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International Stock Market Co-Movements and Politics-Related Risks

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Abstract

We investigate the determinants of international stock market co-movements, shedding light on the relevance of politics-related factors. We propose a new characterization for the link connecting politics and financial markets, disentangling two different components: political risk and economic policy risk. We uncover the surprisingly low correlation between the two variables, and show they are priced differently by the market.

We implement a pairs trading strategy, in the spirit of Gatev et al. (2006), which loads on international stock market co-movements. Exclusively relying on hard macro-data proves not to be sufficient to explain the statistically significant and economically large returns generated by the strategy. We show how to increase the abnormal returns (alphas) generated by the strategy by exploiting shorter-time co-movements. We document the utmost relevance of political risk, which explains and predicts returns driven by both short-term and long-run correlations. Our analysis also unveils the relevance of confidence factors, especially foreign investors' confidence, which should therefore be accounted for when assessing the co-variation of international stock market prices.

Keywords: international stock markets, political risk, economic policy risk, pairs trading, predictive regressions, CDS spreads, abnormal returns

JEL classification: G12, G15

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Knight in the Order of Academic Palms.

1 Introduction

1.1 Point of departure: The growing interdependence between international stock markets

International stock market interdependence has been steadily increasing in the last century. The extant literature has insofar widely ascertained this growing integration, starting from Whitley (1988) and Lin et al. (1994). Accordingly, several models have been put forward for a more in-depth understanding of this interdependence. To start with, Chan et al. (1992) claim not to be able to reject the international version of the CAPM, a finding that is also vindicated by Richards (1995), with the latter shedding light on the common world component affecting national stock market indices. The empirical evidence hitherto adduced suggests an increasing correlation along two dimensions: temporal and geographical. Equity market linkages have been rising over time as well as across countries, in a world that keeps on moving towards openness and interdependence and where the role played by spillovers becomes key.

In this strand of literature, several studies document the rising correlation along the time dimension, starting from the seminal paper of Longin et al. (1995), which rejects the hypothesis of constant conditional correlation among international financial markets in the period 1960-1990. Proceeding along the same path, Kim et al. (2005) reinforce the result in the time interval 1989-2003, stressing how key the introduction of the European Monetary Union was for regional as well as global stock market integration. Hamao et al. (1990) document the short-run interdependence of prices and price volatility among international stock markets before the 1987 market crash. Koutmos et al. (1995) corroborate this empirical evidence focusing on the period after the market slump that occurred in 1987.

As to the space dimension, Jondeau et al. (2006) implement GARCH-copula methods to show the particularly high interdependence among European markets. From the same perspective, Thorbecke (1997) reports the remarkable effects of monetary policy on ex-post stock market returns, which therefore acts as a natural impulse towards more interdependence among European markets due to the common ECB policy. On the other hand, Morck et al. (2000) assert that stock prices tend to co-move more in poor rather than rich economies, and Bekaert et al. (1995) point out that emerging markets

exhibit time-varying integration, with some markets displaying higher correlation than what would be suggested by the restrictions they impose on foreign investment. Aloui et al. (2011) run an analysis on the BRIC countries and their intimate relation with the US stock market, asserting that high levels of dependence persistence are observed for all market pairs during bullish as well as bearish periods.

The correlation between international equity markets becomes even stronger during market crashes, as shown by Longin et al. (2001). Likewise, Poon et al. (2001) point in the same direction finding that an increase in daily correlation occurs after a large negative return. This evidence addresses the debate towards the existence of contagion in bond markets, as discussed by Gande et al. (2005), and in stock markets. In this respect, Forbes et al. (2002) separate the notion of interdependence from that of contagion, claiming that during several financial crises international stock markets were indeed interdependent although no contagion occurred.

