

The Relative Importance of Industry and Country Influences

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Abstract: The relative importance of industry and country influences on stock returns has long been a subject of debate, despite consistent anecdotal evidence in support of increasing global integration. In this paper we summarise the literature on the subject and describe our research which indicates that, within Europe at least industry membership is more important than country membership.

The Relative Importance of Industry and Country Influences

In the past decade the industry/country debate has been a hot topic, with highly-respected academics arriving at quite different conclusions. Beckers et al¹ wrote that “global and national influences are of roughly equal importance”, while Heston and Rouwenhorst² found that “industries explain less than 1% of country index volatility.” With the recent FAJ publication of Rouwenhorst’s latest research³, concluding that “[in Europe] country effects continue to dominate industry effects” it is clear that, post-EMU, the industry/country debate is still very much alive.

At ABN AMRO Asset Management we believe that companies are increasingly operating in a global market-place, that a global industries approach is the right way for us to add value to our Equity portfolios and that, in Europe in particular, industry effects are becoming as important as country influences. This belief is supported by the on-the-ground observations of industrial structure from our portfolio managers and industry analysts. They see, for example, that GM and Chrysler face similar challenges to Toyota in the global market-place for Automobiles, and that the profitability of the UK company Glaxo/Wellcome is related to the success of the Canadian company, Biochem Pharma, in one of their strongest franchises, the HIV market. Despite this anecdotal support, the research evidence on the subject has been unclear and contradictory.

What the academics say

One of the simplest ways to see the changing relationship between country and industry factors is to analyse the correlations of country and industry indices over time: however, correlations don’t provide us with hard evidence about the relative importance of industry and country factors. Why is that?

In practice, industries differ in their geographical distribution and countries differ in their industrial make-up. This means that when we observe a change in correlation between two indices we don’t know if it’s the result of the industry element of the index return or the country element. As one example, the Swiss market index has a more than 40% exposure to the Health industry, where the Italian index is un-represented. Is the relatively low correlation of the Swiss market with Italy (0.28 since 1990) due to its Swiss-ness or its Health exposure?

¹ Beckers, Connor and Curds: “National versus Global Influences on Equity Returns”, Financial Analysts Journal Vol 52, No 2 April 1996 pp 31-39

² Heston and Rouwenhorst: “Does Industrial Structure explain the benefits of international diversification?” Journal of Financial Economics Vol 36 Issue 1, June 1994, pp 3-27

³ Rouwenhorst, Geert: “European Equity Markets and EMU: Are the differences between countries slowly disappearing?” Financial Analysts Journal, May/June 1999

Given the above, the majority of industry/country research in the past decade has focused on isolating “pure” country and industry impacts. In the early 1990s, the BARRA group of Beckers, Grinold, Rudd and Stefek had published a paper which looked at Europe only and carried out analysis at the stock level. They found **that industry factors alone explained 21% of volatility**. However, in making that statement it seems that the group were capturing at least part of a “general market” influence in their industry factors and that the additional explanation provided by industry factors was only around 5%.

A few years later Heston and Rouwenhorst ran a stock level analysis within Europe using monthly data and a broad seven sector industrial classification. They used an approach which has been generally adopted since then, estimating industry and country factors returns for each period by giving each stock a 1/0 exposure to the various industry and country factors and estimating “best fit” factor returns. They explicitly included a general market factor in their estimation, so that the returns to industries and country factors can be thought of in excess return terms. In their conclusions they focused on their equal-weighted result **that industry factors explained less than 1% of the variation in index returns**. However, the value-weighted results found a somewhat higher level of explanation, just over 7%.

In 1996 Beckers, with Connor and Curds, published a further piece which is particularly interesting as it provides a comparison between Global and European results and the use of broad Sector and finer Industry categorisations. They adopted the Heston and Rouwenhorst estimation methodology, using an equally-weighted approach. They found that Sectors provided less explanation than the finer Industry divisions, that Industry effects were relatively more important within Europe than Globally and that there was **strong evidence of a trend towards integration in Europe**. Although they stated in their conclusion that **“global and national influences are of roughly equal importance”** they found relatively limited industry effects at a global level (an additional 5% explanation from the finer Industry classification).

