

Country Betas and Potential Gains From Diversification in the European Union

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I. Introduction:

Europe has undergone a significant change in its geopolitical landscape since 1990 when the reunification of East and West Germany took place. The break-up of the former Soviet Union gave birth to several independent nations in Central and Eastern Europe. The political freedom brought with it the economic freedom as well to these countries. A new era of capitalism was born in central and eastern Europe. Country after country began setting up stock exchange of its own. While capitalism was taking root in the central and eastern parts of Europe, Western Europe was conducting its own economic experiment by forming European Monetary Union (EMU). The member nations of the European Union agreed in principle to form a single market and a single currency. A strategic plan of economic and monetary convergence went into effect in phases and the new currency, Euro was born. The Euro was adopted by 12 of the 15 EU nations. Britain, Sweden and Denmark were expected to adopt later. In December of 2002, the EU members met in Copenhagen and agreed to admit ten new members into the Union from the central and eastern parts of Europe. The European Union currently has a total of 25 nations under its umbrella with a combined population of nearly 445 million people and gross domestic product of 8.5 trillion dollars.

All the longstanding members of the EU have well established equity markets. The ten new members of the Union also established their own stock markets and they are functioning fairly well for the past ten years. Research studies conducted and reported during the last five years showed that the central European stock markets are not yet integrated with the stock markets of the EMU members such as Germany. Gilmore and McManus (2003) conducted co-integration tests on stock markets of Germany, Poland, the Czech Republic and Hungary. They found no long-term relationship between the German market and the three central European markets. Naidu and Choudhury (2004) conducted co-integration tests on stock markets of France and the ten new members of the Union and found that the stock markets are not yet integrated. The lack of integration among the 25 EU stock markets offers an opportunity for investors in and outside of EU to diversify and reduce risk. Gilmore and McManus (2002) examined this very specific issue. They found that the U.S. investors and German investors can reduce risk by diversifying their equity portfolios into the central European equity markets such as Poland, Czech and Hungary.

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II. Purpose of this Research:

In this paper we accomplish three things: First, we examine the return/risk characteristics in all EU equity markets. Second, we investigate the correlation structure of returns among the 25 EU equity markets. Finally, we combine the correlation structure and the individual equity market variances to estimate country betas. It is our belief that a country's beta estimate offers a better insight to judge the extent of risk reduction achievable through international diversification. At this juncture in the paper the reader is better served if we offer an explanation for the concept of country beta.

III. Theoretical Background:

Harry Markowitz(1959) popularized the idea of risk reduction through diversification. The correlation structure of returns determines the extent of benefits derived through diversification. Sharpe's theory of capital market equilibrium introduced the concept of beta. The beta of an asset reflects variability of its return relative to the variability of market's return. Thus beta is a relative risk measure. Individual asset's beta is calculated relative to a specific market index such as S&P500. In global capital market environment, we have several national equity markets and if we aggregate all the national equity markets we will have a huge world (global) equity market. Each national equity market has its own degree of volatility. However, its volatility relative to each other market will be different. In the same way an equity market's volatility relative to an index of world equity market will be different. Just as we estimate the risk (beta) of an asset relative to a market index we can estimate the risk (beta) of a national equity market relative to world equity market index. We call this risk estimate of a national equity market, country beta. Therefore, a country's beta is the measure of its market's sensitivity to world market variability. Bekaert and Havey (1997) concluded that market volatility is a function of the openness of its economy. Therefore, a country's beta is indicative of integrator. The smaller the beta, the more segmented is the country's market and hence better will be the gains from diversification. Similarly, we can also study the sensitivity of a given equity market to the movements of another equity market of our interest. For example, if we want to know how sensitive the Polish equity market is relative to the movements in German equity market, we can examine this relationship by estimating country beta for Poland with respect to the German equity market. Shapiro (2003) demonstrated this methodology in his book (p.517). A country's market beta is estimated as follows:

Market beta for country, i with respect to France

$$= [\text{Correlation of market, i with French market}] \times \frac{[\text{Std. Devn. of market, i}]}{[\text{Std.Devn. of French Market.}]}$$

$$\beta_i = \rho_{i,F} \left(\frac{\sigma_i}{\sigma_F} \right)$$

where $\rho_{i,F}$ = Correlation coefficient between i^{th} market returns and French market returns

σ_i = Standard deviation of i^{th} market returns

σ_F = Standard deviation of French market returns

A small beta value for a country implies a higher unsystematic risk in that market. Therefore, a smaller country beta offers greater potential for the benefits of diversification. On the contrary, a higher value for a country's beta implies smaller potential for gains from diversification.