1.2 Motivation: explaining and exploiting such an interdependence

This growing interdependence has therefore been widely documented in all its aspects. In this framework, the next logical step is to *i)* investigate if and how an investor can benefit from this interdependence, and *ii)* identify the main determinants of stock market co-movements. From a financial perspective, this boils down to establishing which international factors are priced by the market. Ferson et al. (1994) put forward a multifactor model explaining international expected returns by means of macroeconomic variables, and Ferson et al. (1997) then moved to address the issue of predictability in international stock market returns. Roll (1992) also looked at the comparative behaviors of international equity markets, asserting that these behaviors may depend on exchange rates and on the specific industrial structure of each country.

As a consequence, notwithstanding that stock market interdependence has been hitherto extensively studied, there is room for and need of further research to clarify *i*) why international stock markets co-move, *ii*) which factors drive these co-movements, *iii*) whether common international stock market fluctuations reflect standard macroeconomic news or whether other factors have been overlooked so far, and *iv*) if and how investors may systematically benefit from these common market fluctuations. The lit-

erature does not provide a detailed explanation regarding which factors underlie the co-dynamics of international equity markets. There may be an impact of some macroeconomic factors, but it is not clear which they are. For instance, we do not know what is the relative importance of public deficits, GDP growth, unemployment or monetary policy, to cite only a few.

This paper aims to contribute to the literature by filling these gaps. First, it aims to show how to effectively implement pairs trading, an investment strategy that loads on the co-movements between couples of assets. If countries are becoming more closely related, and their stock markets more interdependent accordingly, the most logical way to proceed for an investor is to design a trading strategy able to exploit the co-movements between assets that replicate the dynamics of these stock markets. We show that designing such a strategy is feasible, in that it can be easily replicated by any investor, both retail and institutional, and that indeed it can generate economically and statistically significant abnormal returns.

After showing how to build a strategy that yields such high abnormal returns and how to maximize the strategy returns through an appropriate calibration of the model parameters, the second logical step is to attempt to explain from where do these abnormal returns come from. We seek to understand which international factors significantly impact international stock market co-movements. We do not focus only on those factors proposed in the literature, but we enlarge the set of test factors to other variables that received less attention in the literature but which could potentially have a huge impact on international market co-movements, as for example political indicators.

1.3 The (crucial) role played by political factors

Indeed, the attention of researchers, investors and the general public should not be solely captured by standard macroeconomic factors, but also by other less investigated yet influential elements. We hypothesize that yet another crucial factor has been much overlooked so far: the interconnection between politics and financial markets. In addition, when it has been considered, its proposed definition has lacked accuracy. Given its abstract nature, politics and its linkages with financial markets need to be clearly defined and as precisely measured as possible. Vague and equivocal terminology has made difficult to quantitatively approach this issue and disentangle the different components inside the notion of politics.

For a better understanding of the political dimension, we should untie two separate yet related aspects. On the one hand, *political risk* relates to government instability and institutional and legal weaknesses. On the other hand, *economic policy risk* concerns the ineffectiveness, inadequacy and inaptitude of economic changes or reforms implemented by a government. For instance, political authorities may benefit from a solid position among voters but not be able to conduct the economic reforms most effective for the country. In this paper, we investigate these two aspects separately and quantitatively assess their respective contribution to international stock market co-movements.

[Insert Table 1 Near Here]

To substantiate the claim that disentangling these two components of politics is important, Table 1 provides the ranking for 32 countries worldwide regarding their political risk and economic policy risk. Although the details about the construction of these two variables will not be discussed until Section 3, we hint at the importance of separating them by pointing out some surprising and intriguing empirical evidence. So far, no paper has ever distinguished these two factors within a formal asset pricing model, implying that political risk and economic policy risk have been thought of as conveying essentially the same information. Yet, Table 1 reveals that they can lead to drastically different interpretations and can influence variously financial markets.

Consider first the following illustrative examples. For the period 2008-2015, France is 6th in the political risk ranking, meaning that only 5 countries display lower political risk. In that respect, France turns out to be the best European country on the list. Nevertheless, as far as economic policy risk is concerned, France is ranked 21st (out of 32) only, which reflects the fact that the economic policies of 20 other countries have been judged more effective. Equally astonishing is the fact that Turkey's rank is 29th for political risk, with only China, Russia and Indonesia suffering from higher risk, but is 16th for economic policy effectiveness, 5 ranks above France. China is an even more extreme case: it ranks 30th for political risk, displaying a very high value for this indicator, but 8th for its economic policy effectiveness.

