.252	0.000	0.460	1.554	38.336	0.455	0.000	0.583	3586
Switzerland	0.858	65.193	0.000	0.249	0.487	6.012	0.000	0.225	0.894	37.991	0.866	0.000	0.540	3586
United Kingdom	0.920	112.03	0.000	0.413	1.163	47.319	0.000	-0.537	0.760	5.841	0.558	0.002	0.660	3586
United States	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panel B - Emerging Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	Obs.
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Argentina	0.717	60.847	0.000	-0.167	0.570	14.396	0.000	-0.246	0.920	15.430	0.971	0.000	0.143	3586
Brazil	0.911	59.117	0.001	2.887	1.340	19.710	-0.001	-1.889	1.425	25.181	0.001	0.360	0.452	3586
Bulgaria	1.056	0.003	-0.001	-1.116	0.523	9.599	-0.005	-2.504	0.574	7.064	0.031	0.620	0.161	1141
Chile	0.854	76.160	0.000	0.334	0.445	13.724	0.001	2.516	0.803	14.933	0.265	0.000	0.405	3586
China A	0.981	57.068	0.000	0.533	0.131	3.060	0.000	0.424	0.375	7.413	0.942	0.000	0.045	2901
China	0.888	98.396	0.001	2.294	0.541	10.330	0.001	1.161	1.308	12.208	0.822	0.000	0.220	3586
Columbia	0.886	48.624	0.001	1.660	0.295	3.895	0.001	2.711	0.725	17.240	0.599	0.000	0.205	3586
Czech Republic	0.885	55.065	0.001	1.681	0.694	12.639	0.001	2.210	1.145	15.441	0.898	0.000	0.330	3586
Egypt	0.977	2.514	0.000	1.421	0.266	7.370	-0.001	-0.428	0.328	2.126	0.515	0.697	0.033	3486
Hungary	0.634	56.944	0.001	1.646	0.760	9.849	0.000	-0.481	1.522	27.119	0.115	0.000	0.398	3586
India	0.978	67.569	0.001	2.406	0.426	7.200	0.000	0.031	0.904	20.240	0.097	0.000	0.180	3586
Indonesia	0.451	26.730	0.000	0.438	0.109	1.041	0.001	1.611	0.720	16.109	0.908	0.000	0.102	3586
Israel	0.985	28.286	0.000	1.721	0.676	19.373	-0.001	-0.897	0.643	3.800	0.267	0.848	0.248	3586
Korea	0.997	71.952	0.001	2.014	0.876	19.805	0.000	-0.006	1.339	6.545	0.927	0.028	0.192	3586
Kuwait	0.994	30.324	0.000	0.581	0.157	3.995	0.000	-0.289	0.056	0.742	0.563	0.230	0.010	1901
Malaysia	0.994	52.536	0.001	2.148	0.166	4.442	0.000	1.287	0.387	12.101	0.353	0.000	0.094	3586
Mexico	0.785	14.122	0.001	1.387	0.983	18.237	0.000	2.504	1.144	40.450	0.799	0.008	0.539	3586
Pakistan	0.747	35.020	0.001	3.013	0.058	2.040	-0.003	-2.333	0.061	1.244	0.002	0.949	0.004	3586
Peru	0.372	36.041	0.001	3.541	0.123	3.040	0.000	1.154	0.532	14.986	0.100	0.000	0.197	3586
Philippines	0.983	45.723	0.000	0.991	0.251	7.733	0.000	1.146	0.458	9.168	0.705	0.000	0.070	3586
Poland	0.812	75.563	0.001	1.310	0.615	7.728	0.000	-0.003	1.348	25.518	0.263	0.000	0.387	3586
Romania	1.018	6.448	0.000	0.927	0.856	11.680	0.001	0.811	0.776	5.278	0.793	0.623	0.160	3586
Russia	0.812	48.734	0.001	2.918	1.224	18.110	0.002	0.510	2.521	5.253	0.823	0.007	0.255	3586
Slovenia	0.867	127.71	0.001	1.859	0.144	3.349	0.000	-0.975	0.638	13.541	0.041	0.000	0.195	3446
South Africa	0.937	44.572	0.001	2.497	1.062	29.683	0.000	-0.590	1.349	20.467	0.136	0.000	0.403	3586
Sri Lanka	1.123	20.741	0.001	2.113	0.051	2.003	-0.001	-1.470	0.029	0.770	0.041	0.633	0.001	3586
Taiwan	0.962	10.029	0.000	0.722	0.603	9.637	0.000	-0.066	0.529	12.766	0.568	0.326	0.118	3586
Thailand	1.043	42.963	0.001	2.282	0.582	13.591	-0.001	-0.625	0.879	5.962	0.291	0.051	0.130	3586
Turkey	0.978	29.402	0.001	1.590	1.155	19.032	-0.010	-2.881	0.140	0.474	0.002	0.001	0.163	3586
Venezuela	0.873	66.212	0.001	1.861	0.035	1.105	0.000	-0.510	0.217	3.410	0.188	0.011	0.002	3586

This table shows the estimated parameters of the two-regime logistic smooth transition regression model for the period January 1999 – September 2012. The regime variables are the one-day-lagged forward RPEs. Panel A and Panel B present the results for developed and emerging markets, respectively. The steepness parameter of the logistic function is fixed at 100 in all the regressions. The t-statistics account for possible heteroskedasticity and autocorrelation in the residuals applying the Newey and West (1987) consistent covariance matrix estimator. The reported p-values are in reference to Wald F-statistics that test the null hypothesis that the alphas and betas are different under the two regimes.

4.2 Historical local P/E ratios as regime variables

After reviewing the regime-determining role of forward P/E variants we turn our attention to their historical counterparts. Our goal with this analysis is to compare the utility of using analysts' earnings predictions instead of reported corporate earnings. What can we benefit from using forward-looking P/Es instead of historical P/Es? First of all, somewhat faster adjustment to changed market conditions. Analysts' expectations can change literally every day, whereas corporate profits are reported only in determined intervals. However, it is not necessarily advantageous in conservative asset allocation strategies. We have to distinguish between two situations, booms and recessions. Conservative portfolio managers should follow historical P/Es in bull markets, whereas forward P/Es in bear markets. In bull markets historical P/Es experience a sharper increase than forward P/Es due to the inertia of the denominator. Moreover, analysts incline to condition their earnings forecast on recent market performance (see e.g., Lakonishok et al., 1994; La Porta, 1996) and to overreact to positive news (DeBondt and Thaler, 1990; Easterwood and Nutt, 1999) that soothes forward P/Es downward in bull markets. In contrast, historical P/Es are more conservative and signal more expensive asset prices and a more likely timing to escape from the market when prices surge. In contrast, stock markets might seem to be cheap based on historical P/Es when asset prices decline. In turmoils forecasters slash their earnings expectations that triggers a less salient drop in P/Es indicating more expensive markets and a less likely timing to go long. This feature of forward P/Es fits better in conservative asset management strategies.

4.2.1 Local historical P/E ratios as regime variables

First in this subsection we review the role of local historical P/E ratios. P/E might signal bubbles at very high levels. We define bubbles as situations when prices increase faster than corporate profits over a prolonged period. Forward P/E is less likely to detect bubbles because forward expectations grow with prices. Moreover, P/E ratios might be able to recognize negative bubbles in which we mean asset prices plunge faster than corporate profits resulting in a very low P/E⁹. Extreme P/E levels are thus indications for possible overreaction that creates bubbles in either tail of the return distribution. Historical P/E ratios vary in a wider range than their forward-

⁹ However, as we have noted a conservative strategy should rather focus on forward P/Es in downturns.

looking counterparts because when prices surge, analysts raise their future forecasts contributing to a lower increase in forward P/Es than in historical P/Es. Similarly, in a market crash analysts cut back their forecasts that trigger smaller drop in forward P/E than in historical P/E. Historical ratios can thus be better tools to detect overreaction thanks to the fact they are not smoothed by analysts' reaction to market movements.