Correlation and Benefits of Diversification: Markowitz (1959) theorized that the smaller the degree of correlation the greater is the benefits of diversification. However, this theory looks too simple when it comes to global diversification. In a global market, it is possible for a pair of countries to have the same degree of correlation with a third country and yet have different values for individual market risk. For example,

$$\begin{aligned} \rho_{F,US} &= 0.25 & \sigma_F &= 28.8\% & \beta_F &= 0.40 \\ \rho_{N,US} &= 0.25 & \sigma_N &= 35.5\% & \beta_N &= 0.50 \end{aligned}$$

In this example, the difference in individual standard deviations produced different country betas. That means even though France and Norway had the same degree of correlation (0.25) with the U. S. market, their country betas imply that French market offers better gains from diversification than the Norwegian market does. This example demonstrates that gains from diversification can be estimated better by using country betas rather than the simple correlation coefficients.

By generalizing this theory we can develop the following equation:

Market beta for country i with respect to World Market
 = [Correlation of market, i with World Market] X
 [Std.Devn. of market, i / Std.Devn. of World Market.]

$$\beta_i = \rho_{i,W} \left(\frac{\sigma_i}{\sigma_W} \right)$$

where $\rho_{i,W}$ = Correlation coefficient between i^{th} market returns and World Market returns

σ_i = Standard deviation of i^{th} market returns

σ_W = Standard deviation of World Market returns

IV. Data and Methods

The data base for this study was obtained from Global Financial Data, Inc., The data covers the period, 1995-2002. Daily data for all the stock market indices of the EU region were obtained. Daily returns were computed and then the daily returns were annualized. Summary statistics of annualized daily returns appear in Table I. The correlation structure of returns has been the basis for judging the diversification (risk reduction) potential. Therefore, we estimated the correlation structure of annualized daily stock returns among the EU equity markets. The correlation structure of returns is presented in Table II. As pointed out earlier in the paper, for certain markets the correlation structure does not give us adequate picture of diversification potential when we are looking for global diversification. So we proposed country market's beta as a better indicator of its diversification potential. Therefore, we estimated country betas for all the EU stock markets by taking three different perspectives. First, a set of betas was estimated by taking the French market's perspective. Then a second set of betas were estimated from the German perspective. While France and Germany are Euro-zone countries, Great Britain is not. We, therefore, estimated a third set of country betas from the British perspective. These country betas are reported in Table III. We are extending this procedure to estimate country betas from the World Market perspective. We have used Morgan Stanley Capital International Index to represent World Equity Market.

V. Presentation and Discussion of Results

A quick look at Table II reveals that the stock markets in the Euro-zone countries are positively correlated. Although the correlation coefficients have increased somewhat in recent years after the introduction of Euro, they are not high enough to rule out the benefits of diversification. The stock markets in the ten new members of the EU portray a different picture. The data, however, covers pre-EU period for the ten new member countries. The correlation coefficients are smaller in size and some members even have negative correlations with few other members in the group. Latvia and Cyprus, Lithuania and Cyprus, Latvia and Slovenia are good examples of this situation. The correlation coefficients between Euro-zone countries and nonmembers of the Euro-zone offer yet another interesting perspective. Some Euro-zone countries are negatively correlated with a few new members of the Union. Germany, for example, is negatively correlated with Latvia and Lithuania. Ireland is also negatively correlated with Latvia. The results presented in Table II lead us to the inescapable conclusion that the stock markets in the new member countries of the Union offer better potential for risk reduction.