To vindicate these findings, we compute the Kendall-τ correlation coefficient between political risk and economic policy risk. We compute this statistic to assess whether, when country i has higher political risk with respect to country j, this relative ranking

still holds for economic policy risk, *i.e.* country i also displays higher economic policy risk with respect to country j. The Kendall-τ correlation coefficient (which ranges from -1 to $+1$) is 0.35 only, quite a small value. Therefore, the relative ranking of one country with respect to another for political risk is unlikely to be respected in the ranking for economic policy risk. This confirms the relevance of distinguishing these variables and considering them as different factors.

Separating political risk from economic policy risk and assessing their differential impact on international stock market co-movements is a novel approach. Although Diamonte et al. (1996) claim that political risk matters only for developing countries, we show that political risk is an undeniable risk factor to be taken into consideration to understand market co-movements for both more and less developed countries. Moreover, Bailey et al. (1996) study monetary and political turbulences in Mexico and report that these two aspects are reflected into prices, exactly as Perotti et al. (1999) underscore how important the resolution of political risk in emerging markets has been for local stock market development and their excess returns. Also Gultekin et al. (1989) agree on the importance of politics, providing evidence of different prices of risk for the US and Japan before but not after liberalization reforms. Interestingly, Foerster et al. (1997) allege that the US election cycle may be an important non-diversifiable political factor in the determination of international expected returns. Nevertheless, neither have these or other papers differentiated between the different components of the interconnections between politics and equity markets, nor have they controlled for several other macroeconomic risk factors to assess their relative importance for stock market returns. Our main focus translates in further explaining market co-movements, shedding light on the relevance of different political factors and showing how an investor can systematically exploit them.

1.4 Confidence indicators and international stock market returns

Another element of innovation brought about by this paper regards confidence indicators. We hypothesize that hard macroeconomic data by themselves cannot explain the cross-section of stock market returns and their co-movements. We should consider the sentiment of all participants for each domestic market: *i)* consumers, *ii)* firms and *iii) foreign* investors. Baker et al. (2006) attempt to explain the cross-section of US

returns by investors' sentiment, and Schmeling (2009) widens the scope of the analysis to 19 international stock markets. Stambaugh et al. (2012) try to reconcile some well-known asset pricing anomalies by also taking into account investors' sentiment. In this paper we disentangle the separate impact stemming from the confidence of each of the three aforementioned types of agents.

While Lemmon et al. (2006) investigate the channel between consumers' optimism and stock market returns, this research is not limited to domestic consumers and provide evidence of the misleading conclusions that would stem from such a limitation. The sentiment of each type of agent impacts variously stock prices, and displays different explanatory and predictive power according to circumstances. This novel approach hinges on the belief that consumers, firms' managers and foreign investors are heterogeneous in opinions, confidence, and way of thinking and evaluate the economic situation from different perspectives and according to different utility functions. Accordingly, we conjecture that international stock market co-movements are not only driven by hard macroeconomic data, but also by factors such as political and policy risks and sentiment of the various market players.

It could be objected that investors are obviously also consumers. However, disentangling *foreign* investors' confidence from (domestic) consumers is further motivated by other considerations, such as the well-established home bias. Consequently, our consumer and business confidence indices for one country will refer to consumers and firms actually based in this country while the foreign investors' confidence level will relate to non-residents who consume in other countries. Furthermore, regarding consumers' and business confidence, surveys are conducted by asking consumers and managers to assess very different elements. Consumers are required to provide an evaluation of their purchasing power in addition to their confidence about the possibility to buy durable goods in the near future, while firms' managers are asked to give the enterprises' assessment of production, orders and stocks, as well as the current position and expectations for the immediate future. Our working hypothesis is that financial markets react to the release of our three confidence indicators, as the latter reflect the participants' expectation of variables which are correlated with economic growth, cash-flows and dividends, and therefore asset prices.