In Regime 1 P/E is relatively low and in Regime 2 it is relatively high. The shortcoming of this model is that we cannot focus only on the two extreme cases when either prices drop faster than corporate profits or conversely prices surge faster than corporate profits indicating bubbles on either side of the tails¹⁰. As before we have fixed the steepness coefficient of the smooth transition function at seven; the results are presented in Table 11. Interestingly, the results for developed markets have not changed a lot: most of them exhibit higher risk when P/E is low; that is, when reported earnings are high with respect to the index level. The exceptions are more or less identical to the ones have been obtained from the forward P/E models. Finland, Japan, Singapore and the US have lower systematic risk when historical earnings are relatively high. So far we have explained the anomalies with flying-to-quality; however, the results based on historical P/Es somewhat contradict to this view. We have estimated very high location parameters for Finland, Japan, Singapore and the US that induces that the upper regime describes a situation when these markets show an extremely high valuation level. An extreme price level can be regarded as over-heating or bubble. From this perspective, although the Japanese, the US and the Singaporean location parameters seem to be high with respect to the parameters estimated for the other countries, they are less extreme with respect to their own average P/Es. In contrast, Finnish location coefficient is indeed extraordinary even comparing to its mean value of 15.68. Moreover, the alpha of Finland in Regime 2 is negative and in Regime 1 is positive, this is opposite to the results documented for the most stable markets like Switzerland or the US. It is a clear sign that Finland has experienced over-heating, which resulted in extremely high asset prices with respect

¹⁰ More research is needed in this direction, a three-regime model might be able to handle this issue. A three-regime model could concentrate on tail events when P/E is either very high or very low, these are the situations in which we are interested the most. If the location parameters are extreme enough in a three-regime setting, one can investigate the risk-return characteristic of the stock market under extrem P/E ratios. Ideally a three-regime model would have the following three regimes: Regime 1 when P/E is extremely low, Regime 2 would represent normal market situation and finally Regime 3 would stand for an extremely high P/E.

to reported earnings¹¹. This result also confirms our conjecture that historical ratios are more useful to detect bubbles. In particular, based on the forward-looking P/E ratio, the Finnish bubble is hardly recognizable.

The results are the opposite in emerging markets just like it was the case when forward P/Es were employed. Low P/E; that is, low pricing level relative to high historical earnings leads to lower market risk. The exceptions are similar as before: China A-class shares, the Czech Republic, Egypt, Hungary, Korea, the Philippines, Poland, Slovenia, South Africa, Taiwan and Turkey. One question might emerge, why are the results so mixed for emerging markets? First of all, as we have mentioned before, high or low local P/E ratios, especially for smaller markets is quite meaningless. A low local P/E that comes with low global P/E is not a buy signal and high P/E in a bullish global sentiment is probably not a sell signal. Furthermore, in some cases we might detect ‘negative bubbles’; that is, very low valuation levels with respect to reported corporate profits. For instance, the location parameters of Mexico, Romania and Russia are very low comparing either to other countries or to their mean P/Es. These countries have substantially lower market risk and higher abnormal return in Regime 1 that is a sign that these markets are bargain when they exhibit a sufficiently low P/E. We have to emphasize that a conservative strategy would take into consideration the market sentiment and the local expectations as well before entering the market.

¹¹ It happened in 2000 when the Finnish P/E touched a level of 80.

Table 11 Historical local P/E ratios as regime variables (1985-2012)

Panel A - Developed Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	Obs.
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Australia	19.097	39.974	0.000	1.208	0.913	23.756	0.000	0.644	0.423	10.849	0.841	0.000	0.265	7238
Austria	11.348	54.041	0.000	-0.316	1.229	25.801	0.000	1.900	0.687	13.736	0.397	0.000	0.342	7238
Belgium	10.001	38.106	0.000	0.699	1.051	24.160	0.000	1.602	0.805	24.590	0.758	0.000	0.432	7238
Canada	10.450	37.858	0.001	0.634	1.398	13.384	0.000	0.743	0.887	31.576	0.574	0.000	0.538	7238
Cyprus	12.443	30.841	-0.002	-2.613	0.846	13.653	0.001	1.558	0.407	6.318	0.003	0.000	0.120	3928
Denmark	10.976	33.626	-0.001	-0.874	1.035	15.186	0.000	2.428	0.781	25.032	0.206	0.001	0.344	7238
Finland	61.507	105.11	0.000	1.318	1.229	35.859	-0.004	-1.461	2.412	4.909	0.125	0.016	0.369	6395
France	7.405	31.533	0.004	1.948	1.504	5.528	0.000	1.121	1.094	35.477	0.058	0.136	0.532	7238
Germany	15.777	64.372	0.000	1.402	1.199	39.941	0.000	-0.320	0.923	21.927	0.257	0.000	0.531	7238
Greece	11.254	25.172	0.000	-0.307	0.979	18.244	0.000	0.540	0.795	18.032	0.604	0.008	0.176	5934
Hong Kong	11.707	15.561	0.001	1.268	0.864	12.685	0.000	1.423	0.688	13.858	0.553	0.038	0.181	7238
Ireland	8.969	24.057	0.000	0.389	1.128	14.379	0.000	1.603	0.845	25.522	0.999	0.001	0.346	7238
Italy	14.233	77.015	0.000	-0.676	1.285	25.884	0.000	0.048	0.878	25.296	0.540	0.000	0.412	6976
Japan	45.630	106.31	0.000	0.169	0.690	15.326	0.000	-1.046	1.084	21.151	0.380	0.000	0.280	7238
Luxembourg	18.761	34.621	0.000	0.736	0.474	14.149	0.000	1.843	0.339	7.614	0.396	0.015	0.130	4890
Netherlands	9.526	19.631	0.000	0.430	1.219	23.229	0.000	1.014	1.031	42.311	0.822	0.001	0.567	7238
Norway	14.634	35.633	0.000	0.604	0.610	18.513	0.000	1.405	0.468	16.076	0.701	0.001	0.146	6454
New Zealand	10.981	27.031	0.000	0.204	1.229	21.764	0.000	1.860	1.045	22.009	0.478	0.014	0.377	7238
Portugal	9.252	46.628	-0.001	-0.781	1.150	12.042	0.000	-0.085	0.754	22.452	0.454	0.000	0.363	5892
Singapore	29.817	71.821	0.000	1.147	0.679	25.909	0.000	-0.086	1.266	3.090	0.820	0.160	0.237	7238
Spain	11.635	50.509	0.000	-0.168	1.213	27.547	0.000	1.239	0.869	15.410	0.458	0.000	0.461	6674
Sweden	15.781	61.317	0.000	1.606	1.448	34.630	0.000	0.944	0.933	23.348	0.629	0.000	0.467	7238
Switzerland	18.444	54.824	0.000	2.418	0.891	40.433	0.000	0.517	0.699	18.395	0.442	0.000	0.457	7238
United Kingdom	17.175	110.92	0.000	0.838	1.094	49.200	0.000	-0.140	0.742	23.225	0.583	0.000	0.561	7238
United States	20.797	104.95	0.000	1.366	0.873	31.802	0.000	0.171	1.201	53.675	0.472	0.000	0.579	7238
Panel B - Emerging Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Argentina	8.358	26.704	0.001	0.644	0.467	5.959	0.000	-0.330	0.799	17.081	0.486	0.000	0.144	4999
Brazil	8.782	56.603	0.002	2.146	0.968	5.692	0.000	1.569	1.448	28.338	0.090	0.005	0.482	3481
Bulgaria	1.854	2.231	-0.003	-2.105	0.452	2.584	0.000	0.010	0.701	13.294	0.000	0.000	0.109	3928
Chile	6.781	19.646	0.001	1.669	0.170	2.226	0.000	2.349	0.671	17.305	0.260	0.000	0.240	6064
China A	26.599	42.626	0.001	1.439	0.328	6.034	0.000	0.344	0.097	2.276	0.353	0.001	0.013	4803
China	9.541	42.657	0.001	1.459	0.625	5.689	0.000	0.197	1.074	18.386	0.311	0.000	0.158	5004
Columbia	11.193	36.290	-0.001	-2.194	0.114	3.520	0.001	3.631	0.708	15.233	0.000	0.000	0.195	4501
Czech Republic	12.597	17.365	0.000	-0.028	0.963	13.941	0.001	1.999	0.816	12.813	0.216	0.106	0.284	4645
Egypt	10.593	11.363	0.000	0.510	0.297	6.942	0.001	1.396	0.102	2.401	0.555	0.001	0.025	4174
Hungary	10.623	20.887	0.000	0.205	1.438	15.184	0.000	0.875	1.122	21.527	0.990	0.003	0.313	4890
India	11.734	54.814	0.001	2.245	0.305	3.754	0.000	0.084	0.730	18.632	0.046	0.000	0.135	4890
Indonesia	11.982	26.793	0.000	0.391	0.397	5.570	0.000	0.445	0.787	12.537	0.893	0.000	0.064	5654
Israel	9.389	22.777	0.000	1.612	0.596	13.241	0.000	-0.880	0.748	23.708	0.070	0.007	0.193	4890
Korea	13.757	23.732	0.000	1.022	0.948	15.268	0.000	0.446	0.692	13.875	0.600	0.001	0.115	6456
Kuwait	8.580	13.249	-0.006	-0.877	-0.306	-0.807	0.000	1.266	0.132	3.947	0.354	0.249	0.018	2279
Malaysia	28.085	98.581	0.000	1.594	0.423	14.087	0.000	0.262	1.133	4.302	0.941	0.008	0.077	6976
Mexico	8.478	29.107	0.002	1.828	0.390	1.805	0.000	1.524	1.097	39.340	0.115	0.001	0.344	5804
Pakistan	11.009	17.568	0.000	1.172	0.037	1.327	0.000	-0.678	0.264	4.620	0.191	0.000	0.004	4890
Peru	17.173	17.819	0.000	1.783	0.288	6.714	0.000	1.226	0.555	15.049	0.832	0.000	0.135	4889
Philippines	13.165	30.100	0.001	1.418	0.497	9.452	0.000	0.764	0.317	10.416	0.292	0.003	0.052	6233
Poland	22.496	85.910	0.000	0.531	1.143	28.225	-0.001	-1.224	0.479	4.856	0.190	0.000	0.256	4826
Romania	3.253	11.108	0.002	1.197	0.137	0.715	0.000	0.025	0.847	11.681	0.246	0.001	0.146	3790
Russia	4.926	8.010	0.003	2.773	1.060	7.557	0.000	0.789	1.360	14.649	0.020	0.088	0.176	3828
Slovenia	33.243	20.949	0.000	0.763	0.478	10.994	0.001	0.578	0.187	2.271	0.686	0.002	0.168	3262
South Africa	18.869	108.71	0.000	1.457	0.967	27.337	0.000	0.224	0.282	3.083	0.756	0.000	0.258	7238
Sri Lanka	26.511	66.050	0.000	0.818	0.050	2.310	0.002	0.828	0.315	1.939	0.452	0.107	0.002	4890
Taiwan	25.899	41.477	0.000	1.404	0.617	15.306	-0.001	-1.426	0.378	4.487	0.066	0.011	0.086	5805
Thailand	43.158	133.58	0.000	1.593	0.598	14.686	-0.002	-0.798	2.021	5.110	0.350	0.000	0.088	6715
Turkey	17.054	45.476	0.001	2.110	1.174	21.448	-0.001	-1.327	0.602	4.205	0.041	0.000	0.110	5869
Venezuela	4.900	30.061	0.001	0.902	-0.037	-0.990	0.000	0.508	0.359	7.114	0.646	0.000	0.009	5195

