SEPTEMBER, 2015

EURO STOXX® INTERNATIONAL EXPOSURE INDEX – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

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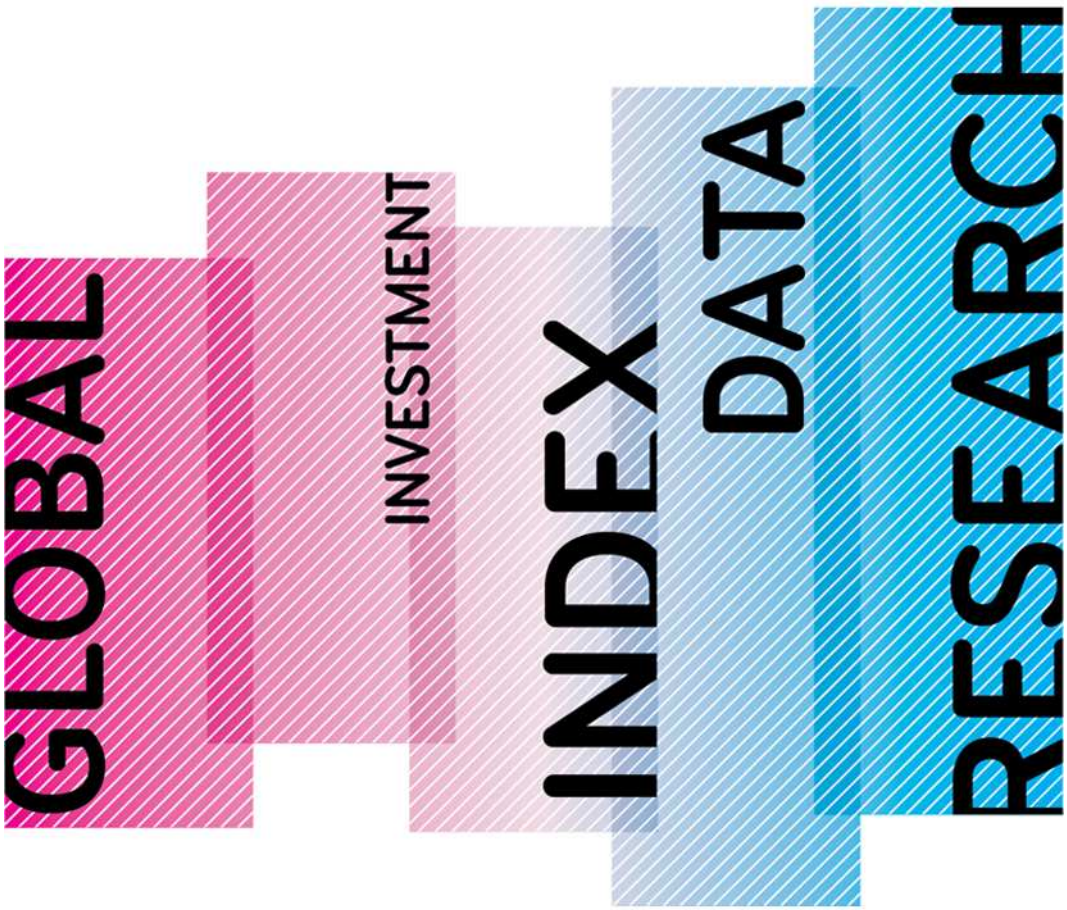

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TABLE OF CONTENTS

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

Abstract

This research paper investigates both the foundations and risk/return characteristics of an alternative approach to indexing that categorizes stocks according to a company's economic exposure. Representation of a company's economic exposure is given by the breakdown of geographic distribution of the company's revenues.

Generally speaking, it is anticipated that firms with higher economic exposure (i.e., firms with higher export propensity) benefit from a depreciating pattern of the home currency, since expected foreign-currency cash flows translate into larger home-currency cash flows.

Export-oriented firms are expected to benefit from depreciation of the home currency, both in export-volume terms and in foreign currency-based overseas earnings, although the magnitude of the latter will be strictly dependent upon—among other factors—the degree of an exchange-rate pass-through[1]. When the home currency depreciates, exporters can either lower exports in the contract currency or increase prices denominated in the home currency.

Economic exposure in general identifies the sensitivity of a firm's value (as measured by its stock price) or a company's fundamentals to a number of risk factors relating to the economies in which it operates. In particular, economic risk reflects the risk to the firm's present value of future operating cash flows that arise from exchange-rate movements.

In particular, STOXX has recently developed the EURO STOXX® International Exposure Index, which provides investors exposure to Eurozone companies that generate a substantial portion of their revenues outside the Eurozone region. Revenue exposures are derived from regional revenue breakdowns as reported by companies or, if regional revenue breakdowns are not provided, from an estimator developed by STOXX. The EURO STOXX International Exposure Index weighs only those companies that generate at least 50% of their revenue outside their country/region of domicile.

[1] Key factors that determine the extent of the exchange-rate pass-through are the size of the export market and the degree of competition the exporter faces in a given market. Economic literature has demonstrated how exports to certain competitive industries in the US, such as autos and alcoholic beverages, show relatively high pricing-to-market ratios and corresponding lower exchange-rate pass-through as exporters try to preserve market share.

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

"I AM A CITIZEN, NOT OF ATHENS OR GREECE, BUT OF THE WORLD."
Socrates (470/469 BC - 399 BC)

1 STOXX International Exposure Indices–An introduction and literature review

As globalization increases, companies tend to broaden their operations across various regions and countries beyond their domicile, i.e., their home country. Whenever a firm operates with production lines established in multiple countries and with customers located across various geographies, its country of incorporation or its headquarters' domicile provides limited information about the fundamentals that drive its revenue stream and its potential for success. The economic exposure of companies represents a new factor in the construction of diversified equity portfolios that could well serve as an alternative metric to the traditional country-factor definition.

Academic literature has analyzed the relationship between economic exposure to country and regional risks and company valuations as well as the impact on stock performance. In particular, foreign exchange-rate exposure and currency risk have been assessed in terms of abnormal returns on stock prices and increased corporate cash flow levels.

Jorion[2] analyzed cross-sectional currency exposure differences across US industry sectors for the period January, 1971-December, 1987, showing that those were significant. Export-oriented industries displayed a significantly positive exposure; their stock prices tended to increase when the dollar declined. Given the significance of the cross-sectional differences above, the author tested whether currency exposure was priced in the stock market, under the assumption that the price of exchange risk is constant through time.

In testing currency exposure, Jorion referenced two models. The first one was a two-factor model, with the value-weighted stock market return as the first factor and the orthogonal component of innovations in a trade-weighted exchange rate[3] as the second factor. In light of the fact that exchange-rate movements may be just proxies for movements in omitted fundamental underlying factors (such as inflation risk), a second multi-factor model was taken into account. The second model weighed six factors (market return, industrial production growth, expected inflation, unexpected inflation, risk premium calculated as the difference between low-grade bond returns and government bond returns and term structure calculated as the difference between long-term government bonds and Treasury bills), along with the orthogonal component of innovations in a trade-weighted exchange rate.

The analysis found "little evidence that U.S. investors require compensation for bearing exchange risk. The premium attached to pure foreign exchange exposure is found to be of the order of 0.2 percent per annum, which is both economically and statistically insignificant. Exchange rate risk appears to be diversifiable. As a result, active hedging policies by financial managers cannot affect the cost of capital,

[2] Jorion, P. (1991), "The Pricing of Exchange Risk in the Stock Market," Journal of Financial and Quantitative Analysis, 26, 3, pp. 353-376.
[3] The exchange-rate series was constructed from the currency weights of 15 selected countries in the effective dollar exchange rate of the IMF's Multilateral Exchange Rate Model (MERM) and end-of-month spot rates as reported by the IMF. Given that the MERM exchange rate reported by the IMF is a monthly average, end-of-period exchange rates were reconstructed from MERM weights and end-of-period bilateral nominal rates.

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

and reasons other than pricing arguments must explain why firms actively manage foreign exchange risk."

In an earlier study, Jorion[4] analyzed the foreign exchange-rate exposure of 287 US multinational companies for the period January, 1971-December, 1987, further broken down into four subperiods. Foreign exposure was measured by the regression coefficient of the change in the value of the firm (whereby stock return was used as a proxy for the value of the firm) on the change in the exchange rate. Firms with a higher rate of foreign activities exhibited a higher measurable difference in exchange-rate exposure, confirming the existence of "...significant cross-sectional differences in the exposure of U.S. multinationals." In light of the results above, the sources of the differential effects were examined further, with the exchange-rate exposure measured in relation to the fraction of total sales made overseas by US multinationals. Working on a subsample of 40 portfolios of 287 nonoil firms[5], the author concluded that "...in spite of potential measurement and instability problems, this evidence is consistent with the hypothesis that exchange-rate exposure is positively related to the foreign sales variable."

Bardov and Bodnar[6], making reference to a sample of US firms with international activities for the period 1978-1990, investigated whether the limited success previous studies had in identifying a significant correlation between simultaneous abnormal stock returns and dollar fluctuations was attributable to either sampling issues or to mispricing.

In selecting firms with same-sign correlations between changes in firm value and the value of the US dollar, the authors found that abnormal changes in the value of the firms as measured by stock prices were negatively correlated with lagged changes in a trade-weighted index of the US dollar. Also, tests for a structural change in the relationship between currency changes and stock returns suggested that, "...although it is significant in both subperiods, the size of the coefficient on the lagged change in the dollar is significantly more pronounced in an earlier sample subperiod, 1978 to 1983, than a later one, 1984 to 1990."

In an earlier study, Amihud[7] analyzed the existence of a lagged relationship between changes in firm value as represented by stock returns and changes in the value of the US dollar for a sample of the 32 largest US exporters from 1982 to 1988. The author found little evidence of the existence of a relationship between lagged monthly (or quarterly) changes in the US dollar and changes in the firms' value for the same firms.

STOXX has recently launched the EURO STOXX International Exposure Index, which provides investors exposure to Eurozone companies that generate a substantial portion of their revenue outside the Eurozone. The new index allows investors to express their views on those companies that are well positioned to profit from currency depreciation and higher growth in markets other than the domestic market.