[Insert Table 2 Near Here]

Inspection of the data confirms that relying on one indicator only would not allow to properly understand how sentiments are translated into market prices. Table 2 shows that confidence indicators should not be thought of as variables conveying the same information. Exactly as for political variables, the rankings for the three confidence indicators can be drastically different. As far as business and consumers' confidence are concerned, we standardize the variables to ensure comparability, given that the data come from different sources for each country. Focusing on the median values of these two confidence indicators in the period 2008-2015, the analysis reveals that Russia is ranked 5th in the business confidence ranking, but only 30th in the consumers' confidence ranking. France is ranked 10th regarding consumers' confidence, whereas firms seem to be very pessimistic about the evolution of the French economic situation in this sample period, driving the country to occupy the third-to-last position in the business confidence ranking. Even more surprisingly, Finland leads the consumers' confidence ranking but is only 26th as far as business confidence is concerned.

The Kendall-τ correlation coefficient between consumers' and business confidence is only 0.34. Besides, it displays a value of 0.25 for the rank correlation between the standardized business and foreign investors' confidence, and it becomes even lower, 0.21, when assessing the correlation between consumers' and foreign investors' confidence. It is therefore clear that these indicators reflect the opinions, hopes and forecasts of very different economic agents, who have different points of view, priorities and interests.

Confidence indicators measure the deterioration or improvement in the situation according to the economic agents, and not an absolute value. Hence, emerging markets that are growing fast may display high values of confidence because of the improvement of the overall economic situation, whereas developed countries suffering from a financial crisis may have more pessimistic economic agents who unexpectedly observe their wealth deteriorating. This explains why some European countries are badly ranked in the period 2008-2015, as Table 2 displays, in addition to the impact of the Great Recession. This also reinforces the main point of the paper: making use of only one measure of confidence, or instrumenting the overall sentiment of the economic agents with only one indicator would be prone to yield misleading results. The same warning applies to political variables and their relationship to stock returns.

To sum up, the contribution of this paper is threefold. First, we show whether and how it is possible for an investor to consistently benefit from stock market comovements. Second, we identify those variables affecting the sign and magnitude of

stock market co-movements, highlighting how relevant it is to take into account the impact of political environment, economic policy and confidence indicators. Finally, focusing on CDS spreads, we show that macroeconomic variables cannot suffice to explain country risk: Politics-related risk factors are important in explaining stock market co-variations but also the pairwise differences in CDS spreads among countries. Country risk is usually thought of as a general indicator affected by several specific risks which a country is exposed to, such as political, economic policy related, systemic and geographical risks. CDS spreads are supposed to incorporate all these risks and reflect how the market prices them all together. We show that economic policy risk is the variable that affects CDS spreads the most, after controlling for political risk, a finding that vindicates the need to separate these two risk factors for understanding asset prices. Likewise, focusing not on single market dynamics but on co-dynamics between pairs of stock markets allows to study the recurrent common patterns that international equity markets display.

The paper is structured as follows. Section 2 depicts the research design, emphasizing more specifically the strategy applied to exploit international stock market co-movements as well as the regression-based approach undertaken to explain financial market dynamics and their interdependence. Section 3 details the data, which in themselves represent an innovative element of this research. Section 4 moves to describing the empirical findings, focusing on *i)* statistical and economic importance of international pairs returns, *ii)* factors that help explain these strategy returns, *iii)* factors that help explain the positive abnormal strategy returns from the model of Carhart (1997), *iv)* predictors that help forecast pairs returns and therefore international stock market co-movements, and *v)* the determinants of cross-sectional differences in country risk reflected by CDS spreads. Section 5 concludes.