However, their results within Europe do suggest a different pattern from the Heston and Rouwenhorst work, with **country effects having only 1.4x the impact of industry effects**, versus Heston and Rouwenhorst’s equally-weighted result that country effects had around 2.1x the impact of industry effects. The differences are likely to be mainly due to the different data period (Beckers included post-Maastricht data in his analysis) and the different industry classification (for this result, Beckers was using 36 industries rather than Heston and Rouwenhorst’s 7 sectors). Currency may also be a factor as Beckers has used local currency excess returns while Heston and Rouwenhorst made their estimation in DM terms.

With the arrival of the single European currency, Rouwenhorst directly addresses the question of increasing European integration post-Maastricht in his recent paper in the Financial Analysts Journal. Using the same approach as Heston and Rouwenhorst (1994) and again using the seven sector classification, he looked at data from 1978 to August

1998, both in total and by five-year period. In his summary he concluded **that country effects continue to dominate industry effects in Europe** and that, quite surprisingly, there is **no evidence of an increase in integration post-Maastricht**.

In April 1999, Frank Russell published a research commentary: “Risk Contributors: Country versus Sector”⁴ which concluded **that “country effect was more important ... than the sector effect.”** They looked at 22 global developed countries from May 1993 to January 1998 using both 12 Economic sectors and the 38 MSCI Industries. Following the methodology in a Griffin and Karolyi paper of 1998, rather than working with stock level information, they used returns to the MSCI Country/Industry sub-indices to estimate “pure” factor country and sector returns. On a global basis, using the broad sector factors, they found that country factors had 2.3x the impact of industry factors. However, using the finer industry classing, the ratio fell to 1.6x.

Clearly the various researchers have produced some conflicting results and the differences generally arise from three main factors:

- geographical scope of study (Europe vs Global)
- industry classification (broad sectors vs finer industries)
- data period (within Europe, pre- and post- Maastricht)

Logically, we would expect a broad sector approach to have difficulty identifying the true “industry” effects as, for example, Publishing stocks will be grouped in the same class as Shipping companies.

For our purposes, to allow proper comparison across papers and methodologies, we chose to calculate a relatively crude “common” statistic from three key papers. The statistic we calculated was the ratio of the standard deviation of country effects to industry effects, where the standard deviation has been simply averaged and the data frequency is unimportant, given the ratio. We refer to this as the Common Ratio and the results are summarised in the table below.

Table: Common Ratio – Summary of Research on Relative Importance of Countries and Industries (measured as the ratio of the average standard deviation of “pure” country effects to the average standard deviation of “pure” industry effects)

<i>Industry Classification</i>	<i>Global pre-92</i>	<i>Global post-92</i>	<i>Europe-only Pre-92</i>	<i>Europe-only post-92</i>
Broad (Sector)	n/a	2.3x (b)	2.1x (c)	1.7x (c)
Narrow	2.3x (a)	1.6x (b)	1.4x (a)	?

Source Notes:

(a) Beckers et al (1996): Data 1982 - 1995

(b) Frank Russell (1999): Data 1993-1998: from Tables C3 and C4

(c) Rouwenhorst (1999): Data 1978-1992; 1993-1998:8

⁴ Frank Russell Research Commentary: “Risk Contributors: Country versus Sector” Wenling Lin, April 1999

Why should a high standard deviation indicate greater importance for one class of factors? If a factor is going to explain variability in returns it has to have some variability itself. Other things being equal, the more variation a factor has, the more variation in returns it can explain.

In this case, a ratio greater than 1 indicates that countries are more important than industries, a ratio of 1 would indicate equivalence and a ratio less than 1 would indicate a greater role for industry factors than country factors.

The obvious points to make are:

- improving the industry classification from “broad” to “narrow” appears to increase the relative importance of industries
- industries appear to play a more significant role within Europe than they do worldwide
- within Europe, the relative importance of industries appears to be increasing recently

All these ratios are greater than 1, suggesting that industry specific factors are still less important than country specific factors. However, there is one recent result that is missing in the table: the most recent period for Europe using the “narrow” industry classification. Given the increased importance of industries when analysed using that finer classification, we felt it likely that such an analysis would show that industries are now of equivalent importance within Europe. That is the subject of the second part of this article.