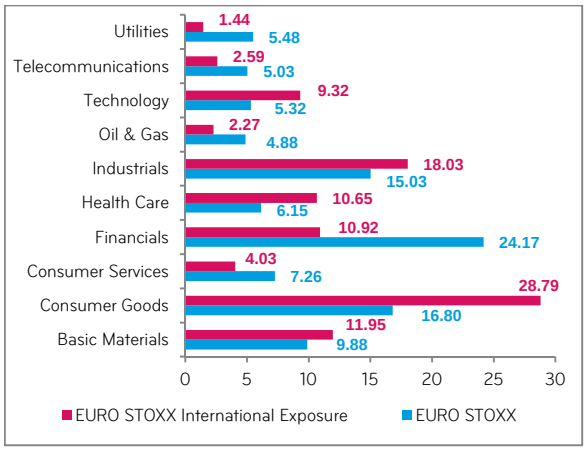
[4] Jorion, P. (1990), "The Exchange Rate Exposure of U.S. Multinationals," Journal of Business, 63, pp. 331-345.
[5] US multinationals in the oil industry showed the largest proportion of overall sales generated abroad, where output prices were commonly set in US dollars. Thus, the analysis reasonably expected that US oil companies were not so sensitive to fluctuations in the value of the US dollar.
[6] Bartov, E., and G. M. Bodnar (1994), "Firm Valuation, Earnings Expectations, and the Exchange Rate Exposure Effect," The Journal of Finance, 49(5), pp. 1755-1785.
[7] Amihud, Y. (1993), "Evidence on Exchange Rates and Valuation of Equity Shares," in Y. Amihud and R. Levich, Eds.: "Exchange Rates and Corporate Performance," Business One Irwin, Homewood, IL.

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

The index is based on a transparent and easily understood methodology: all companies that generate at least 50% of their revenue outside their country/region of domicile are selected for inclusion in the index. In order to control turnover in the index, the selection of index constituents is subject to a buffer rule on a component level. Current components are removed from the index only if their exposure falls below the 40% threshold. Components are weighted by a combination of free-float-adjusted market cap and the exposure factor in order to maximize exposure to foreign revenue while still preserving a size bias; the components are subject to a 5% cap.

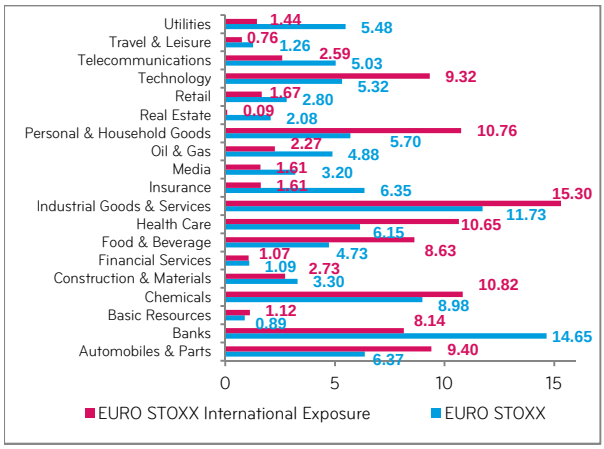
All companies' geographic revenue splits are collected from their annual reports as a first step. Whenever a revenue breakdown by geographies is not included in the annual report, in order to accurately assign reported revenue to individual countries STOXX has developed a proprietary revenue estimator that is based on country-dependent figures on exports of goods and services. Data sources used for revenue estimation include the publicly available UN Comtrade and UN ServiceTrade databases, containing data on exported goods and services among countries, as well as World Bank data. The index is reviewed annually in September, using the latest available data.

FIGURE 1A EURO STOXX INTERNATIONAL EXPOSURE VERSUS EURO STOXX – ICB INDUSTRY ALLOCATION WEIGHTS (SEP. 7, 2015, EUR GROSS RETURN)



Source: STOXX

FIGURE 1B: EURO STOXX INTERNATIONAL EXPOSURE VERSUS EURO STOXX – ICB SUPERSECTOR ALLOCATION WEIGHTS (SEP. 7, 2015, EUR GROSS RETURN)



Source: STOXX

The figures above show the ICB industry and supersector allocations at Sep. 7, 2015, for both the EURO STOXX International Exposure Index and the EURO STOXX Index. The 50% threshold in the required minimum foreign exposure determines a reallocation of weightings away from sectors with lower foreign exposure to sectors with higher exposure to international markets (other than Eurozone countries). As a

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

result of the constituents' revenue-breakdown methodology construction, allocation overweightings to basic materials, consumer goods, health care, industrials and technology are noticeable for the EURO STOXX International Exposure Index compared to the EURO STOXX Index. At the same time, the EURO STOXX International Exposure Index underweights industry allocations to consumer services, financials, oil and gas, telecommunications and utilities compared to the EURO STOXX Index.

In particular, for the EURO STOXX International Exposure Index, within the largest ICB industry by aggregated weighting—i.e., consumer goods—automobiles and parts, food and beverages and personal and household goods accounted for 9.40%, 8.63% and 10.76%, respectively, of the overall allocation. The allocation percentages for the same ICB supersectors of the EURO STOXX Index were 6.37%, 4.73% and 5.70%.

2 Risk-return analysis and benchmarking

An analysis of the performance of the EURO STOXX International Exposure Gross Return Index confirms that the international exposure index outperformed the underlying EURO STOXX Index in both absolute and risk-adjusted terms over longer-term measurement periods.

In particular, Table 1 below shows that the gross-return version of the EURO STOXX International Exposure Gross Return Index generated superior returns—in both absolute and risk-adjusted terms—for the five-year and since-inception periods ended Jul. 31, 2015. The performance measurement comparison was against the EURO STOXX Gross Return Index[8], with a certain level of reduction in volatility relative to the underlying benchmark for the five-year period.

For the year-to-date and three-year periods ended Jul. 31, 2015, the EURO STOXX International Exposure Gross Return Index underperformed the EURO STOXX Gross Return Index by 40 basis points (bps) and 452 bps, respectively. Conversely, it outperformed the European benchmark for the one-year, five-year and since-inception periods ended Jul. 31, 2015, by 160 bps, 1,731 bps and 2,616 bps, respectively.

Outperformance for the periods above was also evident for the risk-adjusted measures, and those measures can be particularly appealing for institutional investors, who are traditionally risk-averse. The traditional risk/return annualized measure of 0.66 for the EURO STOXX International Exposure Gross Return Index over the five-year period ended Jul. 31, 2015, compared favorably to the 0.54 for the EURO STOXX Gross Return Index. Similarly, for the period Sep. 24, 2007, to Jul. 31, 2015, the risk/return annualized reading of 0.20 for the EURO STOXX International Exposure Gross Return Index compared favorably to the 0.10 for the EURO STOXX Gross Return Index. The tracking error of the EURO STOXX International Exposure Gross Return Index against the European benchmark for the two-, three- and five-year periods was contained within the 3.0% annualized reading.

[8] The EURO STOXX International Exposure Index was launched on May 26, 2015 (hereinafter, launch date). Index values calculated for any date or period prior to the index's launch date are considered backtested. The inception of backtested time-series data was set at Sep. 24, 2007.

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

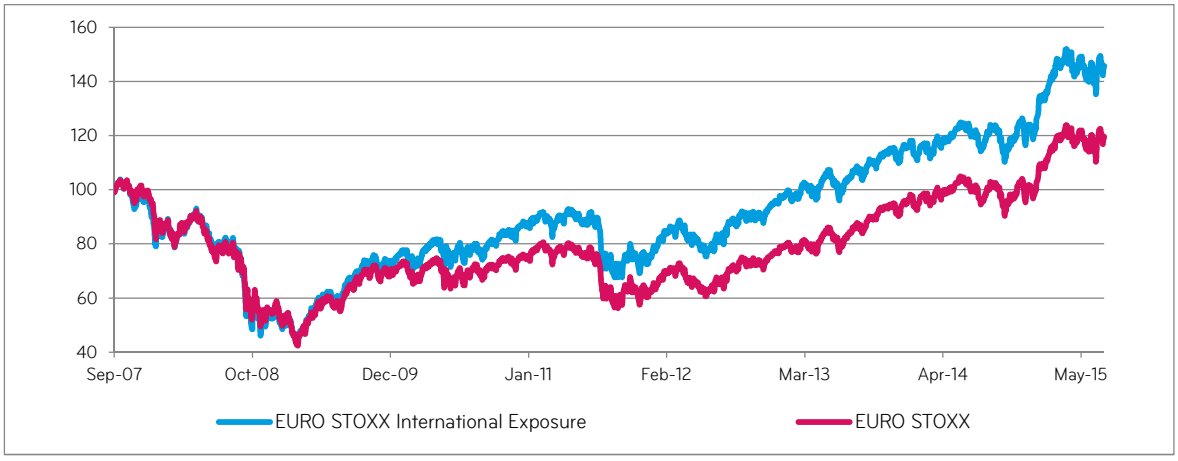
TABLE 1 EURO STOXX INTERNATIONAL EXPOSURE INDEX VERSUS EURO STOXX INDEX, SUMMARY OF RISK/RETURN MEASURES (SEP. 24, 2007-JUL. 31, 2015, GROSS RETURN INDICES)[9]

	EURO STOXX INTERNATIONAL EXPOSURE				EURO STOXX			
	Annualized Return (%)	Annualized Volatility (%)	Return/Risk Annualized	Tracking Error Annualized	Annualized Return (%)	Annualized Volatility (%)	Return/Risk Annualized	
2-Year	17.48	15.52	1.02	2.37	18.82	15.97	1.06	
3-Year	19.70	15.45	1.15	2.41	20.74	15.98	1.16	
5-Year	13.35	18.66	0.66	2.84	11.17	19.27	0.54	
Since inception	4.91	24.02	0.20	4.12	2.30	23.50	0.10	
	Max Drawdown (%)		ßeta		Max Drawdown (%)		ßeta	
Since Sep. 25, 2007	-58.56		0.98		-58.96		1.00	

Source: STOXX

The charts below plot indexed performance, 20-day annualized rolling-window volatility, correlation and maximum drawdown of the EURO STOXX International Exposure Gross Return Index and the EURO STOXX Gross Return Index for the period Sep. 24, 2007-Jul. 31, 2015.