2 Research Design

We start investigating the behavior of each stock market relative to another one by implementing a pairs trading strategy. Let us denote by p_t^A and r_t^A respectively the price and the return of asset A at time t. The normalized price $\tilde{P}_t^A$ is defined as

$$\tilde{P}_t^A \equiv \prod_{i=1}^{t} \left(1 + r_i^A\right). \tag{1}$$

Given two assets A and B, we compute at each time t the dynamics of the difference in normalized prices

$$d_t^{A,B} = \tilde{P}_t^A - \tilde{P}_t^B, \tag{2}$$

the mean and standard deviation of which are defined as

$$\mu_d^{A,B} \equiv \mathbb{E}\left[d^{A,B}\right] \tag{3}$$

and

$$\sigma_d^{A,B} \equiv \sqrt{\mathbb{E}\left[\left(d^{A,B} - \mathbb{E}\left[d^{A,B}\right]\right)^2\right]}. \tag{4}$$

If assets A and B co-move, $d^{A,B}$ will be, by construction, stationary and mean-reverting. Indeed, as long as asset A outperforms (underperforms) asset B, the former will soon underperform (outperform) the latter to close the gap and re-establish their statistical equilibrium relationship. Should this not happen, in a given time period the two securities would not co-move anymore but one of them would consistently outperform or underperform the other.

If the properties of stationarity and mean-reversion hold, benefiting from these co-movements is straightforward. A *formation period* and a *trading period* have to be defined. During the former, the dynamics of $d^{A,B}$ are observed and studied, so as to come up with an estimate of $\mu_d^{A,B}$ and $\sigma_d^{A,B}$. During the latter, a trading strategy can be performed, under the assumption that if the two stock markets co-move, any temporary mispricing would be swiftly wiped out in such a way that $d^{A,B}$ will always fluctuate around its mean.

To establish a trading rule we need to define a corridor $c^{A,B}$ for the difference in normalized prices as

$$c^{A,B} \equiv \left[\mu_d^{A,B} - k\,\sigma_d^{A,B}\,;\quad \mu_d^{A,B} + k\,\sigma_d^{A,B}\right] \tag{5}$$

for any arbitrary constant k. Gatev et al. (2001) use $k = 2$, together with a 250-day formation period and a 125-day trading period. In this paper, we test several different values of k and show that its choice can lead to drastically different results and interpretations.

The trading strategy is illustrated in Figure 1.

[Insert Figure 1 Near Here]

A trading position will be opened at time t in either of the following two scenarios.

- $d_t^{A,B} > \mu_d^{A,B} + k\,\sigma_d^{A,B}$: as soon as $d_t^{A,B}$ crosses the upper threshold *from above*, a trading position is opened. Since asset A is overpriced with respect to asset B, the strategy is short A and long B.
- $d_t^{A,B} < \mu_d^{A,B} - k\,\sigma_d^{A,B}$: as soon as $d_t^{A,B}$ crosses the lower threshold *from below*, a trading position is opened. Since asset A is underpriced with respect to asset B, the strategy is long A and short B.

Thus, defining the indicator variable

$$I_t^{A,B} = \begin{cases} 0, & \textit{not open} \\ +1, & \textit{short } A,\ \textit{long } B \\ -1, & \textit{long } A,\ \textit{short } B \end{cases} \tag{6}$$

and denoting by r_t^A and r_t^B the returns for assets A and B at time t, the daily return for the pair formed by securities A and B, denoted by $r_t^{A,B}$, can be computed as

$$r_t^{A,B} = I_t^{A,B}\,\left(r_t^B - r_t^A\right). \tag{7}$$

Assets A and B are bought and sold short such that the resulting portfolio is self-financing. The quantities to be traded for each of the two securities are therefore selected according to their respective prices. To perform this strategy, the investor does not need *ex ante* any financial resource. In both scenarios, the positions are simultaneously closed as soon as, at time t, one of the following two conditions is met. If $d_t^{A,B}$ crossed $\mu_d^{A,B}$, a statistical-arbitrage profit would be ensured. However, if $d_t^{A,B}$ did not revert to its mean, but on the contrary hit the upper or lower threshold, thereby stepping out of the corridor, the profit would be equal to zero: the positions would be closed at a value of $d_t^{A,B}$ exactly equal to its value when the positions had been opened. A *caveat*, however, is in order: dealing with continuous time processes, there is a tiny yet unavoidable probability of the process being tangent to the upper (lower) boundary from above (below), triggering the opening of the positions but then diverging away from the corridor. In this scenario, the strategy would suffer a loss.