Our Research

We used the same approach as Griffin and Karolyi in their 1998 paper and calculated “pure” country and industry returns using the monthly returns to MSCI Country/Industry indices for fifteen developed European countries and thirty⁵ MSCI industries from 1993(7) to 1999(2). Given the time series of “pure” country and industry returns we were able to calculate standard deviations for each factor return over time.

Although we did carry out analysis using the “sector” classification and found results similar to Rouwenhorst (1999), our real interest was in the results using the “industry” classification. The table below shows the results based on the fine industry (30) and country (15) classification.

The Common Ratio for these results (ratio of the standard deviation of country effects to the standard deviation of industry effects) was calculated as 1.0x using the simple average, 1.0x using the median and 0.9x using the weighted average - **a result indicating that industry effects are now at least as important as country effects within Europe.** The chart overleaf, ranking standard deviations, and showing country factors blue and industry factors yellow now shows a real inter-leaving of industry and country factors – with no clear pattern of dominance for either countries or industries.

Hence, it does seem that post-Maastricht, industry influences are now at least as important in Europe as country-specific factors.

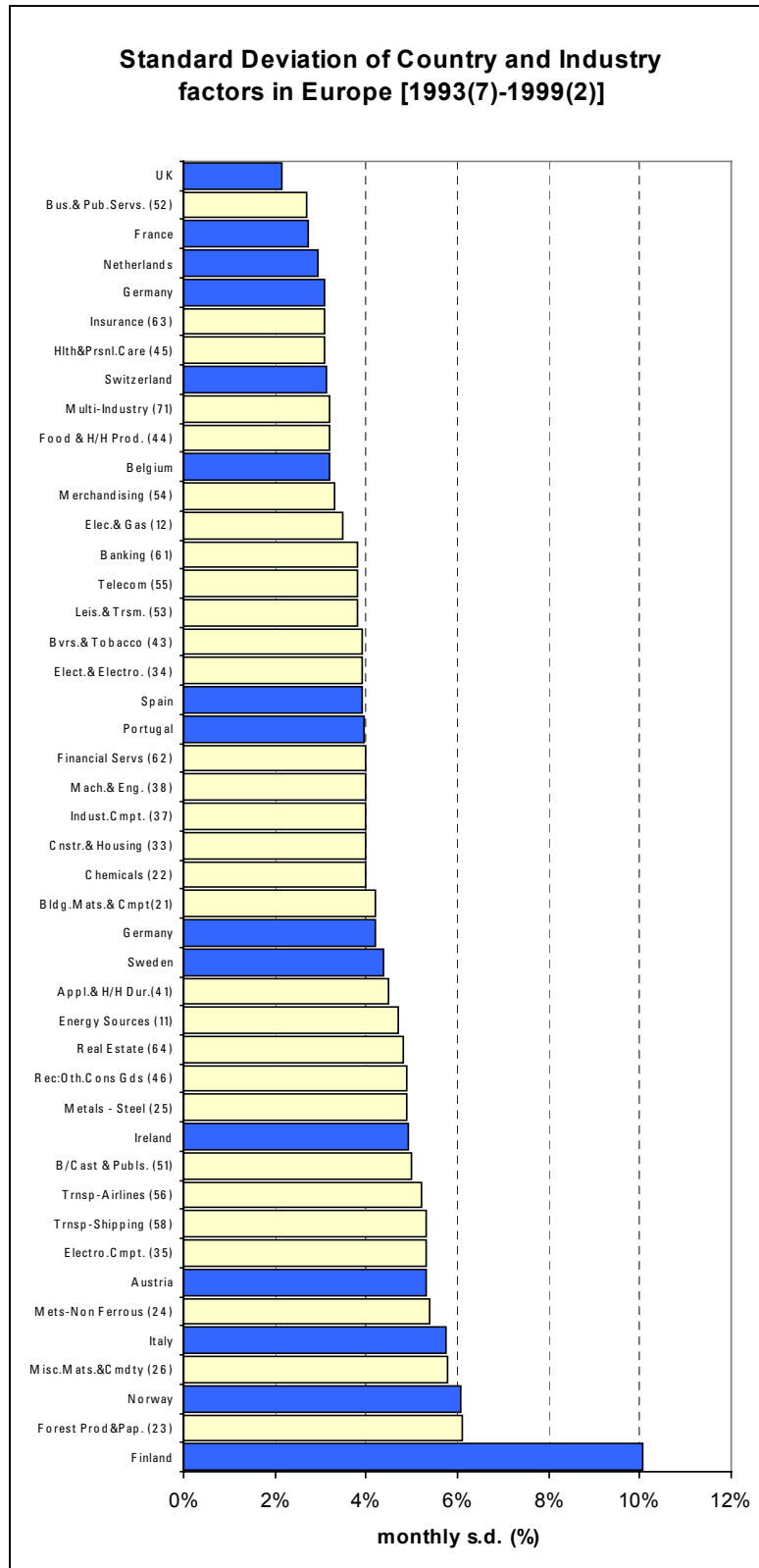
⁵ The MSCI Europe universe consists of 37 industries. In order to achieve a robust overall result, we excluded from the analysis MSCI industries with very low weights (i.e. an industry is excluded if a market weight (Feb 99) is lower than 0.2%). Excluded industries were Misc. Materials (26), Data Processing (33), Energy Equipment (36), Appliances (41), Textiles (47), Transportation – Roads & Rail (57) and Trade (59).