FIGURE 2 EURO STOXX INTERNATIONAL EXPOSURE INDEX VERSUS EURO STOXX INDEX, INDEXED PERFORMANCE (SEP. 24, 2007-JUL. 31, 2015, GROSS RETURNS)

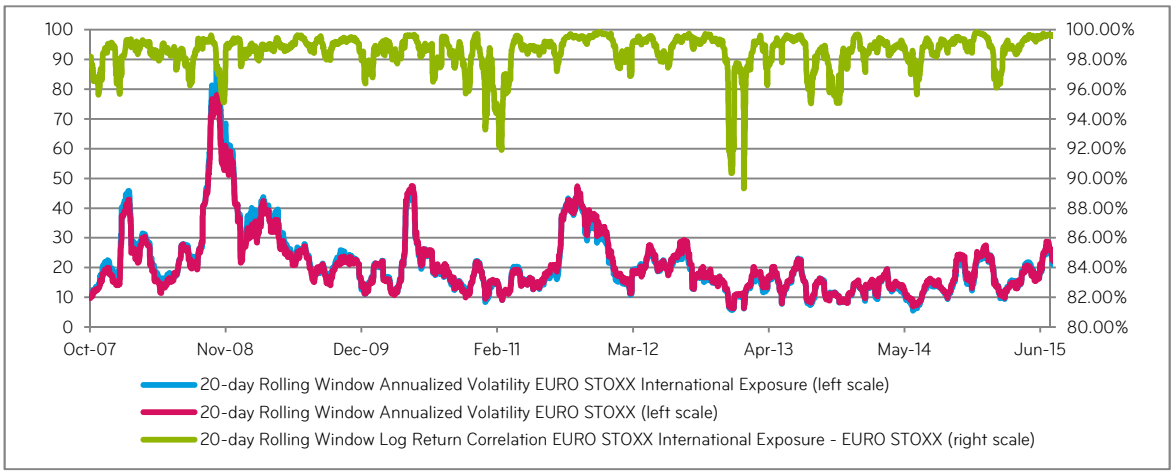


Source: STOXX

[9] βeta in Table 1 is computed for the period Dec. 2, 2008-Jul. 31, 2015, by taking into account a risk-free rate given by the twelve-month Eurozone government benchmark and the EURO STOXX Index as the market benchmark. In the same table, rather than the traditional standard deviation of active returns, a more robust measure of tracking error has been computed to take into account both the drift component and the stochastic term of the active returns distribution. Tracking error has been computed as the root mean square of the active returns against the EURO STOXX Index.

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

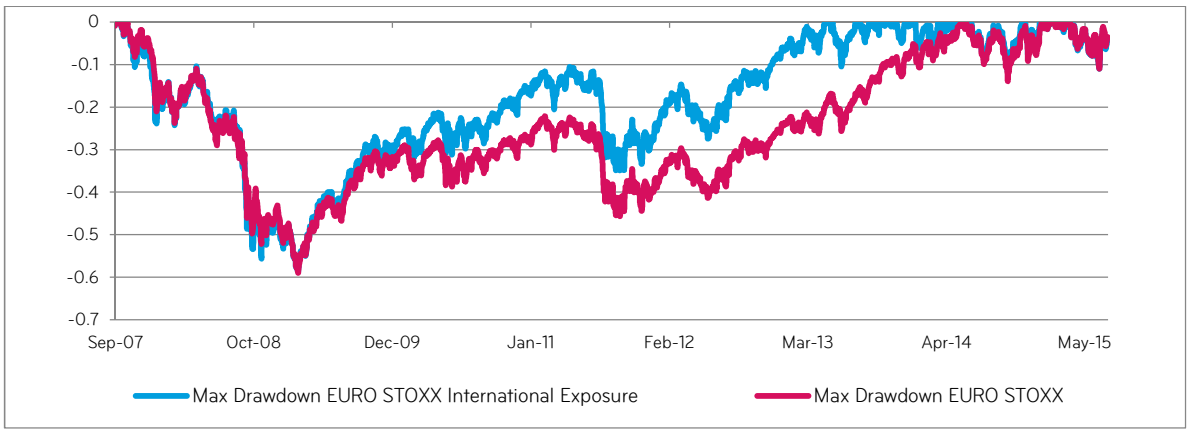
FIGURE 3 EURO STOXX INTERNATIONAL EXPOSURE INDEX AND EURO STOXX INDEX, 20-DAY LOG-RETURN CORRELATION VERSUS 20-DAY ROLLING-WINDOW VOLATILITY (OCT. 22, 2007-JUL. 31, 2015, GROSS RETURNS)



Source: STOXX

Generally speaking, except for periods of volatility clustering, lower volatility levels were observed in the periods of decreased correlation patterns between the EURO STOXX International Exposure Index and the underlying EURO STOXX benchmark.

FIGURE 4 EURO STOXX INTERNATIONAL EXPOSURE INDEX AND EURO STOXX INDEX, MAXIMUM DRAWDOWN (SEP. 25, 2007-JUL. 31, 2015, GROSS RETURNS)



Source: STOXX

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

As was also suggested by dynamic calculations of maximum drawdowns for the analysis period, the asymmetric response of the international exposure index to market movements points to its expected underperformance in "home-country" bull markets. At the same time, the asymmetric response highlights the index's ability to provide a certain level of abnormal-return potential in uncertain home-country market conditions and in market dislocations in general (compared to the underlying benchmark) whenever international exposure provides a boost to the revenue potential of the index's participating firms.

Based on daily gross returns for the period Sep. 25, 2007-Jul. 31, 2015 (2,015 daily observations), the EURO STOXX International Exposure Index outperformed the EURO STOXX Index 57.16%[10] of the time during down markets, while it outperformed the "plain-vanilla" European benchmark a lower 47.28% of the time during up markets. The median level of daily outperformance of the EURO STOXX International Exposure Index was 0.13% during up-market periods and 0.14% during down markets.

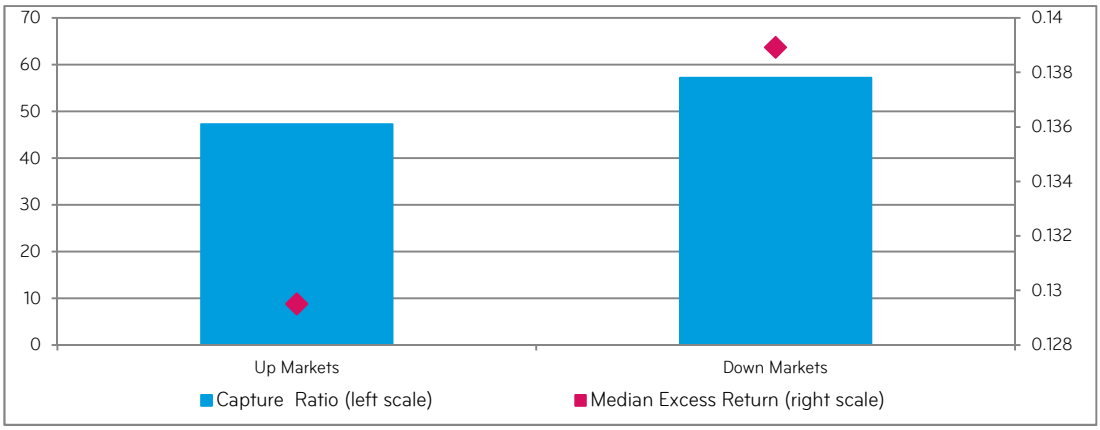
Evidence of an asymmetric performance behavior of the EURO STOXX International Exposure Index was more pronounced when the single-currency depreciation cycle[11] tied to the Eurozone debt crisis of the period May 4, 2011, through Jul. 24, 2012, was taken into account. For that period, based on daily gross returns (316 daily observations), the EURO STOXX International Exposure Index outperformed the EURO STOXX Index 68.10% of the time during down markets. Conversely, it outperformed the plain-vanilla European benchmark a lower 39.87% of the time during up markets. The median level of daily outperformance of the EURO STOXX International Exposure Index was 0.14% during up-market periods and 0.17% during down markets.

[10] That percentage is generally referred to as the capture ratio.

[11] The single-currency depreciation cycles referred to throughout this section and the next chapter have been computed with reference to the Euro Effective Exchange Rate calculated by the Bank of England since May 11, 1999. It is an effective trade-weighted exchange-rate index for the euro area, where the weightings reflect the relative importance of trade flows between the euro area as a whole and countries outside the euro area. (Trade between countries within the euro area is excluded, so the weightings are based solely on extra-euro area trade). Sterling has the largest weighting, and the US dollar has the next largest.