This table shows the estimated parameters of the two-regime logistic smooth transition regression model for the period January 1985 – September 2012. The regime variables are the one-day-lagged historical local P/E ratios. Panel A and Panel B present the results for developed and emerging markets, respectively. The steepness parameter of the logistic function is fixed at seven in all the regressions. The t-statistics account for possible heteroskedasticity and autocorrelation in the residuals applying the Newey and West (1987) consistent covariance matrix estimator. The reported p-values are in reference to Wald F-statistics that test the null hypothesis that the alphas and betas are different under the two regimes.

The results for the shorter estimation period of January 1999 – September 2012 are reported in Table 12. Luxembourg has now higher beta when P/E is relatively high; however, it is not in contradiction to our previous results. The Luxembourgish market exhibits a low valuation level when global valuation is low that happens in highly uncertain times. Luxembourg is more resilient to global stress than most of the other markets, thus it is not striking it has lower risk in Regime 1. More stable countries tend to post higher alphas in Regime 1 when the valuation level is low, which is likely to be low because of poor investors' sentiment worldwide. In contrast, more risky and resource-oriented stable countries tend to post higher alphas in Regime 2 when local P/Es are high. Again, although it is worth following local P/E ratios, without any information about investors' sentiment it is risky to make an investment decision.

We can conclude that historical P/E ratios provide a more useful signal for stock pickers, simply because they exhibit sharper movements when the most significant events happen.

Table 12 Historical local P/E ratios as regime variables (1999-2012)

Panel A - Developed Markets														
	Location		Regime 1			Regime 2			p-Value		Adj. R ²	Obs.		
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)			α	β
Australia	18.481	147.04	0.000	1.478	1.080	29.615	0.000	1.227	0.318	10.459	0.949	0.000	0.397	3586
Austria	11.383	48.993	0.000	-0.832	1.237	25.942	0.000	1.572	0.742	13.815	0.195	0.000	0.473	3586
Belgium	9.775	16.862	0.000	0.286	1.055	23.579	0.000	-0.042	0.948	24.262	0.777	0.069	0.534	3586
Canada	10.407	23.473	0.001	0.645	1.428	13.573	0.000	2.265	1.039	46.799	0.655	0.000	0.640	3586
Cyprus	12.385	35.099	-0.002	-2.624	0.847	13.893	0.001	1.390	0.539	7.671	0.004	0.001	0.127	3586
Denmark	14.507	70.577	0.000	-0.247	1.125	25.746	0.000	1.868	0.815	21.040	0.497	0.000	0.456	3586
Finland	61.573	83.246	0.000	1.106	1.376	32.489	-0.004	-1.478	2.401	4.827	0.120	0.039	0.457	3586
France	18.619	73.849	0.000	0.633	1.283	47.289	0.000	-0.959	0.961	18.575	0.263	0.000	0.679	3586
Germany	9.784	63.973	0.002	1.066	1.555	15.177	0.000	-0.761	1.141	42.900	0.275	0.000	0.672	3586
Greece	25.773	103.90	0.000	-1.234	0.953	25.777	0.000	-0.112	0.505	4.237	0.843	0.000	0.250	3586
Hong Kong	9.227	14.382	0.001	0.395	0.842	5.216	0.000	1.540	0.681	22.978	0.838	0.325	0.252	3586
Ireland	25.325	306.80	0.000	-0.714	1.022	27.759	-0.001	-1.173	-0.148	-1.125	0.286	0.000	0.440	3586
Italy	18.668	100.53	0.000	-0.947	1.272	35.470	0.000	-0.750	0.758	15.539	0.817	0.000	0.613	3586
Japan	36.457	59.324	0.000	0.000	0.453	11.760	0.000	0.170	0.612	11.045	0.880	0.017	0.131	3586
Luxembourg	8.827	20.255	0.000	0.474	0.422	7.587	0.000	0.851	0.553	15.324	0.958	0.047	0.161	3586
Netherlands	21.699	53.547	0.000	-0.448	1.264	50.555	0.000	-1.346	0.826	12.932	0.273	0.000	0.670	3586
Norway	14.642	46.132	0.000	0.020	0.648	16.850	0.000	2.247	0.452	14.928	0.297	0.000	0.221	3586
New Zealand	7.249	15.178	0.003	1.698	1.516	10.608	0.000	1.489	1.228	27.466	0.124	0.059	0.498	3586
Portugal	5.947	15.582	-0.001	-0.776	1.260	12.148	0.000	-0.516	0.823	22.630	0.521	0.000	0.446	3586
Singapore	4.830	19.801	0.020	1.368	0.071	0.305	0.000	1.764	0.694	26.544	0.177	0.009	0.310	3586
Spain	12.579	48.041	0.000	-0.658	1.278	25.505	0.000	0.749	0.941	28.975	0.362	0.000	0.574	3586
Sweden	15.669	48.956	0.000	1.321	1.555	30.940	0.000	0.685	1.095	22.567	0.749	0.000	0.589	3586
Switzerland	18.635	76.536	0.000	0.674	0.908	36.454	0.000	0.060	0.592	13.579	0.788	0.000	0.541	3586
United Kingdom	18.927	96.556	0.000	-0.035	1.193	61.835	0.000	-0.982	0.695	20.419	0.395	0.000	0.672	3586
United States	21.815	150.98	0.000	1.024	0.994	39.592	0.000	-1.417	1.276	54.930	0.089	0.000	0.700	3586
Panel B - Emerging Markets														
	Location		Regime 1			Regime 2			p-Value		Adj. R ²			
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)			α	β
Argentina	8.296	21.976	0.000	0.398	0.465	5.764	0.000	-0.363	0.686	15.719	0.634	0.015	0.140	3586
Brazil	8.782	56.603	0.002	2.146	0.968	5.692	0.000	1.569	1.448	28.338	0.090	0.005	0.482	3481
Bulgaria	1.882	3.022	-0.003	-2.113	0.452	2.604	0.000	-0.092	0.775	15.194	0.000	0.000	0.123	3586
Chile	19.586	32.732	0.000	1.658	0.725	13.474	0.001	1.741	0.617	14.310	0.606	0.109	0.386	3586
China A	29.692	28.837	0.000	0.589	0.327	7.416	0.000	0.533	0.114	2.251	0.946	0.002	0.031	3586
China	9.576	45.044	0.001	2.110	0.620	5.140	0.000	0.887	1.111	17.630	0.204	0.000	0.201	3586
Columbia	11.186	41.524	-0.001	-1.556	0.079	2.056	0.001	3.860	0.719	15.602	0.001	0.000	0.225	3586
Czech Republic	9.582	56.150	0.021	1.575	1.186	4.655	0.000	2.001	0.912	17.800	0.124	0.296	0.320	3586
Egypt	33.499	103.67	0.000	1.151	0.265	7.526	-0.009	-2.091	-0.884	-2.366	0.030	0.002	0.032	3586
Hungary	16.508	59.242	0.000	1.016	1.291	22.816	0.000	-0.623	0.773	8.799	0.312	0.000	0.373	3586
India	11.806	38.548	0.002	2.240	0.350	4.261	0.000	0.960	0.800	20.081	0.107	0.000	0.173	3586
Indonesia	8.387	35.677	0.000	-0.320	0.103	0.762	0.001	1.884	0.667	14.087	0.473	0.000	0.096	3586
Israel	9.407	24.030	0.001	2.166	0.607	12.342	0.000	-0.521	0.770	22.080	0.042	0.007	0.252	3586
Korea	10.179	21.266	0.001	1.616	1.062	10.153	0.000	1.057	0.844	20.681	0.243	0.049	0.191	3586
Kuwait	8.580	13.249	-0.006	-0.877	-0.306	-0.807	0.000	1.266	0.132	3.947	0.354	0.249	0.018	2279
Malaysia	8.674	29.588	-0.001	-0.229	0.131	1.054	0.000	2.586	0.333	13.765	0.728	0.108	0.087	3586
Mexico	11.863	24.994	0.001	1.957	1.193	21.921	0.000	2.119	1.054	36.147	0.223	0.024	0.539	3586
Pakistan	12.526	28.200	0.001	2.499	0.048	1.890	-0.001	-0.875	0.168	2.146	0.076	0.147	0.002	3586
Peru	17.986	90.018	0.001	3.702	0.152	4.401	0.000	1.082	0.558	15.066	0.209	0.000	0.201	3586
Philippines	23.540	168.24	0.000	1.796	0.347	11.412	-0.009	-2.798	0.045	0.112	0.004	0.455	0.069	3586
Poland	22.504	84.355	0.000	1.341	1.161	26.494	0.000	-0.475	0.514	5.329	0.341	0.000	0.364	3586
Romania	4.316	15.679	0.001	0.593	0.403	2.428	0.000	0.947	0.943	13.102	0.778	0.003	0.168	3586
Russia	4.915	6.936	0.003	2.770	1.063	7.624	0.001	1.731	1.326	16.783	0.032	0.120	0.254	3586
Slovenia	33.243	20.949	0.000	0.763	0.478	10.994	0.001	0.578	0.187	2.271	0.686	0.002	0.168	3262
South Africa	12.594	42.299	0.001	2.452	0.916	17.089	0.000	0.641	1.306	30.958	0.068	0.000	0.414	3586
Sri Lanka	26.537	63.167	0.000	1.801	0.047	1.946	0.002	0.808	0.323	1.834	0.530	0.120	0.001	3586
Taiwan	35.913	85.800	0.000	1.020	0.559	15.856	-0.005	-2.334	0.267	1.193	0.015	0.199	0.120	3586
Thailand	34.491	44.628	0.001	1.947	0.598	15.059	-0.005	-0.843	1.860	3.513	0.348	0.018	0.132	3586
Turkey	15.623	46.031	0.001	1.923	1.270	21.082	0.000	-0.002	0.672	4.038	0.373	0.001	0.168	3586
Venezuela	4.718	24.835	0.000	0.592	-0.043	-1.067	0.001	1.183	0.206	4.849	0.881	0.000	0.003	3586