Table: Factor Standard Deviations: 1993-1999 (15 country 30 industry classes)

Pure Industry Effect	Mean	Stdev	Pure Country Effect	Mean	Stdev
Energy Sources (11)	-0.1%	4.7%	Austria	-1.3%	5.3%
Elec.& Gas (12)	-0.1%	3.5%	Denmark	0.0%	3.1%
Bldg.Mats.& Cmpt(21)	-0.9%	4.2%	Belgium	0.6%	3.2%
Chemicals (22)	-0.4%	4.0%	Germany	-0.3%	4.2%
Forest Prod&Pap. (23)	-2.0%	6.1%	Spain	0.7%	3.9%
Mets-Non Ferrous (24)	-0.9%	5.4%	France	-0.1%	2.7%
Metals - Steel (25)	-0.6%	4.9%	Italy	0.3%	5.7%
Aero & Mil. Tech (31)	0.3%	5.8%	Netherlands	0.1%	3.0%
Cnstr.& Housing (32)	-0.9%	4.0%	Norway	-0.4%	6.1%
Elect.& Electro. (34)	-0.2%	3.9%	Sweden	0.5%	4.4%
Electro.Cmpt. (35)	-0.3%	5.3%	Switzerland	-0.2%	3.1%
Indust.Cmpt. (37)	-0.7%	4.0%	UK	-0.1%	2.2%
Mach.& Eng. (38)	-0.2%	4.0%	Portugal	-5.6%	4.0%
Autos (42)	0.4%	4.5%	Ireland	1.1%	4.9%
Bvrs.& Tobacco (43)	0.0%	3.9%	Finland	3.5%	10.1%
Food & H/H Prod. (44)	-0.1%	3.2%			
Hlth&Prsnl.Care (45)	0.7%	3.1%			
Rec:Oth.Cons Gds (46)	-1.1%	4.9%			
B/Cast & Publs. (51)	0.1%	5.0%			
Bus.& Pub.Servs. (52)	0.3%	2.7%			
Leis.& Trsm. (53)	-0.2%	3.8%			
Merchandising (54)	-0.3%	3.3%			
Telecom (55)	0.6%	3.8%			
Trnsp-Airlines (56)	-0.1%	5.2%			
Trnsp-Shipping (58)	-0.3%	5.3%			
Banking (61)	0.3%	3.8%			
Financial Servs (62)	1.1%	4.0%			
Insurance (63)	0.1%	3.1%			
Real Estate (64)	-0.7%	4.8%			
Multi-Industry (71)	-1.2%	3.2%			

	Unweighted	Cap weighted
Average Stdev of Country effects	4.2%	3.2%
Average Stdev of Industry effects	4.0%	3.6%
Common Ratio	1.0	0.9
Median Stdev of Country effects	4.1%	
Median Stdev of Industry effects	4.0%	
Common Ratio	1.0	

Chart: Variability Comparison for Country and Industry Factors in Europe



Summary and Conclusion

The relative importance of industry and country influences on stock returns has long been a subject of debate, despite consistent anecdotal evidence in support of increasing global integration. Summarising the academic research we found that:

- industries were relatively more important in Europe than globally
- using a finer industry classification shows more impact for industrial influences than the broad sector classes, and
- industry influences were increasing in Europe post-Maastricht.