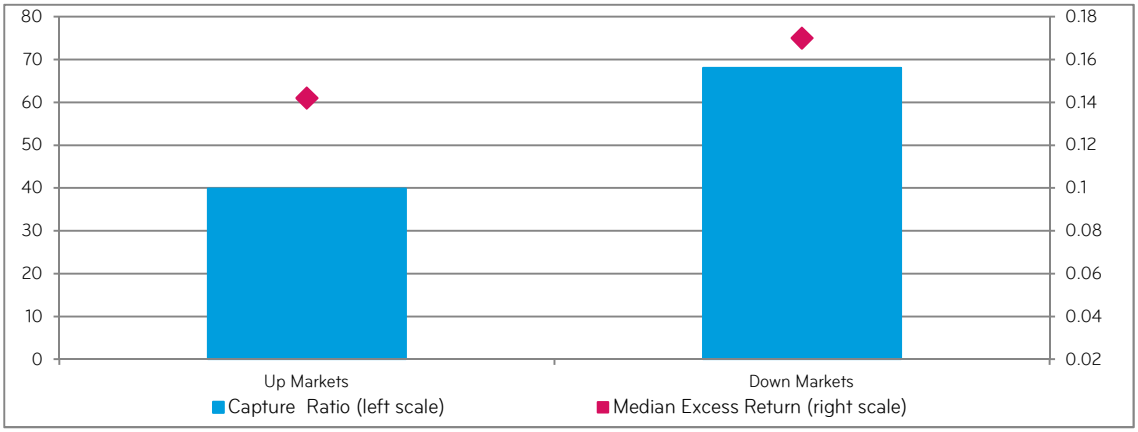
STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

FIGURE 5 EURO STOXX INTERNATIONAL EXPOSURE INDEX VERSUS EURO STOXX INDEX, CAPTURE RATIO AND MEDIAN EXCESS RETURN (SEP. 25, 2007-JUL. 31, 2015, GROSS-RETURN INDICES, DAILY DATA)



Source: STOXX

FIGURE 6 EURO STOXX INTERNATIONAL EXPOSURE INDEX VERSUS EURO STOXX INDEX, CAPTURE RATIO AND MEDIAN EXCESS RETURN (MAY 4, 2011-JUL. 24, 2012, GROSS-RETURN INDICES, DAILY DATA)



Source: STOXX

The analysis extended to the two additional depreciation cycles of Oct. 23, 2009, through Jun. 29, 2010 (Greece's fiscal position crisis) and the more recent period from Mar. 12, 2014, through Jul. 31, 2015 (weak macro data, geopolitical tensions, the Russian crisis, oil- and "Grexit"-driven market corrections, the specter of a currency war and last but not least China's stock market volatility) confirmed the

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

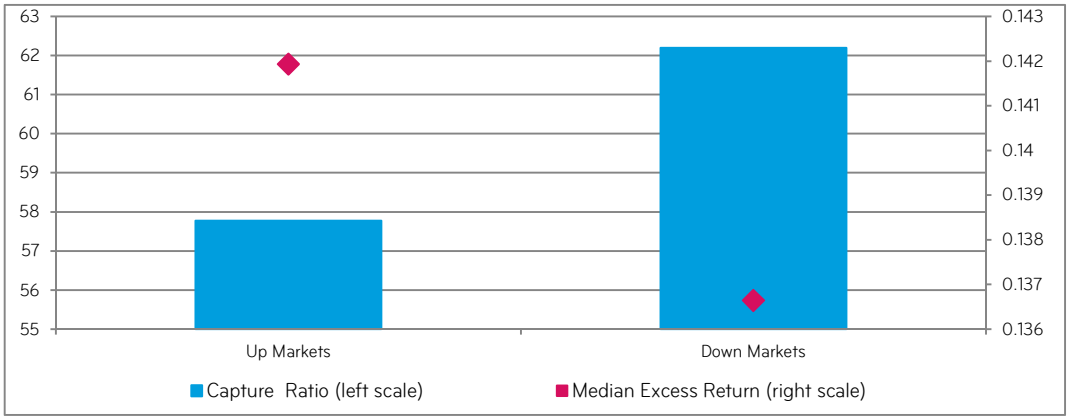
asymmetric performance behavior of the EURO STOXX International Exposure Index versus the EURO STOXX Index.

Conversely, for the period Jul. 11, 2008-Oct. 27, 2008 (credit crisis, 75 daily observations), data evidence did not confirm the existence of a relatively higher frequency of outperformance of the EURO STOXX International Exposure Index versus the EURO STOXX Index in down-market periods (38.64% of the time, compared to 53.12% during up markets). In that period of significant global market dislocations and volatility clustering, markets appeared to factor in information arrival and risk-on/risk-off drivers rather than fundamentals. Nonetheless, for the same period, the median level of daily outperformance of the EURO STOXX International Exposure Index was marginally higher during down markets (0.20%) than during up-market periods (0.19%).

For the period Oct. 23, 2009, through Jun. 29, 2010, based on daily gross returns (173 daily observations) the EURO STOXX International Exposure Index outperformed the EURO STOXX Index 62.19% of the time during down markets. Conversely, it outperformed the plain-vanilla European benchmark a lower 57.78% of the time during up markets. During both up-market and down-market periods, the median level of daily outperformance of the EURO STOXX International Exposure Index was the same at 0.14%.

For the more recent period—Mar. 12, 2014, through Jul. 31, 2015—based on daily gross returns (355 daily observations) the EURO STOXX International Exposure Index outperformed the EURO STOXX Index 63.46% of the time during down markets. Conversely, it outperformed the EURO STOXX Index a lower 41.75% of the time during up markets. The median level of daily outperformance of the EURO STOXX International Exposure Index was 0.09% during up-market periods and 0.10% during down markets.

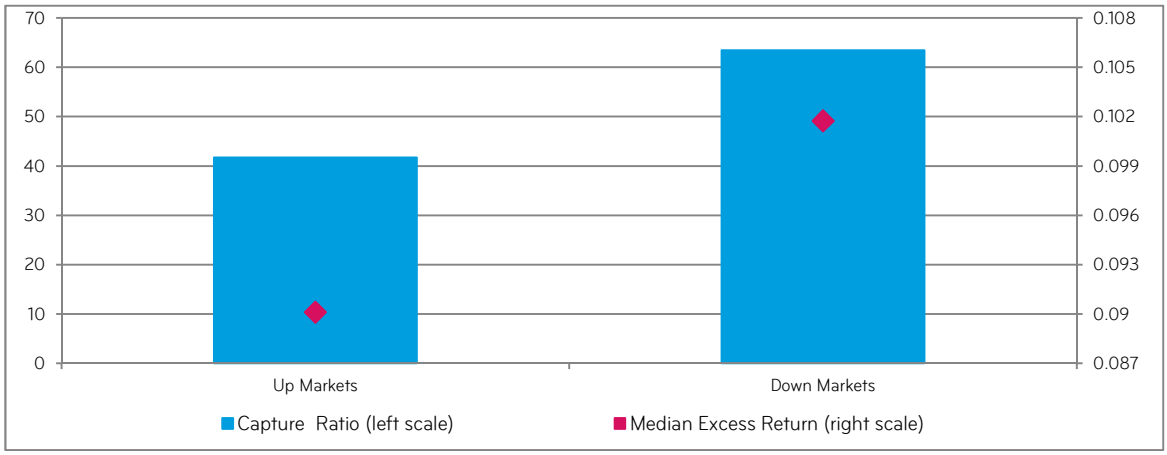
FIGURE 7 EURO STOXX INTERNATIONAL EXPOSURE INDEX VERSUS EURO STOXX INDEX, CAPTURE RATIO AND MEDIAN EXCESS RETURN (OCT. 23, 2009-JUN. 29, 2010, GROSS-RETURN INDICES, DAILY DATA)



Source: STOXX

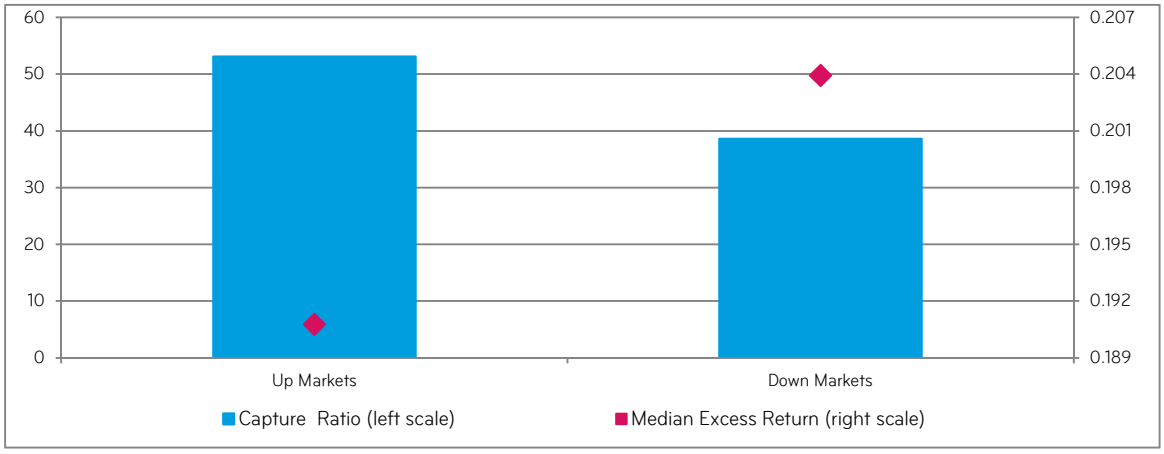
STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

FIGURE 8 EURO STOXX INTERNATIONAL EXPOSURE INDEX VERSUS EURO STOXX INDEX, CAPTURE RATIO AND MEDIAN EXCESS RETURN (MAR. 12, 2014-JUL. 31, 2015, GROSS-RETURN INDICES, DAILY DATA)



Source: STOXX

FIGURE 9 EURO STOXX INTERNATIONAL EXPOSURE INDEX VERSUS EURO STOXX INDEX, CAPTURE RATIO AND MEDIAN EXCESS RETURN (JUL. 11, 2008-OCT. 27, 2008, GROSS-RETURN INDICES, DAILY DATA)



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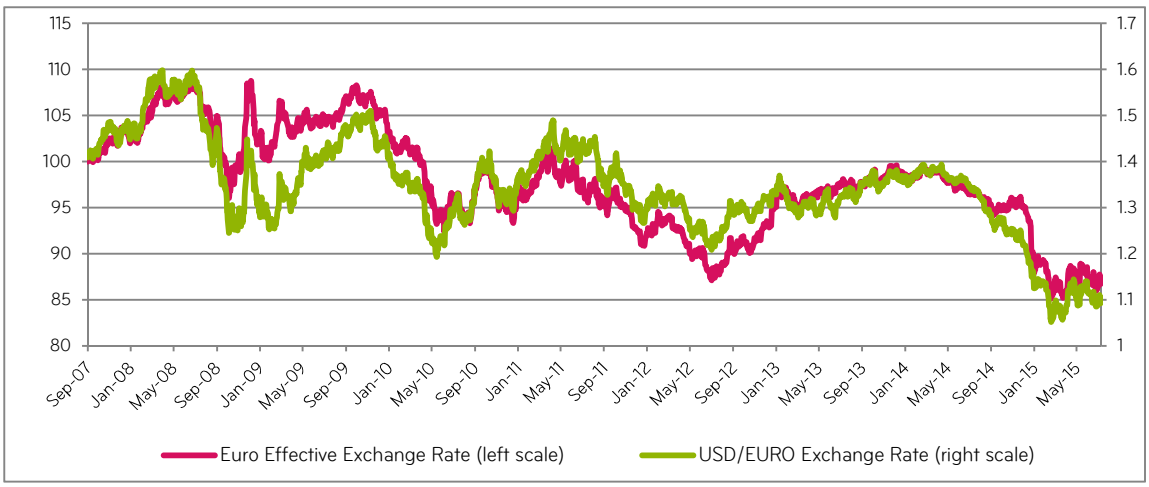
STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