This table shows the estimated parameters of the two-regime logistic smooth transition regression model for the period January 1999 – September 2012. The regime variables are the one-day-lagged historical local P/E ratios. Panel A and Panel B present the results for developed and emerging markets, respectively. The steepness parameter of the logistic function is fixed at seven in all the regressions. The t-statistics account for possible heteroskedasticity and autocorrelation in the residuals applying the Newey and West (1987) consistent covariance matrix estimator. The reported p-values are in reference to Wald F-statistics that test the null hypothesis that the alphas and betas are different under the two regimes.

4.2.2 Historical world P/E as the regime variable

Historical world P/E can also be used to capture market sentiment like its forward variant, since in bullish (bearish) sentiment a high (low) P/E evolves. For signaling, the historical world P/E has an advantage over the forward one: it is more sensitive to very sharp market movements, which can be the results of investors' overreactions. Overreactions are in stockpickers' outmost interest, as the correction after overpessimistic and overoptimistic sentiment triggers the best and the worst returns, respectively. Although overreactions can be more easily detected by historical ratios, we have to underline as before that a conservative strategy should focus on the historical world P/E in bull markets and on the forward world P/E in bear markets.

Regime 1 corresponds to a relatively low global valuation level, whereas Regime 2 to a rather high valuation level¹². The location parameter has been kept constantly at seven. Table 13 shows the regression estimates for the period January 1985 – September 2012.

Similar conclusion can be drawn from the results as from the estimates when forward world P/E was employed. Developed markets are exposed to higher market risk when the valuation level based on P/E is low. Only Finland, HK, Japan Singapore and the US have lower risk when P/E is relatively low. Under stressful low global valuation level HK, Switzerland and the US post significant positive alphas, which we can interpret as safe haven premium (see e.g., Ericsson and Renault, 2006). In contrast, when P/E is high, riskier and resource-rich countries (Australia, Denmark, Finland, Ireland, the Netherlands, Norway and New Zealand) achieve significant positive alphas. The results have neither changed in emerging markets; most of the markets do not cheer with low global valuation level.

¹² More interesting cases would be the extreme ones when prices either drop faster or surge faster than reported corporate profits over a long period of time resulting in extreme low and high historical P/Es, respectively. Unfortunately, a two-regime setting does not necessarily guarantee that we can focus on extreme cases in either tail. A three-regime model that is able to distinguish between extremely low, normal and extremely high P/Es might provide a better insight how stock markets behave under extreme pricing conditions.

Table 13 Historical world P/E ratio as regime variable (1985-2012)