The estimates of country betas are reported in Table III. These betas give us a better insight into the diversification potential of each equity market. The smaller the beta value better will be the benefits of diversification. Latvia, Lithuania, Slovenia and Slovakia have the lowest beta values with respect to Germany, a leading member of the Euro-zone. The market beta for Luxemburg from German perspective is 0.17 and the beta for Austria with

respect to Germany is 0.19. It is understandable to see former Soviet states like Lithuania, Latvia, Slovakia and Slovenia to have small market betas compared to other members of the EU. Their economies have been isolated from the rest of the world during Soviet rule. In recent years following Perestroika, their economies have started restructuring away from the Soviet socialist model. The trade and investment flows with the European counterparts to their west are still pale by comparison. Their status of economic segmentation is simply reflected in their respective stock markets. Therefore, gains from diversification for German and French investors will be a lot better if they look to their neighbors to the east rather than to the west. Inside the Euro-zone, another interesting observation is made. That is, the market betas for Austria and Luxemburg from the German and French perspective appear to be lower than the betas for Spain and Italy. This pattern implies that if German and French investors want to invest within the Euro-zone, gains from diversification will be better if they look to Austrian and Luxemburg than what they gain by investing in Spain and Italy.

Great Britain is a member of the Union but not a member of Euro-zone. So, we wanted to see what type of pattern emerges if we estimate country betas from the British perspective. The results suggest that the British investors will gain more if they diversify their holdings into the equity markets of Slovenia, Slovakia and Latvia than what they gain by moving into Italy or Spain. The Irish stock market has lower beta from the German or French perspective than from the British perspective even though Ireland, Germany and France have a common currency, Euro. Irish equity market betas suggest that fellow Euro-zone investors from Germany and France gain more by diversifying into the Irish market than they would if they diversify into non-Euro country like Poland.

Country betas with respect to World Equity Index (MSCI) are shown in the last column of Table III. Here again the pattern is quite similar to the one we saw with respect to Germany and France. Investors from around the world stand to gain more by diversifying into Latvia, Lithuania, Slovenia and Slovakia than any other EU country.

VI. Conclusion

Finance literature has long used estimates of correlation coefficients between a pair of return series to assess the extent of risk-reduction potential by combining the two investments. This study proposes a different measure to assess the diversification potential of an equity market from international investor's point of view. This new measure is called country beta. This new measure, country beta is defined in section III above. We estimated country betas for twenty five countries in the European Union. The country beta estimates reveal that the investors in Germany and France stand to gain more by diversifying into the newer markets of EU such as Lithuania, Latvia, Slovakia and Slovenia compared to some other EU countries. The Austrian and Luxembourg markets also offer better diversification potential for the German and French investors. Another interesting finding is that the British investors will gain more if they diversify their holdings into the equity markets of Slovenia, Slovakia, and Latvia than what they could achieve by moving into Italy or Spain.

TABLE I

Summary Statistics of Annualized Daily Stock Market Returns (1995-2002)