3 Analysis of correlation between exchange-rate risk and index return

An analysis of the sensitivity to the FX rate of the performance of the EURO STOXX International Exposure Index relative to the EURO STOXX Index has been performed through four main depreciation cycles of the euro: Jul. 11, 2008-Oct. 27, 2008 (credit crisis, with an 11.63% Euro Effective Exchange Rate Index depreciation); Oct. 23, 2009-Jun. 29, 2010 (Greece's fiscal position crisis, with a 14.72% Euro Effective Exchange Rate Index depreciation); May 4, 2011-Jul. 24, 2012 (Eurozone debt crisis, with a Euro Effective Exchange Rate Index depreciation of 14.14%) and Mar. 12, 2014-Jul. 31, 2015 (weak macro data, geopolitical tensions, Russian crisis, oil- and Grexit-driven market corrections, with a 12.14% Euro Effective Exchange Rate Index depreciation).

As clarified earlier, the single-currency depreciation cycles have been computed with reference to the Euro Effective Exchange Rate calculated by the Bank of England since May 11, 1999. The effective exchange rate is a weighted average of the movements in euro FX rates against a basket of other currencies, with the weightings reflecting the relative importance of the other currencies as measured by trade flows between the relevant countries.

FIGURE 10 EURO EFFECTIVE EXCHANGE RATE INDEX AND USD/EUR EXCHANGE RATE INDEX (SEP. 24, 2007-JUL. 31, 2015, DAILY DATA, INDICES REBASED AT SEP. 24, 2007 = 100)



Source: STOXX

The outperformance of the EURO STOXX International Exposure Index against the EURO STOXX Index was negatively related to the trade-weighted Euro Effective Exchange Rate in most of the depreciation cycles.

The log return differential between the EURO STOXX International Exposure Index and the EURO STOXX Index showed a mixed correlation pattern with both the Euro Effective Exchange Rate and the USD/EUR

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

FX rate. Generally speaking, except for periods of volatility clustering, higher active returns of the international exposure index above the EURO STOXX Index were observed in periods of higher negative correlation patterns. The 20-day rolling-window log return correlation between the EURO STOXX International Exposure Index-EURO STOXX Index log return differential and the Euro Effective Exchange Rate log return as well as the USD/EUR FX rate log return showed significant negative readings throughout the analysis period. The 20-day rolling-window log return correlation peaked on Jan. 3, 2012, at a negative 81.37% against the Euro Effective Exchange Rate and on Nov. 2, 2011, at a negative 74.86% against the USD/EUR FX rate.

The correlation between the EURO STOXX International Exposure Index and the EURO STOXX Index log return differential and the Euro Effective Exchange Rate log return stood at minus 0.11 for the overall period Sep. 25, 2007-Jul. 31, 2015, while it was a less negative minus 0.08) against the EUR/USD FX rate log return. The correlation across the four main depreciation cycles of the euro analyzed above is summarized in the table below.

TABLE 2 EURO STOXX INTERNATIONAL EXPOSURE GROSS-RETURN INDEX, CORRELATION VERSUS PERFORMANCE ACROSS EURO DEPRECIATION CYCLES

DEPRECIATION CYCLES	MARKET EVENT	EURO DEPRECIATION		EURO STOXX INTERNATIONAL EXPOSURE INDEX-EURO STOXX INDEX LOG RETURN DIFFERENTIAL CORRELATION		EURO STOXX INTERNATIONAL EXPOSURE INDEX-EURO STOXX INDEX LOG RETURN DIFFERENTIAL 20-DAY ROLLING WINDOW NEGATIVE CORRELATION SPIKE		EURO STOXX INTERNATIONAL EXPOSURE INDEX-EURO STOXX INDEX LOG RETURN DIFFERENTIAL
		EURO EFFECTIVE EXCHANGE RATE	USD/EUR FX RATE	EURO EFFECTIVE EXCHANGE RATE	USD/EUR FX RATE	EURO EFFECTIVE EXCHANGE RATE	USD/EUR FX RATE	
Jul. 11, 2008-Oct. 27, 2008	Credit crisis	-11.63%	-21.75%	0.13	0.11	-0.39	-0.46	-9.02%
Oct. 23, 2009-Jun. 29, 2010	Greece's fiscal position crisis	-14.72%	-18.91%	-0.33	-0.29	-0.73	-0.74	8.38%
May 4, 2011-Jul. 24, 2012	Eurozone debt crisis	-14.14%	-18.80%	-0.36	-0.39	-0.81	-0.75	8.49%
Mar. 12, 2014-Jul. 31, 2015	Weak macro data, geopolitical tensions, Russian crisis, oil- and Grexit-driven market corrections	-12.14%	-20.54%	-0.17	-0.17	-0.76	-0.72	3.11%
Sep. 25, 2007-Jul. 31, 2015	Full analysis period	-12.55%	-21.60%	-0.11	-0.08	-0.81	-0.75	19.78%

Source: STOXX

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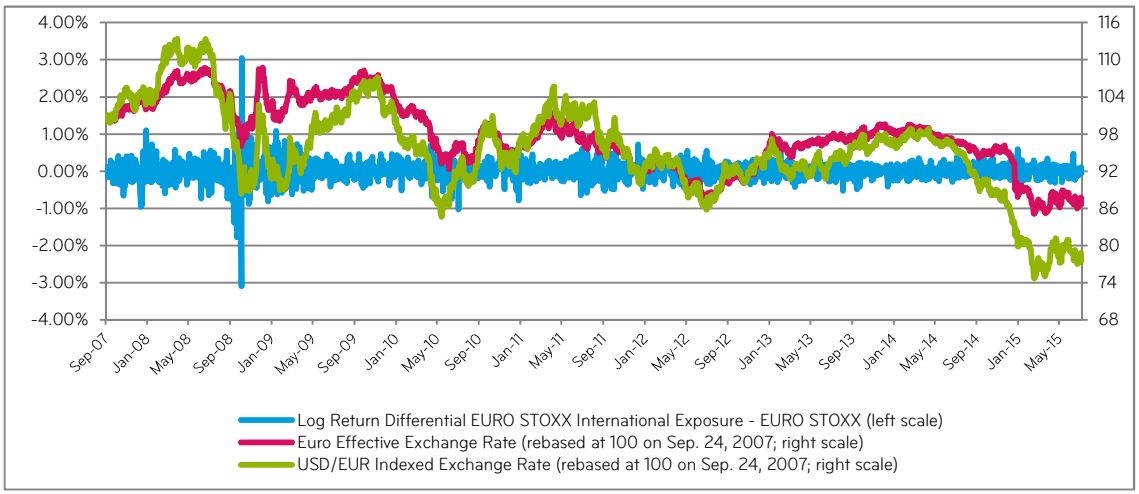
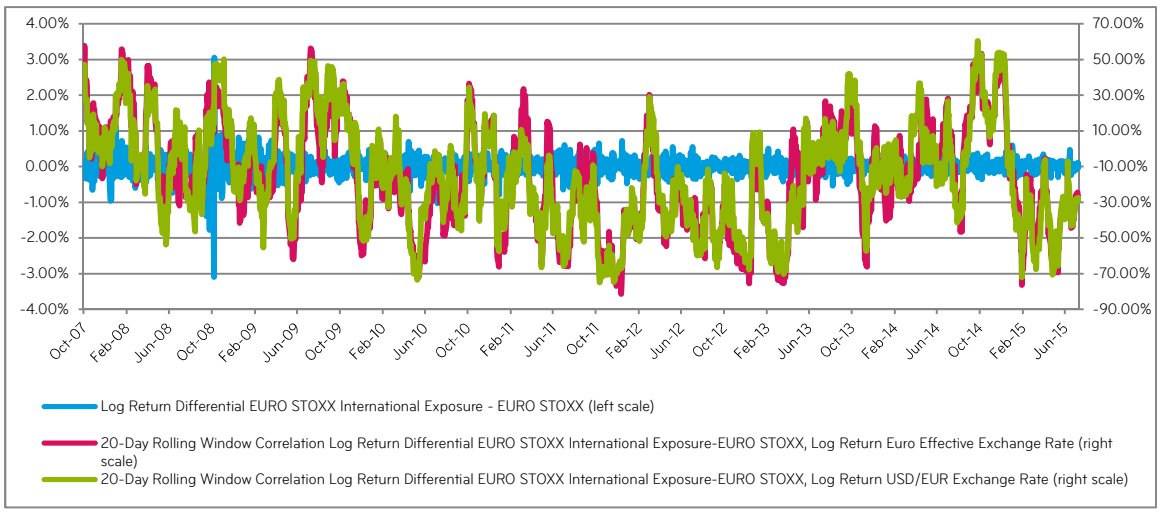
FIGURE 11 EURO STOXX INTERNATIONAL EXPOSURE-EURO STOXX LOG RETURN DIFFERENTIAL, EURO EFFECTIVE EXCHANGE RATE INDEX AND USD/EUR EXCHANGE RATE INDEX (SEP. 25, 2007-JUL. 31, 2015, DAILY DATA, INDICES REBASED AT SEP. 24, 2007 = 100)



Source: STOXX

FIGURE 12 EURO STOXX INTERNATIONAL EXPOSURE-EURO STOXX LOG RETURN DIFFERENTIAL, 20-DAY ROLLING-WINDOW CORRELATIONS BETWEEN THE EURO STOXX INTERNATIONAL EXPOSURE-EURO STOXX LOG RETURN DIFFERENTIAL AND THE EURO EFFECTIVE EXCHANGE RATE INDEX LOG RETURN AND THE USD/EUR EXCHANGE RATE INDEX LOG RETURN (OCT. 22, 2007-JUL. 31, 2015, DAILY DATA)



Source: STOXX

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4 Analysis of relationship between company fundamentals and trade-weighted exchange rates

Economic exposure to exchange-rate risk can be defined as the possibility that a given firm's cash flows and indirectly its market value may be impacted by unanticipated changes in the exchange rate[12]. Exposure to currency risk can be measured by the sensitivity of a firm's expected cash flows and its market value to changes in exchange rates. Statistically, this sensitivity can be estimated by the regression coefficient. As a result, a company faces an exchange risk to the extent that variations in the domestic currency value of its cash flows are correlated with variations in the nominal exchange rate.