Panel A - Developed Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	Obs.
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Australia	16.486	92.632	0.000	-0.999	1.060	25.059	0.000	2.416	0.596	9.495	0.047	0.000	0.268	7238
Austria	17.459	111.86	0.000	0.612	1.237	35.101	0.000	1.299	0.462	10.127	0.871	0.000	0.380	7238
Belgium	18.781	147.19	0.000	0.227	1.082	36.363	0.000	1.517	0.602	20.517	0.413	0.000	0.455	7238
Canada	15.171	85.987	0.000	-0.296	1.205	27.189	0.000	1.369	0.792	23.173	0.442	0.000	0.549	7238
Cyprus	18.807	106.68	-0.001	-1.538	0.911	17.277	0.000	0.408	0.125	2.000	0.287	0.000	0.135	3928
Denmark	16.632	143.90	0.000	-0.249	1.145	35.608	0.000	2.468	0.571	21.337	0.155	0.000	0.380	7238
Finland	21.500	74.818	0.000	-0.597	1.197	33.458	0.001	1.962	1.503	13.900	0.043	0.007	0.367	6395
France	18.234	100.22	0.000	0.594	1.270	40.412	0.000	0.936	0.908	21.907	0.850	0.000	0.544	7238
Germany	18.534	81.161	0.000	0.222	1.217	38.340	0.000	0.290	0.915	22.416	0.975	0.000	0.532	7238
Greece	17.148	81.162	-0.001	-2.193	1.073	23.150	0.000	1.704	0.638	12.846	0.007	0.000	0.186	5934
Hong Kong	20.252	15.730	0.000	2.273	0.725	16.882	0.000	0.582	0.849	7.575	0.632	0.292	0.179	7238
Ireland	17.568	91.914	0.000	-0.667	1.178	25.235	0.000	2.093	0.654	19.009	0.079	0.000	0.367	7238
Italy	18.760	91.930	0.000	0.209	1.243	32.652	0.000	-0.293	0.797	20.383	0.722	0.000	0.407	7238
Japan	17.909	95.408	0.000	-0.509	0.531	11.316	0.000	-0.251	1.104	25.108	0.825	0.000	0.299	7238
Luxembourg	19.806	82.186	0.000	0.951	0.541	15.942	0.000	0.808	0.210	4.748	0.868	0.000	0.142	4890
Netherlands	18.816	118.07	0.000	-1.320	1.241	42.859	0.000	1.954	0.831	26.774	0.025	0.000	0.584	7238
Norway	16.654	59.735	0.000	-0.760	0.657	22.680	0.000	1.909	0.429	14.520	0.100	0.000	0.151	6454
New Zealand	16.400	107.37	0.000	-0.819	1.532	30.760	0.000	2.228	0.872	16.104	0.088	0.000	0.404	7238
Portugal	16.302	57.504	-0.001	-1.729	1.038	27.349	0.000	0.701	0.607	19.043	0.068	0.000	0.379	5892
Singapore	9.293	63.413	-0.003	-1.636	0.269	2.468	0.000	1.046	0.726	18.890	0.091	0.000	0.233	7238
Spain	17.801	104.95	0.000	0.040	1.234	30.293	0.000	0.678	0.830	14.178	0.724	0.000	0.465	6674
Sweden	17.656	104.13	0.000	0.198	1.479	30.034	0.000	1.512	1.019	21.858	0.443	0.000	0.464	7238
Switzerland	24.421	85.609	0.000	2.205	0.883	45.342	0.000	0.399	0.487	8.377	0.806	0.000	0.460	7238
United Kingdom	16.411	88.445	0.000	0.169	1.218	49.554	0.000	1.031	0.874	31.620	0.755	0.000	0.565	7238
United States	22.819	56.814	0.000	2.156	0.920	32.472	0.000	-1.649	1.208	9.891	0.035	0.039	0.573	7238
Panel B - Emerging Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	Obs.
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Argentina	19.693	48.942	0.000	0.815	0.625	16.091	0.000	-0.714	0.998	10.608	0.300	0.000	0.147	4999
Brazil	17.165	44.262	0.000	1.686	1.490	25.678	0.000	0.709	1.139	16.401	0.591	0.000	0.383	4759
Bulgaria	16.573	84.571	-0.001	-1.857	0.547	12.266	0.002	3.974	0.071	1.161	0.000	0.000	0.059	3023
Chile	16.267	78.258	0.000	1.163	0.802	11.562	0.000	2.547	0.504	19.516	0.802	0.000	0.243	6064
China A	16.824	57.114	0.000	-0.224	0.366	7.578	0.001	1.681	0.057	1.060	0.207	0.000	0.015	4803
China	16.796	65.983	0.000	0.162	1.051	11.427	0.000	1.385	0.574	10.493	0.444	0.000	0.159	5004
Columbia	17.693	163.97	0.001	3.543	0.752	14.308	0.000	-1.261	0.165	5.301	0.001	0.000	0.196	4501
Czech Republic	16.492	92.556	0.000	0.463	1.165	18.220	0.000	1.791	0.588	14.199	0.599	0.000	0.310	4645
Egypt	16.179	54.331	0.000	-0.586	0.373	8.614	0.001	1.893	0.083	2.340	0.135	0.000	0.031	4174
Hungary	16.497	52.911	0.000	-0.793	1.488	24.380	0.000	1.680	0.922	16.549	0.140	0.000	0.325	4890
India	18.628	132.14	0.000	1.074	0.820	19.132	0.000	0.125	0.271	5.138	0.556	0.000	0.146	4890
Indonesia	9.244	45.635	-0.013	-0.913	0.135	0.745	0.000	0.806	0.635	13.527	0.352	0.010	0.045	5869
Israel	11.428	30.449	0.000	0.042	0.478	6.881	0.000	0.532	0.713	27.316	0.971	0.002	0.194	4890
Korea	12.043	40.119	0.000	-0.087	1.102	9.641	0.000	1.269	0.731	14.929	0.813	0.003	0.111	6537
Kuwait	8.918	25.627	0.023	0.892	-0.828	-0.817	0.000	0.842	0.130	3.688	0.378	0.347	0.015	2282
Malaysia	9.423	92.104	-0.005	-4.588	-0.080	-0.636	0.000	1.619	0.488	11.825	0.000	0.000	0.073	6976
Mexico	12.776	47.918	0.000	0.549	1.166	23.172	0.000	2.267	1.014	29.306	0.860	0.012	0.315	6102
Pakistan	9.672	17.860	-0.007	-1.732	0.090	1.160	0.000	0.995	0.086	3.093	0.073	0.962	0.003	4890
Peru	17.036	41.179	0.000	1.568	0.526	12.834	0.000	1.473	0.342	8.130	0.728	0.002	0.130	4889
Philippines	17.271	15.743	0.000	1.165	0.439	11.409	0.000	1.035	0.345	8.013	0.817	0.100	0.050	6233
Poland	17.265	74.674	0.000	-0.105	1.294	24.103	0.000	0.249	0.813	14.376	0.805	0.000	0.261	4826
Romania	17.451	126.13	0.000	-0.846	1.178	17.227	0.001	0.901	0.136	2.223	0.231	0.000	0.193	3790
Russia	16.128	38.216	0.000	-0.721	1.426	13.595	0.001	2.145	1.115	9.351	0.043	0.050	0.176	3828
Slovenia	16.293	126.82	-0.001	-3.222	0.658	14.235	0.001	2.865	0.141	4.224	0.000	0.000	0.197	3586
South Africa	17.056	85.849	0.000	0.249	1.230	29.950	0.000	1.489	0.701	16.973	0.553	0.000	0.274	7238
Sri Lanka	9.231	59.658	-0.009	-2.333	-0.263	-1.211	0.000	1.195	0.070	3.321	0.016	0.126	0.005	4890
Taiwan	19.701	59.712	0.000	-0.766	0.657	13.800	0.000	1.116	0.389	6.168	0.184	0.001	0.087	5805
Thailand	17.186	26.589	0.000	0.426	0.722	14.390	0.000	1.530	0.521	9.303	0.475	0.008	0.085	6715
Turkey	22.764	59.137	0.001	1.533	1.152	21.594	0.001	0.681	0.339	1.812	0.842	0.000	0.106	6079
Venezuela	17.536	69.892	0.001	2.893	0.034	1.375	0.000	-0.427	0.351	5.322	0.032	0.000	0.007	5195

This table shows the estimated parameters of the two-regime logistic smooth transition regression model for the period January 1999 – September 2012. The regime variables are the one-day-lagged historical local P/E ratios. Panel A and Panel B present the results for developed and emerging markets, respectively. The steepness parameter of the logistic function is fixed at seven in all the regressions. The t-statistics account for possible heteroskedasticity and autocorrelation in the residuals applying the Newey and West (1987) consistent covariance matrix estimator. The reported p-values are in reference to Wald F-statistics that test the null hypothesis that the alphas and betas are different under the two regimes.

4.2.3 Historical RPEs as regime variables

The advantage of RPE is that it compares the local price level to the global price level that captures investors' sentiment. A very low local P/E ratio alone is probably not a reason to step in the market if it couples with bad market sentiment. Beside poor market sentiment; that is, low global valuation level, a seemingly attractive, low local P/E ratio translates to a less appealing RPE. In contrast, a low local pricing that couples with favorable market sentiment might indicate a discount and a time to step in. Apparently, strained local P/E valuation in a global bullish environment does not necessarily imply a sell signal in RPE terms.

In Regime 1 the RPE shows a low local valuation level, and in Regime 2 a relatively high valuation level. The results have not changed substantially comparing to results obtained from the forward RPE models. Most of the countries have lower risk when valuation level with respect to global valuation level drops. The first remarkable difference between the forward and the historical RPE models is that Germany, Greece, the Netherlands, New Zealand, Spain and the UK behave like most of the other countries, higher valuation is not beneficial for investors: market risk increases and abnormal returns drop. This inference meets better the economic theory, thus from this point of view, the historical RPE performs better in developed markets. Sweden joins HK in that it is less risky when RPE is high; however, the Swedish market produces significantly higher alpha when it is relatively cheap.

Most of the emerging markets have lower systematic risk and higher abnormal return at relatively low valuation levels. Only four countries are significantly more risky when RPE is relatively low; these are Argentina, Egypt, Israel and Turkey. However, Israel and Turkey have substantially and significantly higher alphas when RPE is low. Argentina and Egypt might show opposite results to most of the markets because in the sample period both countries experienced severe crisis.