Country	N	Mean	Median	StDev	Maximum	Minimum	Skewness	Kurtosis
Cyprus	1917	2.5488858	0	31.6957470	893.6944689	-73.9593645	14.2230712	355.6725672
Czech	1959	0.8404791	-0.2202844	15.2547195	93.4748667	-59.9074576	0.5863724	2.2367710
Estonia	1891	30.8465053	1.1087259	826.2549928	25476.59	-99.9898431	30.6703361	940.7866805
Hungary	1805	1.4285622	0.4745616	17.7759669	145.8237106	-71.4581002	0.9233754	5.7579520
Latvia	1582	3.6823361	0.3877321	32.0902704	296.7164932	-87.0226270	3.3448734	21.8482236
Lithuania	1398	2.8858019	-0.4206863	54.4876330	1314.81	-96.6435439	17.5529708	353.9727304
Poland	1980	2.9757436	-0.3399867	26.7694550	324.8173113	-86.1967853	1.7720358	12.8565057
Slovak	1835	0.9515931	0	17.8453509	212.5738564	-78.9253863	1.9769350	19.5010057
Slovenia	1986	1.6346053	0.4038777	19.9929185	574.9858303	-79.3391521	12.5994128	344.6629877
Turkey	1965	9.0483443	1.9690455	46.3611588	511.2565350	-95.0167645	2.8740885	19.3998038
Austria	1932	0.4682288	0.2587233	9.7901735	63.4932337	-58.5034115	0.0414492	3.9184102
Belgium	1987	1.0246734	0.5538661	14.2233192	109.5558910	-50.9953357	1.0513163	6.6704975
Finland	1986	3.9053381	1.4090732	29.1540748	359.5651229	-92.0347286	1.9297824	14.8486508
France	1998	1.6499400	0.5281739	18.2952352	114.7116958	-63.1399562	0.8080117	3.5004408
Germany	2001	1.7943586	1.2744343	19.6729528	132.2514159	-68.9247757	0.8745516	4.4727925
Greece	1983	2.3994573	-0.0795623	22.5395449	134.8641654	-72.1038721	1.3003305	5.1764373
Ireland	1989	0.9226702	0.8238323	12.6553921	88.4108176	-76.4445114	0.1249612	4.2592754
Italy	1994	1.4081553	0.8283195	15.8858683	101.8334634	-67.0908975	0.3168216	2.4785749
Luxemburg	1943	0.8548585	0.5388100	12.8844649	169.0104634	-67.8637374	1.8108062	22.1309704
Portugal	1935	0.7065645	0.2176396	11.0803746	112.2728546	-64.3566713	1.3784154	16.6381433
Spain	1977	1.7887675	1.0599107	18.3491907	104.1426819	-61.3439018	0.7196017	2.9673735
Netherlands	2005	1.6747920	0.7635748	18.2732613	129.8505368	-62.3696399	0.9817194	5.3400154
Denmark	1989	0.8538327	0.6153301	11.1493947	60.6162431	-48.5324469	0.2033139	2.7852160
Sweden	1990	1.6724513	0.7646658	18.1804048	194.2504979	-65.1219704	1.3726424	9.9668438
England	2001	0.9697102	0.5214161	14.1254732	75.7403602	-52.7829960	0.5265788	2.7048108

TABLE II
Correlation Coefficients of Annualized Daily Stock Market Returns (1995-2002)

Country	Cyprus	Czech	Estonia	Hungary	Latvia	Lithuania	Poland	Slovak	Slovenia	Turkey	Austria	Belgium	Finland
Cyprus	1.00												
Czech	0.06777 (0.0036)	1.00											
	0.00017 (0.9944)	-0.00681 (0.7716)	1.00										
Hungary	0.06267 (0.0099)	0.54450 (<.0001)	0.01594 (0.5016)	1.00									
	-0.00800 (0.7579)	0.03835 (0.1326)	0.00925 (0.7142)	0.06448 (0.0130)	1.00								
Lithuania	-0.00715 (0.7963)	0.01000 (0.7131)	0.02090 (0.4398)	0.03973 (0.1513)	0.24264 (<.0001)	1.00							
	0.03027 (0.1914)	0.35022 (<.0001)	0.04193 (0.0726)	0.58685 (<.0001)	0.03463 (0.1746)	0.04679 (0.0850)	1.00						
Slovak	0.04850 (0.0439)	0.02143 (0.3645)	0.01692 (0.4868)	0.02559 (0.3000)	-0.01303 (0.6254)	0.02919 (0.3081)	-0.01669 (0.4800)	1.00					
	0.00256 (0.9121)	0.04418 (0.0535)	-0.01904 (0.4151)	0.11479 (<.0001)	-0.00769 (0.7627)	0.01035 (0.7030)	0.04462 (0.0492)	-0.00913 (0.6988)	1.00				
Turkey	0.04810 (0.0400)	0.19993 (<.0001)	0.00526 (0.8235)	0.25159 (<.0001)	0.01635 (0.5261)	0.00418 (0.8795)	0.19938 (<.0001)	-0.01026 (0.6667)	0.03234 (0.1600)	1.00			
	0.03770 (0.1078)	0.25010 (<.0001)	0.02856 (0.2274)	0.31203 (<.0001)	0.03808 (0.1406)	0.00099 (0.9713)	0.34598 (<.0001)	0.00958 (0.6874)	0.05878 (0.0105)	0.18637 (<.0001)	1.00		
Belgium	0.03041 (0.1896)	0.26916 (<.0001)	0.04316 (0.0642)	0.25684 (<.0001)	0.00421 (0.8686)	0.01026 (0.7060)	0.29057 (<.0001)	0.04283 (0.0691)	0.05602 (0.0136)	0.13838 (<.0001)	0.43795 (<.0001)	1.00	
	0.02609 (0.2595)	0.36138 (<.0001)	0.02121 (0.3628)	0.32769 (<.0001)	0.01182 (0.6419)	0.00056 (0.9837)	0.37393 (<.0001)	0.05098 (0.0302)	0.01198 (0.5983)	0.18657 (<.0001)	0.35645 (<.0001)	0.43404 (<.0001)	1.0

P-values are provided in parentheses in the second row.