The measurement of exchange-rate risk may prove to be a difficult exercise, since the impact of the various components obtained from its disentanglement cannot be easily assessed. Exchange risk is a multi-faceted variable, with a number of different components. We highlight the following, referring for instance to a Eurozone-based manufacturer with a Swiss subsidiary:

1. Transaction risk on the firm's exports to the US—this type of risk is cash flow-related and reflects exposure of transactions related to export (receivables) and import (payables) contracts and repatriation of dividends.
2. Translation risk on the euro value of the firm's Swiss plant and the profit remittances thereof—this type of risk is balance sheet-related and arises incidental to the valuation of a foreign subsidiary and its consolidation into the parent company's balance sheet.
3. The economic risk of a depreciating pattern of the US dollar, facilitating the entrance of global competitors into the Eurozone and Swiss markets—this type of risk is cash flow-related and concerns the effect on unanticipated changes on both revenues (sales and exports) and operating expenses (input factors and imports). Generally speaking, firms with a higher component of foreign input factors will be less favorably impacted by a depreciating domestic currency.
4. FX parities' indirect risk—asymmetric changes in cross rates can sustain higher relative competitiveness of overseas-based competitors.

The real versus nominal exchange rate is a key element in assessing the extent to which economic exposure alters the competitive position of a firm. If unexpected changes in the exchange rate affected a given firm in a uniform manner, there would be no change in the relative competitive position.

For instance, depreciation of the local currency would imply a higher inflation rate. According to the absolute PPP hypothesis[13], the exchange rate between the currencies of two countries should equal the ratio of the price levels of the two countries.

[12] In the broader meaning of operating exposure, all other conditions equal (i.e., the structure of the markets in which the firm sources its inputs such as labor and materials and sells its products), if the changes in the exchange rate are matched by the inflation-rate differential between countries, the firm's competitive position is not expected to be impacted by exchange rate changes. Those implications hold, according to purchasing power parity (PPP).

[13] The relative version of the absolute PPP hypothesis states that the exchange rate between the currencies of two countries should include a constant proportionate relationship to the ratio of the price levels of the two countries. In other terms:

$EXCH_{nom} = kP/P^*$,
where k is a constant parameter.

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

In other terms:

$EXCH_{nom} = P/P^*$,

Where $EXCH_{nom}$ is the nominal exchange rate measure in units of currency A per unit of currency B, P is the price level in country A and P* is the price level in country B.

Under the PPP hypothesis, a change in the ratio of price levels implies a proportional change in the exchange rate[14]. As a result, in global markets—given that an increase in the nominal exchange rate is offset by an increase in the inflation rate, the competitive position of firms producing locally with respect to firms importing from abroad remains the same. As per PPP, changes in the exchange rate imply changes in nominal rates but not in real ones. In light of the relative price-adjustment process, it is only the change in real exchange rates that determines economic exposure.

In the real world, data evidence about the behavior of real exchange rates confirms that PPP is not a strong hypothesis about the relationship between nominal exchange rates and national price levels in the short run. In order for the PPP hypothesis to hold for the price levels of any two countries, three main conditions should be met[15]:

a) Tradable goods obey the "law of one price," exhibiting the same price (when converted into a common currency) in each country.
b) Factor price equalization and identical production functions bring the prices of nontradable goods into equality internationally.
c) Each good receives identical weightings in the aggregate price indices of the two countries.

The fact that certain categories of manufactured goods show significantly diverging patterns in the common-currency prices following changes in nominal exchange rates negates conditions under (a) above, and it is one of the key reasons to doubt the validity of the PPP hypothesis in the short run. Further, transportation costs, trade restrictions, taxation levels and delays in the wage-adjustment mechanism contribute to determine certain levels of inelasticity of demand of finite goods across different countries.

The factors above contribute to negating the validity of the law of one price for similar products manufactured in different countries in the short run and lead to doubt for any readjustment process to eliminate any deviations from the PPP hypothesis in the short term.

The economic exposure of a given firm to exchange-rate fluctuations is summarized in the table below:

[14] The PPP hypothesis, however, does not infer any conclusions about the direction of causation between exchange rates and national price levels. It is consistent with a two-way causation-adjustment process.
[15] For a thorough review of the PPP hypothesis, please refer to Isard, P. (1995), "Exchange Rate Economics," Cambridge Surveys of Economic Literature.

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TABLE 3 SUMMARY OF IMPACT OF ECONOMIC EXPOSURE TO EXCHANGE-RATE FLUCTUATIONS ON FIRM'S CASH INFLOWS

Transactions that influence the firm's cash inflows	Local Currency Appreciates	Local Currency Depreciates
Local sales (relative to foreign competition in local markets)	Decrease	Increase
Firm's exports denominated in local currency	Decrease	Increase
Firm's exports denominated in foreign currency	Decrease	Increase
Firm's imported supplies denominated in local currency	No impact	No impact
Firm's imported supplies denominated in foreign currency	Decrease	Increase
Interest owed on foreign funds borrowed	Decrease	Increase

Source: Madura, J. (2014), "International Financial Management," 12th edition, South-Western College Publishing.

The impact of the two exchange rate-risk components of transaction exposure and economic exposure on a firm's value (*FVal*) can be expressed according to the following formulation:

$$\text{FVal} = \sum_{t=1}^{n} \left\{ \frac{\sum_{j=1}^{m} \left[E(CF_{j,t}) * E(FX_{j,t}) \right]}{(1+k)^t} \right\}$$

Where:

$E(CF_{j,t})$ = expected cash flows in currency *j* to be generated by the Eurozone-based parent at the end of period *t*

$E(FX_{j,t})$ = expected FX rate at which currency j can be converted to euros at the end of period *t*

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k = weighted average cost of capital of the parent firm

A widely used method to measure exchange-rate risk is value at risk (VaR)[16], although both translation and economic risks might not be easily estimated. Firms use VaR to estimate the risk (in terms of worst maximum loss) of a foreign exchange position resulting from a given business activity.

The economic exposure of a firm can be measured through regression analysis by assessing the sensitivity of the firm's cash flows to changes in exchange rates. The regression model can be estimated including additional currencies as additional independent variables or by using a composite currency index. Also, by replacing the dependent variable (cash flows), the impact of unexpected changes in the exchange rates on the firm's value (using its stock price as a proxy variable), or, alternatively, on earnings, exports, and sales may be estimated.

The regression model is estimated using the following equation:

$$\Delta CF_t = c + b\Delta FX_t + \varepsilon_t,$$

Where:

ΔCF_t= change in inflation-adjusted cash flows measured in the firm's home currency for period t

ΔFX_t= change in the currency exchange rate for period t

ε_t= error term.

In order to assess the impact of the euro depreciation on expected firm's values, we completed a cross-sectional regression analysis to estimate the significance of the relationship between the log changes in the euro effective exchange rate and the stock price log return of a representative sample of 30 constituents[17] of the EURO STOXX International Exposure Index for the period Q1 2007 through Q2 2015.

The parameters of the following regression were estimated by generalized-least-squares (GLS), applying the Parks estimator to correct for both period heteroscedasticity and general correlation of observations within a given cross-section.

LOGPi,t = C(1) + C(2)*LOGEURINDEX(t) + C(3)*LOGEURINDEX(t-1) + C(4)*LOGEURINDEX(t-2) + C(5)*LOGEURINDEX(t-3) + C(6)*LOGEURINDEX(t-4)

Where:

LOGPi,t = log return of single constituents of the EURO STOXX International Exposure Index.

LOGEURINDEX(t) to LOGEURINDEX(t-4)= log return of the Euro Effective Exchange Rate at time t and lagged by one to four periods.

[16] Formally, VaR measures the worst expected loss over a target time horizon under normal market conditions at a given confidence level.

[17] The selected constituents of the EURO STOXX International Exposure Index at Jun. 17, 2015, which were taken into account in the cross-sectional analysis, are the following: Bilfinger SE, Deutsche Post AG, Deutsche Lufthansa AG, Orion Oyj, Prysmian SpA, Immofinanz AG, UPM-Kymmene Oyj, Volkswagen AG, Rheinmetall AG, Man SE, Beiersdorf AG, Continental AG, Eni SpA, Air France KLM SA, Telefonica SA, ASML Holding NV, Dialog Semiconductor PLC, Tenaris SA, Airbus Group SE, ASM International NV, Vallourec SA, MTU Aero Engines AG, Huhtamaki Oyj,. STMicroelectronics NV, Delhaize Group SA, Koninklijke Philips NV, Acs Actividades de Construccion y Servicios SA, Technip, Alcatel Lucent SA, Lafarge SA.

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Results of the regression analysis (please see the Appendix for the estimation output) confirmed the existence of a significant inverse relationship between the two-, three-, and four-quarter lagged changes in the euro trade-weighted index and the changes in the stock market price of the selected constituents of the EURO STOXX International Exposure Index. Conversely, the relationship between the coincident and one-quarter lagged changes in the euro trade-weighted index and the changes in the stock market price of the selected constituents of the EURO STOXX International Exposure Index was positive, i.e. the opposite of the expected coefficient sign. The latter result appeared to factor in the existence of lagged effects on cash flows of internationally exposed firms.