Table 14 Historical RPEs as regime variables (1985-2012)

Panel A - Developed Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	Obs.
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Australia	0.822	51.858	0.001	1.949	0.477	8.178	0.000	0.681	0.889	18.216	0.141	0.000	0.259	7238
Austria	0.551	15.782	0.000	-1.118	0.226	4.295	0.000	1.621	0.890	17.133	0.111	0.000	0.329	7238
Belgium	0.761	44.416	0.000	1.341	0.800	23.233	0.000	0.110	1.088	29.074	0.418	0.000	0.434	7238
Canada	0.848	67.247	0.000	1.001	0.648	7.947	0.000	0.195	1.061	35.472	0.466	0.000	0.548	7238
Cyprus	0.578	6.290	-0.001	-2.132	0.843	13.513	0.001	1.333	0.418	6.621	0.012	0.000	0.118	3928
Denmark	0.958	109.52	0.001	3.141	0.545	17.346	0.000	0.014	0.999	25.516	0.020	0.000	0.363	7238
Finland	0.568	28.548	0.000	0.944	0.623	8.535	0.000	0.239	1.359	34.502	0.463	0.000	0.379	6395
France	0.896	81.232	0.000	2.335	1.045	30.725	-0.001	-3.406	1.459	33.314	0.000	0.000	0.539	7238
Germany	1.008	41.718	0.000	0.690	1.053	30.456	0.000	-0.478	1.209	23.915	0.528	0.012	0.524	7238
Greece	0.641	30.305	0.000	0.288	0.580	7.698	0.000	0.136	0.933	26.173	0.900	0.000	0.178	5934
Hong Kong	0.562	33.811	0.001	1.112	1.105	7.513	0.000	1.458	0.713	16.125	0.451	0.011	0.183	7238
Ireland	1.167	114.08	0.000	1.769	0.849	25.859	0.000	-1.165	1.378	23.505	0.072	0.000	0.352	7238
Italy	1.609	19.362	0.000	-1.082	1.057	31.887	0.006	4.823	0.485	1.586	0.000	0.063	0.401	6976
Japan	1.350	56.952	0.000	0.165	0.396	8.063	0.000	-0.679	0.859	18.928	0.689	0.000	0.275	7238
Luxembourg	0.843	21.058	0.000	-0.089	0.398	9.515	0.000	2.358	0.561	17.059	0.236	0.002	0.133	4890
Netherlands	1.095	82.177	0.000	1.236	1.035	41.545	-0.001	-2.179	1.436	38.413	0.015	0.000	0.570	7238
Norway	1.031	26.446	0.000	1.354	0.458	15.456	0.000	0.397	0.635	21.176	0.680	0.000	0.148	6454
New Zealand	0.841	38.401	0.000	1.012	1.097	24.091	0.000	1.353	1.465	17.458	0.484	0.000	0.379	7238
Portugal	0.719	10.916	0.000	0.633	0.669	10.586	0.000	-0.754	0.854	26.779	0.354	0.009	0.358	5892
Singapore	1.332	51.386	0.000	1.736	0.680	26.137	-0.002	-2.084	1.294	3.017	0.021	0.159	0.239	7238
Spain	1.008	31.650	0.000	0.520	1.025	23.817	0.000	0.325	1.206	23.956	0.989	0.006	0.450	6674
Sweden	0.957	40.204	0.000	2.291	1.307	36.022	0.000	-0.734	1.077	17.433	0.045	0.002	0.452	7238
Switzerland	0.791	18.206	0.000	2.230	0.781	14.902	0.000	0.912	0.884	42.385	0.162	0.068	0.455	7238
United Kingdom	0.955	73.045	0.000	1.098	1.008	44.130	-0.001	-0.977	1.427	9.203	0.260	0.007	0.551	7238
United States	0.920	48.192	0.000	1.050	0.674	11.408	0.000	0.947	1.052	54.255	0.589	0.000	0.583	7238
Panel B - Emerging Markets														
	Location		Regime 1				Regime 2				p-Value		Adj. R ²	Obs.
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)	α	β		
Argentina	0.827	39.130	0.000	-0.632	0.821	16.523	0.000	0.985	0.545	9.819	0.246	0.000	0.144	4999
Brazil	0.908	54.671	0.001	2.624	1.193	20.685	0.000	0.797	1.641	21.186	0.670	0.000	0.483	3481
Bulgaria	0.980	7.347	0.001	2.409	0.278	6.054	0.000	0.421	0.556	9.645	0.222	0.000	0.047	3023
Chile	0.983	58.732	0.000	1.770	0.468	15.572	0.000	2.319	0.786	13.639	0.757	0.000	0.245	6064
China A	0.997	13.640	0.001	0.958	0.380	1.784	0.000	0.953	0.213	5.759	0.541	0.434	0.011	4803
China	0.969	47.812	0.000	1.410	0.726	9.303	0.000	-0.256	1.252	14.919	0.420	0.000	0.156	5004
Columbia	0.752	66.504	0.000	-1.551	0.120	4.139	0.001	3.367	0.755	16.040	0.001	0.000	0.203	4501
Czech Republic	0.848	69.512	0.000	1.828	0.617	13.786	0.000	0.807	1.158	17.182	0.669	0.000	0.306	4645
Egypt	0.934	27.906	0.000	0.371	0.260	6.862	0.001	2.091	0.097	1.603	0.107	0.022	0.024	4174
Hungary	0.662	67.986	0.002	3.230	0.674	8.752	0.000	-0.856	1.351	24.464	0.002	0.000	0.323	4890
India	0.977	31.139	0.001	1.741	0.350	6.560	0.000	-0.498	0.810	19.857	0.107	0.000	0.142	4890
Indonesia	0.737	24.715	0.000	0.526	0.336	3.792	0.000	0.392	0.756	15.214	0.778	0.000	0.064	5654
Israel	0.863	45.340	0.000	1.805	0.695	21.137	-0.001	-2.429	0.596	10.570	0.003	0.098	0.193	4890
Korea	0.984	24.098	0.000	1.551	0.859	16.709	-0.001	-1.053	0.793	10.293	0.090	0.479	0.113	6456
Kuwait	0.871	18.154	0.001	1.516	-0.028	-0.291	0.000	-0.134	0.141	3.360	0.173	0.089	0.012	2279
Malaysia	1.031	40.897	0.000	0.932	0.376	9.243	0.000	1.169	0.586	8.219	0.961	0.009	0.072	6976
Mexico	0.796	12.538	0.000	1.278	1.046	20.724	0.000	1.696	1.113	35.440	0.923	0.256	0.342	5804
Pakistan	0.786	35.144	0.001	2.148	0.072	2.389	-0.001	-2.232	0.124	2.463	0.002	0.383	0.004	4890
Peru	0.947	30.774	0.000	1.728	0.290	6.714	0.000	1.237	0.554	14.940	0.837	0.000	0.135	4889
Philippines	0.998	10.813	0.000	1.368	0.382	10.699	0.000	0.467	0.431	7.375	0.609	0.473	0.049	6233
Poland	0.770	38.493	0.000	0.886	0.949	12.395	0.000	-1.024	1.184	22.916	0.203	0.011	0.252	4826
Romania	0.478	26.384	0.000	-0.348	0.261	2.583	0.000	0.905	1.084	15.579	0.480	0.000	0.172	3790
Russia	0.838	38.357	0.001	1.936	1.266	16.194	-0.001	-0.689	1.705	6.940	0.270	0.084	0.174	3828
Slovenia	0.914	96.759	0.001	2.387	0.233	5.105	0.000	-1.294	0.625	12.555	0.009	0.000	0.194	3262
South Africa	0.778	74.840	0.000	1.540	0.675	13.135	0.000	0.347	1.220	32.071	0.376	0.000	0.274	7238
Sri Lanka	0.465	5.943	0.000	-0.245	0.053	1.254	0.000	1.281	0.053	2.096	0.427	0.989	0.001	4890
Taiwan	1.007	24.538	0.001	2.168	0.564	12.109	0.000	-1.165	0.605	10.867	0.020	0.585	0.084	5805
Thailand	1.003	45.914	0.001	2.067	0.582	13.389	0.000	-0.618	0.864	5.567	0.225	0.080	0.085	6715
Turkey	0.981	41.697	0.001	1.758	1.110	19.980	-0.003	-1.395	0.604	3.334	0.089	0.007	0.107	5869
Venezuela	0.922	24.909	0.000	0.997	0.124	3.692	0.000	-0.185	0.525	4.548	0.541	0.001	0.006	5195

This table shows the estimated parameters of the two-regime logistic smooth transition regression model for the period January 1985 – September 2012. The regime variables are the one-day-lagged RPEs. Panel A and Panel B present the results for developed and emerging markets, respectively. The steepness parameter of the logistic function is fixed at 100 in all the regressions. The t-statistics account for possible heteroskedasticity and autocorrelation in the residuals applying the Newey and West (1987) consistent covariance matrix estimator. The reported p-values are in reference to Wald F-statistics that test the null hypothesis that the alphas and betas are different under the two regimes.