TABLE II (contd.1)

Correlation Coefficients of Annualized Daily Stock Market Returns (1995-2002)

Country	Cyprus	Czech	Estonia	Hungary	Latvia	Lithuania	Poland	Slovak	Slovenia	Turkey	Austria	Belgium	Finland
France	0.05905	0.35190	0.02385	0.29627	0.00888	0.02061	0.36543	0.02999	0.02069	0.16319	0.42642	0.68338	0.62046
	(0.0106)	(<.0001)	(0.3053)	(<.0001)	(0.7260)	(0.4463)	(<.0001)	(0.2029)	(0.3612)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Germany	0.04649	0.32458	0.04555	0.31528	-0.01817	-0.00470	0.37809	0.02259	0.01494	0.15891	0.46840	0.64761	0.58926
	(0.0440)	(<.0001)	(0.0497)	(<.0001)	(0.4734)	(0.8623)	(<.0001)	(0.3359)	(0.5097)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Greece	0.10191	0.23261	0.01691	0.29493	0.04706	-0.00883	0.17162	0.00287	0.03046	0.15795	0.19004	0.23346	0.23944
	(<.0001)	(<.0001)	(0.4693)	(<.0001)	(0.0652)	(0.7454)	(<.0001)	(0.9037)	(0.1810)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Ireland	0.04811	0.27269	0.00758	0.29338	-0.00344	0.02207	0.27390	0.04643	0.03246	0.17936	0.37091	0.41151	0.41171
	(0.0377)	(<.0001)	(0.7452)	(<.0001)	(0.8924)	(0.4164)	(<.0001)	(0.0488)	(0.1537)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Italy	0.05859	0.36484	0.05696	0.43263	0.02635	0.01417	0.39892	0.01681	0.07993	0.18604	0.47309	0.54338	0.49699
	(0.0110)	(<.0001)	(0.0144)	(<.0001)	(0.2998)	(0.6011)	(<.0001)	(0.4745)	(0.0004)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Luxembourg	0.06032	0.21727	0.01850	0.29726	0.03346	0.02047	0.24202	0.05463	0.07560	0.10304	0.24098	0.23749	0.28486
	(0.0098)	(<.0001)	(0.4324)	(<.0001)	(0.1931)	(0.4561)	(<.0001)	(0.0212)	(0.0010)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Portugal	0.07187	0.28178	0.05209	0.33373	0.02041	0.02430	0.38326	-0.01058	0.06168	0.16049	0.40604	0.40452	0.41789
	(0.0022)	(<.0001)	(0.0274)	(<.0001)	(0.4294)	(0.3783)	(<.0001)	(0.6575)	(0.0072)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Spain	0.03230	0.33919	0.02919	0.30577	0.01664	0.01755	0.33324	0.00926	0.02475	0.17503	0.43546	0.61236	0.57986
	(0.1634)	(<.0001)	(0.2119)	(<.0001)	(0.5143)	(0.5194)	(<.0001)	(0.6951)	(0.2775)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Netherlands	0.04628	0.34997	0.03988	0.30476	0.01886	0.01955	0.36934	0.02314	0.01139	0.16616	0.46295	0.75139	0.62205
	(0.0452)	(<.0001)	(0.0860)	(<.0001)	(0.4571)	(0.4709)	(<.0001)	(0.3244)	(0.6155)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Denmark	0.06627	0.32007	0.01229	0.31530	-0.01032	0.00335	0.33440	0.03320	0.03485	0.15800	0.41984	0.52694	0.49823
	(0.0042)	(<.0001)	(0.5983)	(<.0001)	(0.6854)	(0.9021)	(<.0001)	(0.1591)	(0.1259)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
Sweden	0.05552	0.38214	0.01181	0.36224	-0.00474	0.01316	0.39213	0.02620	0.03483	0.19639	0.41369	0.55635	0.73870
	(0.0163)	(<.0001)	(0.6121)	(<.0001)	(0.8519)	(0.6283)	(<.0001)	(0.2652)	(0.1251)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
England	0.05220	0.35747	0.03607	0.31101	0.00671	0.02845	0.34637	0.03670	0.02295	0.15974	0.41176	0.64296	0.58671
	(0.0240)	(<.0001)	(0.1209)	(<.0001)	(0.7918)	(0.2942)	(<.0001)	(0.1189)	(0.3121)	(<.0001)	(<.0001)	(<.0001)	(<.0001)