It is noteworthy that for the period Q3 2009 through Q2 2015 the sign of the coefficient of the three-quarter lagged changes in the euro trade-weighted index became positive, suggesting the existence of a direct relationship between changes in the stock market price of the selected constituents of the EURO STOXX International Exposure Index and the euro trade-weighted index.

5 Factor analysis

Figure 13 below details the characteristics of a factor-exposure analysis using the Axioma multi-factor model on the EURO STOXX International Exposure Index compared to the EURO STOXX for the period Jul. 31, 2012, to Jul. 31, 2015.

The specific return was a negative reading (-11.70%), contributing to determining an active return in the red (-4.91%). In spite of the active return versus the underlying benchmark being negative, the EURO STOXX International Exposure Index showed a significant factor contribution over the period analyzed (+6.79%). In particular, in style-factor terms, the EURO STOXX International Exposure Index showed significant positive exposure to growth (+0.63%) and volatility (+2.39%). Conversely, a negative exposure to value stocks (-2.18%) detracted from the style contribution. At the industry-sectors level (+7.68% contribution), consumer discretionary (+0.90%), energy (+1.92%), health care (+2.44%), materials (+0.36%) and utilities (+1.49%) posted a significant factor contribution for the period analyzed.

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

FIGURE 13 EURO STOXX INTERNATIONAL EXPOSURE INDEX VERSUS EURO STOXX INDEX, SUMMARY OF FACTOR-EXPOSURE ANALYSIS (JUL. 31, 2012-JUL. 31, 2015, EUR GROSS-RETURN INDICES)

Source of Return	Contribution	Avg Exposure	Hit Rate	Risk	IR	T-Stat
Portfolio	71.29%			15.29%		
Benchmark	76.20%			15.81%		
Active	-4.91%	0.00%		2.38%	-0.46	-0.81
Specific Return	-11.70%	0.00%		1.86%	-1.40	-2.45
Factor Contribution	6.79%	0.00%		1.04%	1.46	2.56
Style	0.37%			0.47%	0.18	0.31
Exchange Rate Sensitivity	-0.59%	-0.1492	49.62%	0.15%	-0.88	-1.54
Growth	0.63%	0.1430	54.87%	0.10%	1.42	2.51
Leverage	-0.08%	-0.0597	50.64%	0.04%	-0.45	-0.80
Liquidity	-0.10%	-0.0528	48.21%	0.07%	-0.33	-0.58
Medium-Term Momentum	0.45%	-0.0107	51.28%	0.16%	0.63	1.11
Short-Term Momentum	0.16%	-0.0089	51.03%	0.13%	0.29	0.51
Size	-0.30%	0.0440	48.97%	0.15%	-0.44	-0.78
Value	-2.18%	-0.1899	43.21%	0.20%	-2.39	-4.21
Volatility	2.39%	-0.0557	54.87%	0.21%	2.56	4.50
Country	-1.18%			0.45%	-0.59	-1.04
Austria	0.05%	-0.38%	46.28%	0.03%	0.33	0.58
Belgium	0.29%	2.31%	52.31%	0.17%	0.37	0.65
Finland	0.27%	1.20%	50.13%	0.12%	0.52	0.91
France	-0.69%	-4.33%	45.13%	0.34%	-0.46	-0.80
Germany	0.29%	1.44%	48.59%	0.15%	0.44	0.78
Greece	0.08%	-0.18%	45.38%	0.07%	0.24	0.42
Ireland	0.35%	0.37%	52.56%	0.06%	1.37	2.41
Italy	-2.10%	-3.90%	45.00%	0.52%	-0.91	-1.59
Netherlands	-0.10%	2.40%	52.18%	0.18%	-0.12	-0.21
Portugal	-0.01%	-0.35%	44.36%	0.05%	-0.02	-0.04
Spain	0.38%	1.43%	51.54%	0.18%	0.46	0.82
United Kingdom	0.00%	0.00%	0.13%	0.00%	-0.83	-1.45
Industry	7.68%			0.71%	2.41	4.24
Currency	0.00%			0.00%	-1.12	-1.97
Market	-0.09%			0.01%	-1.40	-2.46
Global Market	-0.09%	0.01%	48.33%	0.01%	-1.40	-2.46
Sectors	7.68%	0.01%		0.71%	2.41	4.24
Consumer Discretionary	0.90%			0.18%	1.12	1.97
Consumer Staples	0.22%			0.19%	0.25	0.45
Energy	1.92%			0.23%	1.87	3.30
Financials	-0.63%			0.24%	-0.59	-1.03
Health Care	2.44%			0.21%	2.64	4.64
Industrials	-0.17%			0.14%	-0.27	-0.48
Information Technology	0.82%			0.18%	1.00	1.76
Materials	0.36%			0.04%	1.79	3.14
Telecommunication Services	0.33%			0.11%	0.67	1.18
Utilities	1.49%			0.27%	1.24	2.18

Source: AXIOMA, based on STOXX data

As highlighted above, the EURO STOXX International Exposure Index showed exposure to unintended factors. Apart from the growth factor, which might have been expected—given the higher price-to-fundamentals multiples of firms benefiting from an export bias and receiving a boost from a depreciating pattern of the euro, the EURO STOXX International Exposure Index had a negative volatility bias—seen in the negative exposure to the volatility factor and a negative value bias, which detracted from the performance for the period. (Institutional investors should be aware of these potential secondary exposures, which in some cases might be desirable features, and manage them appropriately.)

In assets-contribution terms the 15 top constituents ranked by active contribution against the benchmark showed a return contribution in the 0.64% to 2.76% range. It was noteworthy that the largest active

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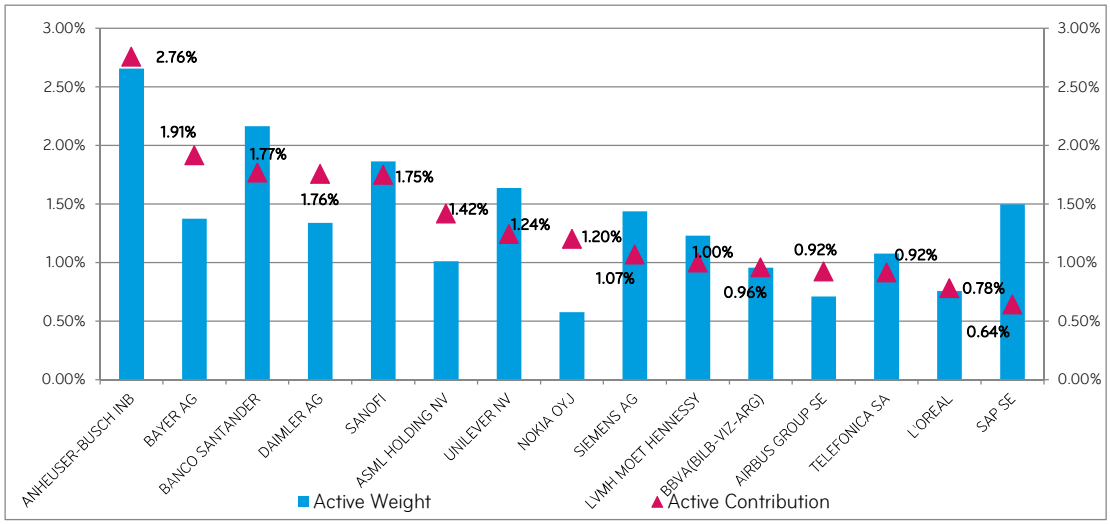
contribution (+2.76%) came from Anheuser-Busch Inbev., for which revenues from exports accounted for 90% of its 2014 total revenue.
Consistently, firms such as Bilfinger SE and Viscofan SA—for which revenues from exports accounted for the relatively lower marginal readings of 2014 total revenue, respectively—were ranked at the bottom of the contribution league table for the period Jul. 31, 2012, to Jul. 31, 2015. Both firms posted an active contribution to the tune of 0.02%. Also, in the specific case of Bilfinger SE, the Eurozone's faltering economy failed to provide—for the analysis period—any momentum to Bilfinger's core segment of industrial services or for its supporting services to energy transformation processes.

FIGURE 14 EURO STOXX INTERNATIONAL EXPOSURE INDEX VERSUS EURO STOXX INDEX, 15 TOP CONSTITUENTS, ACTIVE-RETURN CONTRIBUTION VERSUS ACTIVE EXPOSURE (JUL. 31, 2012-JUL. 31, 2015, EUR GROSS-RETURN INDICES)



Source: AXIOMA, based on STOXX data

The two figures below show the active-return contribution versus the active exposure for the two largest factors identified in the performance-attribution analysis.