Finally, we report the estimates for the period January 1999 – September 2012 in Table 15. Interestingly, the most resilient countries in economic woes, HK, Japan and

the US do not have significantly different market risk under the two regimes. However, all the three markets have posted substantially higher returns when they are relatively cheap. Moreover, Sweden and the UK have significantly higher market risk and significantly higher abnormal returns at low level of RPE. Our previous findings have not changed in emerging markets.

Table 15 Historical RPEs as regime variables (1999-2012)

Panel A - Developed Markets														
	Location		Regime 1			Regime 2			p-Value		Adj. R ²	Obs.		
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)			α	β
Australia	0.886	87.373	0.000	0.718	0.328	5.089	0.000	2.022	0.928	22.132	0.937	0.000	0.358	3586
Austria	1.016	105.59	0.000	0.722	0.870	15.844	0.000	-0.742	1.429	22.241	0.324	0.000	0.462	3586
Belgium	0.614	39.940	0.000	0.617	0.790	15.718	0.000	-1.375	1.152	39.107	0.256	0.000	0.549	3586
Canada	0.756	48.695	0.000	0.063	0.783	12.131	0.000	2.162	1.113	38.085	0.554	0.000	0.635	3586
Cyprus	0.577	5.222	-0.001	-2.147	0.843	13.758	0.001	1.144	0.552	8.072	0.018	0.002	0.126	3586
Denmark	0.961	107.76	0.001	2.711	0.553	7.909	0.000	0.084	1.048	26.893	0.030	0.000	0.464	3586
Finland	0.967	81.528	0.000	0.942	1.273	26.307	0.000	-0.857	1.627	23.052	0.222	0.000	0.457	3586
France	0.904	60.277	0.000	1.567	1.180	46.809	-0.001	-3.241	1.474	32.851	0.000	0.000	0.679	3586
Germany	1.213	36.208	0.000	0.392	1.176	44.309	-0.001	-3.243	1.343	27.912	0.002	0.002	0.666	3586
Greece	0.669	24.191	0.000	-0.039	0.720	6.397	0.000	-1.466	0.967	26.209	0.565	0.036	0.249	3586
Hong Kong	0.742	36.349	0.002	2.790	0.853	6.044	0.000	-0.184	0.699	18.786	0.006	0.258	0.253	3586
Ireland	1.170	96.876	0.000	-0.374	0.928	22.154	0.000	-1.196	1.379	24.320	0.427	0.000	0.447	3586
Italy	0.851	25.843	0.000	0.353	1.241	26.001	0.000	-1.400	1.126	24.964	0.324	0.077	0.601	3586
Japan	0.980	44.206	0.001	0.577	0.932	2.286	0.000	-0.189	0.488	15.214	0.555	0.276	0.130	3586
Luxembourg	0.675	27.124	0.000	0.339	0.400	8.329	0.000	0.854	0.666	23.233	0.888	0.000	0.168	3586
Netherlands	1.068	52.190	0.000	-0.539	1.171	42.814	-0.001	-2.131	1.428	36.819	0.097	0.000	0.664	3586
Norway	0.837	67.693	0.000	0.086	0.273	5.361	0.000	1.943	0.604	21.023	0.400	0.000	0.226	3586
New Zealand	0.818	34.826	0.000	1.561	1.211	23.467	0.000	0.631	1.567	22.328	0.601	0.000	0.499	3586
Portugal	0.823	17.565	0.000	0.018	0.767	11.373	0.000	-1.156	0.924	27.167	0.482	0.037	0.440	3586
Singapore	0.850	20.673	0.000	0.791	0.654	17.578	0.000	1.953	0.745	23.191	0.373	0.067	0.308	3586
Spain	0.637	71.435	0.000	-0.151	1.822	8.879	0.000	-0.182	1.075	42.283	0.910	0.000	0.577	3586
Sweden	1.017	47.489	0.001	2.604	1.474	36.144	0.000	-1.654	1.219	15.764	0.006	0.004	0.580	3586
Switzerland	0.778	40.804	0.000	0.633	0.457	6.416	0.000	0.159	0.885	38.973	0.571	0.000	0.540	3586
United Kingdom	0.799	59.457	0.001	2.178	1.265	26.883	0.000	-1.682	1.011	33.353	0.012	0.000	0.662	3586
United States	1.009	93.104	0.003	1.848	1.234	8.450	0.000	-1.244	1.061	51.291	0.055	0.247	0.692	3586

Panel B - Emerging Markets														
	Location		Regime 1			Regime 2			p-Value		Adj. R ²	Obs.		
	c	t(c)	α	t(α)	β	t(β)	α	t(α)	β	t(β)			α	β
Argentina	0.838	28.459	0.000	-0.224	0.685	15.352	0.000	-0.041	0.535	9.555	0.908	0.035	0.139	3586
Brazil	0.908	54.671	0.001	2.624	1.193	20.685	0.000	0.797	1.641	21.186	0.670	0.000	0.483	3481
Bulgaria	0.980	7.347	0.001	2.409	0.278	6.054	0.000	0.421	0.556	9.645	0.222	0.000	0.047	3023
Chile	0.972	64.044	0.000	0.469	0.477	14.643	0.001	2.527	0.798	14.196	0.282	0.000	0.401	3586
China A	0.941	32.118	0.000	0.512	0.453	4.928	0.000	0.677	0.248	6.659	0.896	0.037	0.027	3586
China	0.967	52.831	0.001	2.521	0.704	7.651	0.000	-0.034	1.274	15.612	0.223	0.000	0.200	3586
Columbia	0.753	65.099	0.000	-0.313	0.082	2.378	0.001	3.339	0.755	16.372	0.024	0.000	0.232	3586
Czech Republic	0.848	68.964	0.001	3.328	0.625	13.058	0.000	0.760	1.157	17.429	0.111	0.000	0.336	3586
Egypt	1.017	11.865	0.000	-0.271	0.271	7.104	0.002	2.831	0.189	2.505	0.009	0.332	0.031	3586
Hungary	1.020	17.387	0.000	0.583	1.233	22.056	0.000	0.227	1.027	6.700	0.985	0.201	0.366	3586
India	0.931	9.263	0.001	1.910	0.364	5.967	0.000	0.588	0.872	20.586	0.286	0.000	0.182	3586
Indonesia	0.917	36.124	0.001	1.707	0.369	5.483	0.000	0.377	0.761	12.281	0.240	0.000	0.097	3586
Israel	0.991	31.689	0.000	1.872	0.682	18.570	-0.001	-1.412	0.585	8.465	0.048	0.216	0.249	3586
Korea	0.918	37.092	0.001	3.059	0.921	14.263	-0.001	-1.567	0.933	15.623	0.002	0.893	0.190	3586
Kuwait	1.117	27.914	0.001	3.231	0.056	1.468	-0.021	-0.430	0.547	0.326	0.653	0.770	0.001	1040
Malaysia	1.008	29.970	0.000	1.764	0.266	9.079	0.001	2.027	0.417	12.808	0.787	0.001	0.089	3586
Mexico	1.079	18.069	0.001	2.729	1.082	31.878	0.000	0.198	1.154	26.895	0.346	0.177	0.537	3586
Pakistan	0.781	52.005	0.001	3.271	0.049	1.722	-0.002	-2.047	0.100	1.940	0.003	0.395	0.006	3586
Peru	0.951	52.737	0.001	3.281	0.143	4.077	0.000	1.308	0.556	15.127	0.345	0.000	0.201	3586
Philippines	0.996	32.464	0.000	1.240	0.302	9.757	0.000	0.414	0.457	7.037	0.710	0.027	0.068	3586
Poland	0.581	20.663	0.000	-0.011	0.528	5.233	0.000	0.804	1.181	28.153	0.787	0.000	0.367	3586
Romania	0.330	22.793	0.000	0.051	0.097	1.186	0.000	1.278	1.043	14.916	0.658	0.000	0.191	3586
Russia	0.405	17.443	0.002	2.949	0.931	8.780	0.000	1.043	1.392	16.511	0.000	0.030	0.258	3586
Slovenia	0.992	93.404	0.001	2.488	0.288	7.365	0.000	-1.599	0.646	11.719	0.006	0.000	0.191	3262
South Africa	0.710	45.495	0.001	1.737	0.600	12.258	0.000	1.404	1.318	33.490	0.501	0.000	0.438	3586
Sri Lanka	0.977	11.616	0.001	2.144	0.045	1.582	0.000	-0.157	0.068	2.119	0.295	0.600	0.001	3586
Taiwan	1.013	32.037	0.001	1.837	0.570	11.343	-0.001	-1.382	0.530	10.575	0.026	0.585	0.119	3586
Thailand	0.977	19.664	0.001	1.866	0.605	13.814	0.000	-0.329	0.623	6.243	0.356	0.870	0.128	3586
Turkey	0.954	18.302	0.001	1.568	1.163	18.505	0.000	-0.146	0.994	3.845	0.549	0.526	0.162	3586
Venezuela	0.913	15.216	0.001	1.672	0.063	2.240	-0.002	-2.958	0.202	2.520	0.001	0.105	0.001	3586