In all the pure factor research we analysed, the results showed that country influences remained dominant over industry effects. However, we noticed an absence of “pure” factor analysis for Europe post-Maastricht, using the fine industry rather than broad sector classification. This encouraged us to undertake our own analysis using the “pure” factor approach for Europe since 1992. We used both sector and industry classifications and found that our sector results were consistent with the literature. Moving to the more natural industry classification (where Publishing, Shipping and Tourism are no longer treated as subject to the same influences) we found that, as anecdotal evidence suggested, in post-Maastricht Europe, industrial effects are now as important as national influences. The overall research is summarised in the table below.

Table: Common Ratio – Summary of Research on Relative Importance of Countries and Industries
(measured as the ratio of the average standard deviation of “pure” country effects to the average standard deviation of “pure” industry effects)

<i>Industry Classification</i>	<i>Global pre-92</i>	<i>Global post-92</i>	<i>Europe-only pre-92</i>	<i>Europe-only post-92</i>
Broad (Sector)	n/a	2.5x (b)	2.1x (c)	1.7x (c)
Narrow	2.3x (a)	1.6x (b)	1.4x (a)	1.0x (d)

Source Notes:

(a) Beckers et al (1996): Data 1982 - 1995

(b) Frank Russell (1999): Data 1993-1998

(c) Rouwenhorst (1999): Data 1978-1992; 1993-1998:8

What of the future? We believe that the relationship between industry and country factors will continue to evolve. In particular, as barriers to cross-border movements of people and goods are removed in Europe, we expect to see increasing geographical specialisation, in line with the US experience where technology is concentrated in California and finance on the East Coast. **We believe the implications for asset managers are clear: a pure country-oriented approach to stock investing will miss its mark and the benefits of a cross-country industry approach will only increase over time.**

Bibliography

Beckers, Grinold, Rudd and Stefek: "The Relative Importance of Common Factors across the European Equity Markets" *Journal of Banking and Finance* 16, 1992, pp 75-95:

Heston and Rouwenhorst: "Does Industrial Structure explain the benefits of international diversification?" *Journal of Financial Economics* Vol 36 Issue 1, June 1994, pp 3-27:

Heston and Rouwenhorst: "Industry and Country Effects in International Stock Returns" *Journal of Portfolio Management* 21 Spring 1995 pp 53-58:

Beckers, Connor and Curds: "National versus Global Influences on Equity Returns" *Financial Analysts Journal* Vol 52, No 2 April 1996 pp 31-39:

Roll: "Industrial Structure and the comparative behaviour of international stock market indices" *Journal of Finance* 47, 1992 pp 3-42:

Griffin and Karolyi: "Another look at the role of the industrial structure of markets for international diversification strategies" *Journal of Financial Economics* Vol 50 (1998) 351-373,

Rouwenhorst "European Equity Markets and EMU: Are the differences between countries slowly disappearing?" Draft: October 1998 (forthcoming)

Peter Martin: "Invest in New Habits: Fund Managers should move towards absolute performance measurement and away from a geographical spread of assets" *Financial Time* (16-Feb-99)

Eric Lambert, WM Company: "Letters to the Editor: No Interest in Short Term aberrations of the market" *Financial Times* (23-Feb-99)

Morgan Stanley: "Leading the Way in a Changing World" Morgan Stanley SICAV In Focus: Special Edition (Winter 1998/1999)

Frank Russell Company: "Interview with Credit Suisse Asset Management: Implications of EMU" *Russell Funds: Issue 16 - Winter 1998*

Morgan Stanley Dean Witter Quantitative Strategies: "European Investing after EMU - Part II: Industry and National Effects in Equity Returns" June 11, 1998

Morgan Stanley Dean Witter Quantitative Strategies: "Country versus Industry Factors in European Stock Returns" March 14, 1997