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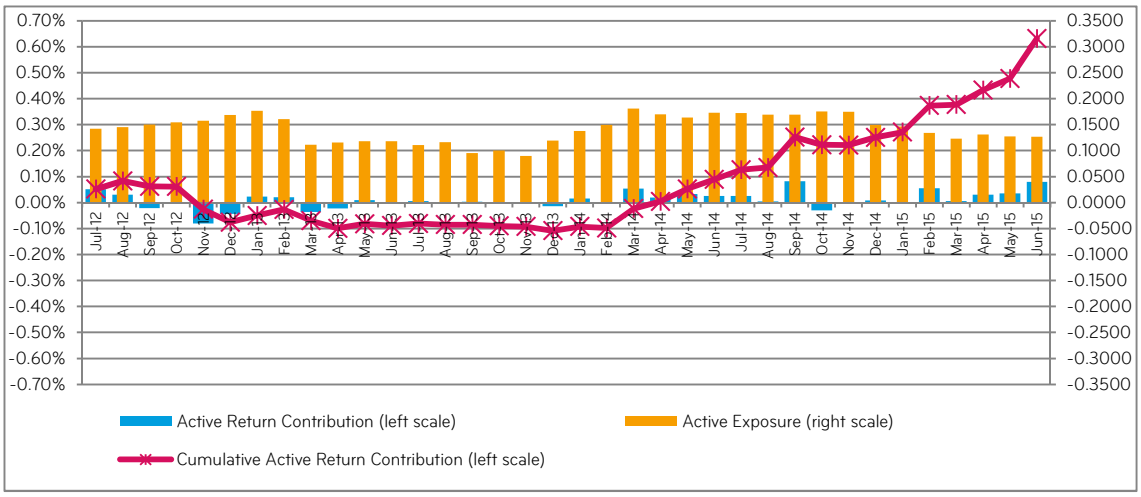
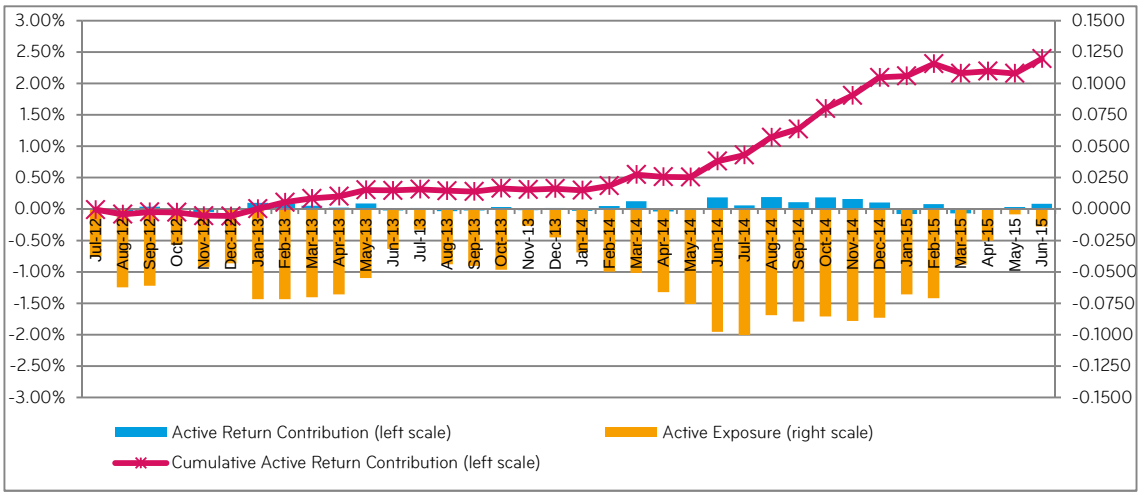
FIGURE 15 EURO STOXX INTERNATIONAL EXPOSURE INDEX VERSUS EURO STOXX INDEX, GROWTH, ACTIVE-RETURN CONTRIBUTION VERSUS ACTIVE EXPOSURE (JUL. 31, 2012-JUL. 31, 2015, EUR GROSS-RETURN INDICES)



Source: AXIOMA, based on STOXX data

FIGURE 16 EURO STOXX INTERNATIONAL EXPOSURE INDEX VERSUS EURO STOXX INDEX, VOLATILITY, ACTIVE-RETURN CONTRIBUTION VERSUS ACTIVE EXPOSURE (JUL. 31, 2012-JUL. 31, 2015, EUR GROSS-RETURN INDICES)



Source: AXIOMA, based on STOXX data

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6 Conclusions

As globalization shapes the broadening of firms' operations across various regions and countries, the country of incorporation or the headquarters' domicile provides limited information about the fundamentals that drive firms' revenue stream and their potential for success.

The economic exposure of companies represents a new factor in the construction of diversified equity portfolios that could well serve as an alternative metric to the traditional country-factor definition.

Institutional investors and pension plans should be wary of economic exposure as a key factor in designing asset allocation policies. Revenue streams and their drivers across various geographies—better than firms' country of domicile—could serve well in aiding the understanding of risks and opportunities tied to a diversified global portfolio of risky assets, with the ultimate goal of building investment programs that are aligned with participants' risk/return objectives.

For instance, since the start of the Eurozone debt crisis in May, 2011 and for the whole year 2012, informed investors could have gained more insight as to the level of portfolio exposure to the European consumer base rather than to the traditional country-factor allocation. In this case, portfolio allocation to a euro international exposure index would have rewarded investors because of an international-exposure premium that factored in the larger revenue potential of firms with an international consumer base and greater export propensity.

Alternatively, later in 2014 savvy investors could have assessed the exposure ratio of Eurozone-based companies and their degree of international exposure in order to lock in any performance potential arising from the depreciating pattern of the euro in the global FX markets.

An analysis of the performance of the EURO STOXX International Exposure Gross-Return Index confirmed that the international exposure index outperformed the underlying EURO STOXX Index in both absolute and risk-adjusted terms over longer measurement periods. Furthermore, except for periods of volatility clustering, higher active returns of the EURO STOXX International Exposure Index in excess of the EURO STOXX Index were observed in periods of higher negative correlation patterns with the Euro Effective Exchange Rate dynamics.

In particular, an analysis of the sensitivity to the FX rate of the performance of the EURO STOXX International Exposure Index relative to the EURO STOXX Index through three main depreciation cycles of the euro confirmed existence of a positive log return differential between the two indices. Conversely, for a fourth depreciation cycle (Jul. 11, 2008-Oct. 27, 2008, credit crisis, with an 11.63% Euro Effective Exchange Rate Index depreciation), the EURO STOXX International Exposure Index posted a negative 9.02% log return differential against the EURO STOXX Index. In that period of significant global market dislocation and volatility clustering, markets appeared to factor in information arrival and risk-on/risk-off drivers rather than fundamentals.

For the Oct. 23, 2009-Jun. 29, 2010 period (Greece's fiscal position crisis, with a 14.72% Euro Effective Exchange Rate Index depreciation), the log return differential between the EURO STOXX International Exposure Index and the EURO STOXX Index was a positive 8.38%. During the May 4, 2011-Jul. 24, 2012 period (Eurozone debt crisis, with a Euro Effective Exchange Rate Index depreciation of 14.14%), the EURO STOXX International Exposure Index posted a positive 8.49% log return differential against the

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EURO STOXX Index. Finally, for the period from Mar. 12, 2014, to Jul. 31, 2015 (weak macro data, geopolitical tensions, Russian crisis, oil- and Grexit-driven market corrections, with a 12.14% Euro Effective Exchange Rate Index depreciation), the log return differential between the EURO STOXX International Exposure Index and the EURO STOXX Index was positive to the tune of 3.11%.

The economic exposure of unanticipated changes in the exchange rate should be fully assessed on both revenues (sales and exports) and operating expenses (input factors and imports). In this study, we could see how, generally speaking, firms with a higher component of foreign input factors will be less favorably impacted by a depreciating domestic currency. Considering the impact of economic exposure on input factors may well make an international exposure index methodology more robust. That is left for future research, and an investigation in this area would appear to be promising.

STOXX® INTERNATIONAL EXPOSURE INDICES – TILTING INDEXING STRATEGIES TOWARD FIRMS' ECONOMIC EXPOSURE

Appendix A

FIGURE 17 ESTIMATION OUTPUT, EURO STOXX INTERNATIONAL EXPOSURE INDEX CONSTITUENTS' LOG RETURN VERSUS EURO EFFECTIVE EXCHANGE RATE INDEX (Q1 2007-Q2 2015, QUARTERLY DATA)

Dependent Variable: EURO STOXX INTL. EXP. CONSTITUENTS' LOG RETURN
Method: Pooled EGLS (PARKS ESTIMATOR)

Sample (adjusted): 2008Q2 2015Q2
Included observations: 29 after adjustments
Cross-sections included: 30
Total pool (balanced) observations: 870
Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.022725	0.001293	17.57990	0.0000
LOGEUROEFFECTIVEFX	0.540500	0.058055	9.310074	0.0000
LOGEUROEFFECTIVEFX(-1)	0.184987	0.039315	4.705209	0.0000
LOGEUROEFFECTIVEFX(-2)	-0.900102	0.030949	-29.08341	0.0000
LOGEUROEFFECTIVEFX(-3)	-0.616942	0.044871	-13.74933	0.0000
LOGEUROEFFECTIVEFX(-4)	-1.232719	0.045512	-27.08587	0.0000

Weighted Statistics

R-squared	0.979049	Mean dependent var	2.168873
Adjusted R-squared	0.978928	S.D. dependent var	6.617446
S.E. of regression	1.003043	Sum squared resid	869.2662
F-statistic	8074.996	Durbin-Watson stat	1.995844
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.068346	Mean dependent var	0.020728
Sum squared resid	34.79694	Durbin-Watson stat	1.733469

Source: STOXX

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FIGURE 18 ESTIMATION OUTPUT, EURO STOXX INTERNATIONAL EXPOSURE INDEX CONSTITUENTS' LOG RETURN VERSUS EURO EFFECTIVE EXCHANGE RATE INDEX (Q3 2009-Q2 2015, QUARTERLY DATA)

Dependent Variable: EURO STOXX INTL. EXP. CONSTITUENTS' LOG RETURN
Method: Pooled EGLS (PARKS ESTIMATOR)

Sample: 2009Q3 2015Q2
Included observations: 24
Cross-sections included: 30
Total pool (balanced) observations: 720
Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.040000	0.003316	12.06388	0.0000
LOGEUROEFFECTIVEFX	0.926220	0.065239	14.19732	0.0000
LOGEUROEFFECTIVEFX(-1)	0.136927	0.061688	2.219668	0.0268
LOGEUROEFFECTIVEFX(-2)	-1.264976	0.053460	-23.66209	0.0000
LOGEUROEFFECTIVEFX(-3)	0.578422	0.072194	8.012040	0.0000
LOGEUROEFFECTIVEFX(-4)	-0.442364	0.074781	-5.915464	0.0000

Weighted Statistics

R-squared	0.453588	Mean dependent var	0.526491
Adjusted R-squared	0.449762	S.D. dependent var	1.436976
S.E. of regression	1.003674	Sum squared resid	719.2555
F-statistic	118.5412	Durbin-Watson stat	1.993433
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.119530	Mean dependent var	0.037707
Sum squared resid	18.17052	Durbin-Watson stat	1.879302

Source: STOXX

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