This table shows the estimated parameters of the two-regime logistic smooth transition regression model for the period January 1999 – September 2012. The regime variables are the one-day-lagged RPEs. Panel A and Panel B present the results for developed and emerging markets, respectively. The steepness parameter of the logistic function is fixed at 100 in all the regressions. The t-statistics account for possible heteroskedasticity and autocorrelation in the residuals applying the Newey and West (1987) consistent covariance matrix estimator. The reported p-values are in reference to Wald F-statistics that test the null hypothesis that the alphas and betas are different under the two regimes.

4.3 Comparing the regime forecasting ability of P/E variants

In this section we review our previous results and compare the regime forecasting ability of the employed P/E ratios. We count how many significant ‘mistakes’ have been made by the different P/E ratios in the full sample period at a 90% confidence level. In developed markets if a market exhibits lower risk and/or higher abnormal return when P/E is at a low level is considered as a mistake. In emerging markets we assume that local P/E ratios can indicate possible under/overpricing, hence we take as a mistake if lower market risk and/or higher alpha couples with high P/E levels. Global P/E ratios work the same way either in developed or in emerging markets, thus the model is at fault if lower P/E results in lower systematic risk and/or higher abnormal return. Finally RPE based models are mistaken if low valuation level comes with higher risk and/or lower alpha.

In developed markets it does not matter which ratio we apply. It cannot be taken as a mistake if a model registers adverse results for Japan, HK, Luxembourg, Singapore or the US, since it can be the consequence of the flying-to-quality effect. If we exclude these markets only the forward-looking RPE is inferior. However, in emerging markets it is of importance which ratio is employed. The local P/E based models are the least reliable and the best performers are the models with RPE being the regime variable. Although the forward-looking RPE has made fewer mistakes, but resulted in not significantly different betas in the two regimes in many cases, thus the application of the historical RPE can be advised in emerging markets.

Table 16 The performance of regime variables (1985-2012)

	Panel A - Developed Markets											
	Forward Local P/E		Forward World P/E		Forward RPE		Local P/E		World P/E		RPE	
	α	β	α	β	α	β	α	β	α	β	α	β
Australia	0	0	0	0	0	0	0	0	0	0	0	0
Austria	0	0	0	0	0	0	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0	0	0	0	0	0
Canada	0	1	0	0	0	0	0	0	0	0	0	0
Cyprus	0	0	0	0	0	1	0	0	0	0	1	1
Denmark	0	0	0	0	0	0	0	0	0	0	0	0
Finland	0	1	0	1	0	0	0	1	0	1	0	0
France	0	0	0	0	0	0	1	0	0	0	0	0
Germany	0	0	0	0	0	1	0	0	0	0	0	0
Greece	0	0	0	0	0	1	0	0	0	0	0	0
Hong Kong	1	0	1	1	0	1	0	0	0	0	0	1
Ireland	0	0	0	0	0	0	0	0	0	0	0	0
Italy	0	0	0	0	0	1	0	0	0	0	1	1
Japan	0	1	0	1	0	0	0	1	0	1	0	0
Luxembourg	1	1	0	0	0	0	0	0	0	0	0	0
Netherlands	0	0	0	0	0	0	0	0	0	0	0	0
Norway	1	0	0	0	0	0	0	0	0	0	0	0
New Zealand	0	0	0	0	0	1	0	0	0	0	0	0
Portugal	0	0	0	0	0	0	0	0	0	0	0	0
Singapore	0	0	0	0	0	0	0	0	0	1	0	0
Spain	0	0	0	0	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	0	0	0	0	0	0	0	1
Switzerland	0	0	0	0	0	0	0	0	0	0	0	0
United Kingdom	0	0	0	0	0	1	0	0	0	0	0	0
United States	0	1	0	1	0	0	0	1	1	1	0	0
Sum	3	5	1	4	0	7	1	3	1	4	2	4

	Panel B - Emerging Markets											
	Forward Local P/E		Forward World P/E		Forward RPE		Local P/E		World P/E		RPE	
	α	β	α	β	α	β	α	β	α	β	α	β
Argentina	0	0	0	1	0	0	0	0	0	1	0	1
Brazil	0	0	0	0	0	0	0	0	0	0	0	0
Bulgaria	0	0	0	0	0	0	1	0	0	0	0	0
Chile	0	0	0	0	0	0	0	0	0	0	0	0
China A	0	0	0	0	0	0	0	1	0	0	0	0
China	0	0	0	0	0	0	0	0	0	0	0	0
Columbia	0	0	1	0	1	0	1	0	1	0	1	0
Czech Republic	0	1	0	0	0	0	0	0	0	0	0	0
Egypt	0	0	0	0	0	0	0	1	0	0	0	1
Hungary	0	1	0	0	0	0	0	1	0	0	0	0
India	0	0	0	0	0	0	0	0	0	0	0	0
Indonesia	0	0	0	0	0	0	0	0	0	1	0	0
Israel	0	0	0	1	0	0	0	0	0	1	0	1
Korea	0	1	0	0	0	0	0	1	0	0	0	0
Kuwait	0	1	0	0	0	1	0	0	0	0	0	0
Malaysia	0	0	0	1	0	0	0	0	0	1	0	0
Mexico	0	0	0	1	0	0	0	0	0	0	0	0
Pakistan	0	0	0	0	0	0	0	0	0	0	0	0
Peru	0	0	1	0	0	0	0	0	0	0	0	0
Philippines	0	0	1	0	0	0	0	1	0	0	0	0
Poland	0	0	0	0	0	0	0	1	0	0	0	0
Romania	0	0	0	0	0	0	0	0	0	0	0	0
Russia	0	0	0	0	1	0	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	1	0	0	0	0
South Africa	0	0	0	0	0	0	0	1	0	0	0	0
Sri Lanka	0	0	1	0	0	0	0	0	0	0	0	0
Taiwan	0	1	0	0	0	0	0	1	0	0	0	0
Thailand	0	0	1	0	0	0	0	0	0	0	0	0
Turkey	0	1	0	0	0	0	0	1	0	0	0	1
Venzuela	0	0	1	1	0	0	0	1	1	1	0	0
Sum	0	6	6	5	2	1	2	10	2	5	1	4

5. Conclusion

We have overviewed international stock returns under a regime-switching asset pricing framework in which the state variables were different price-to-earnings variants. The results show strong evidence that it is worth for investors to follow P/E levels of potential target markets. Although, forming successful investment decisions only on P/E ratios is viable but needs special care. Undervalued or overvalued local markets can be detected based on P/E ratio of the local market only under special conditions and buy or sell side signals can easily be misleading both in developed and emerging markets. Tracking the P/E ratio of a world index is worthwhile but on its own is not sufficient to make an established investment decision because it is just the reflection of investors' sentiment but neglects the characteristics of local stock markets. We propose using the relative P/E (RPE), which is the ratio of local P/E to global P/E. RPE has outperformed other P/E variants in distinguishing between expensive and cheap stock markets. Our estimates also show that forward-looking P/E ratios are not better than their historical counterparts when one aims to detect cheap and expensive stock markets.

Future research is needed in the direction to three-regime models, which are ideally able to concentrate on the most extreme cases when a market is severely under or overpriced. Furthermore, applying a similar approach to ours, one could replace the P/E ratios with cash flow yield, dividend yield or book-to-market ratio as well.

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