P-values are provided in parentheses in the second row.

TABLE II (contd.2)

Correlation Coefficients of Annualized Daily Stock Market Returns (1995-2002)

Country	France	Germany	Greece	Ireland	Italy	Luxembur g	Portugal	Spain	Netherla nds	Denmark	Sweden	England
France	1.00											
Germany	0.76984	1.00										
	(<.0001)											
Greece	0.23495	0.23291	1.00									
	(<.0001)	(<.0001)										
Ireland	0.44710	0.43481	0.19803	1.00								
	(<.0001)	(<.0001)	(<.0001)									
Italy	0.60126	0.60368	0.29940	0.44994	1.00							
	(<.0001)	(<.0001)	(<.0001)	(<.0001)								
Luxemburg	0.28130	0.26149	0.14402	0.27842	0.38569	1.00						
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)							
Portugal	0.49529	0.46282	0.25788	0.33260	0.47562	0.25444	1.00					
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)						
Spain	0.78975	0.69531	0.25750	0.38951	0.58217	0.25698	0.53390	1.00				
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)					
Netherlands	0.83558	0.77935	0.26555	0.47486	0.63117	0.29814	0.49624	0.76212	1.00			
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)				
Denmark	0.56840	0.56150	0.25887	0.44977	0.55982	0.28872	0.42677	0.54645	0.60850	1.00		
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)			
Sweden	0.73566	0.68018	0.25166	0.47442	0.55832	0.31261	0.49416	0.68799	0.71892	0.58407	1.00	
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)		
England	0.78995	0.70146	0.23689	0.46910	0.54557	0.25750	0.44418	0.70376	0.78726	0.56434	0.69518	1.0
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	

P-values are provided in parentheses in the second row.

TABLE III

Country Betas of Annualized Daily Stock Market Returns (1995-2002)

Country	France	Germany	England	World
Cyprus	0.1780968	0.15692437	0.19544121	0.258494646
Czech	0.33577461	0.27713363	0.4104867	0.477271254
Estonia	5.40141168	5.23314284	6.08922218	9.849786708
Hungary	0.30848849	0.29528795	0.41477964	0.598394564
Latvia	0.03929012	-0.0141913	0.05088835	0.088257406
Lithuania	0.10066457	-0.0362827	0.14426685	0.089103894
Poland	0.54225922	0.50020207	0.70062556	0.851627098
Slovak	0.03326147	0.03592119	0.07883275	0.10224307
Slovenia	0.03300237	0.01788625	0.02703377	0.008353861
Turkey	0.4356043	0.42371557	0.57206933	0.747343026
Austria	0.22325269	0.19507738	0.27744249	0.306413146
Belgium	0.56822576	0.48114887	0.68410615	0.79953869
Finland	0.98767222	0.90324054	1.19625739	1.567612772
France	1	0.74974096	1.07643615	1.198728021
Germany	0.86691067	1	1.02198436	1.343971131
Greece	0.35616828	0.33638114	0.51795336	0.661820377
Ireland	0.31819653	0.2823395	0.42457978	0.467679693
Italy	0.55727899	0.49095873	0.66656557	0.821743392
Luxemburg	0.21634636	0.17264032	0.2591401	0.329195259
Portugal	0.29119298	0.22675594	0.32404598	0.394823656
Spain	0.82412332	0.67332448	0.95542497	1.07516531
Netherlands	0.87464822	0.73583654	1.05250459	1.145625004
Denmark	0.36985409	0.31640939	0.45945807	0.516719221
Sweden	0.76238465	0.65918334	0.91793489	1.110015592
England	0.64167969	0.52687933	1	0.881638953

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