Actually, the discussion above only holds in theory, not in a simulation-based approach such as the one implemented here. In fact, we have at our disposal data at daily frequency, meaning that we implicitly have to assume to open and close the positions at the end of the trading day at the closing prices. However, the thresholds will be most frequently crossed during the trading day, which implies that we would buy (sell) at a different price than the one at which traders would be able to execute their intraday transactions. As a consequence, in our simulations the strategy does sometimes produce negative returns: the condition under which this occurs relates to the cases when $d_t^{A,B}$ steps out of the corridor without being able to revert to the mean. Nevertheless, although the imprecision stemming from making use of daily data is not to be denied, this should not significantly affect the results: in fact, the same problem occurs when $d_t^{A,B}$ either reverts back and crosses the mean of the corridor or it steps out of the latter, slightly distorting gains and losses with equal probability. Nevertheless, although the imprecision stemming from making use of daily data is not to be denied, this should not significantly affect the results: in fact, the same problem occurs when $d_t^{A,B}$ either reverts back and crosses the mean of the corridor or it steps out of the latter, slightly distorting gains and losses with equal probability.

We implement a rolling-window approach. Let us suppose that each formation period contains n_1 days and each trading period comprises n_2 days. To start with, the parameters of the corridor are estimated over the first formation period, at the end of which the first trading period begins. The second formation period is still made of n_1 days and its last day coincides with the end of the first trading period. Then,

during the second formation period, a new corridor is set up according to the values estimated during this second formation period itself. This new corridor is used for the implementation of the strategy in the second trading period. In this way, there are no intervals between any consecutive trading periods, hence the trading activity is never stopped. This mechanism is repeated until the end of the sample. Moreover, at the end of each trading period, the positions that are still open, if any, are closed irrespective of the values of $d_t^{A,B}$, because of the re-estimation of the parameters. Not to lose information, the condition $n_1 \geq n_2$ must hold.

This procedure yields a collection of daily returns. When compounding these returns at longer horizons, a difficulty arises. As the strategy is by definition self-financing, it is not possible to cumulate returns: for any zero-cost portfolio the division by zero would lead to financially meaningless results. To solve this problem and compute the annualized returns of the strategy, we proceed as follows. We first cumulate the daily returns for the long and short portfolios separately. Thus, we end up with two cumulated returns at the end of the strategy, which we annualize independently. The last step consists in summing up the two annualized returns for the long and short portfolios to find the net annualized return of the strategy.

It is commonly believed that pairs trading returns merely reflect reward to mechanical arbitrage. Pairs trading is allegedly performed mostly by hedge-funds and professional traders who are indifferent to macroeconomic factors and confidence and political indicators. They are supposed to merely exploit co-integration relationships among market prices by means of automated trading strategies. One of our objectives is to show that pair returns can also be explained by economic and political forces. To achieve this goal, we project pairs trading returns on the space spanned by a set of three types of regressors: *target* variables and *control* variables subdivided into hard macroeconomic variables and experts' qualitative evaluations. An in-depth description of all the explanatory variables is provided in the next section.

The target variables in this study are political and confidence indicators. As far as politics is concerned, we assess political risk and economic policy risk separately by using the following two variables.

- First, *Political Risk*, referring to factors such as government instability, institutional risk, information access and transparency.

- Second, *Economic Policy Risk*, denoting the quality of the government interventions on the economic environment.

Whilst the first factor mainly captures institutional instability and government credibility, the second one identifies the link between government economic policies and the real economy, with a specific focus on the effects of the former on the latter. Accounting for this second factor turns out to be of considerable relevance: a government may have the necessary votes to maintain political stability, but it may not implement the most adequate economic reforms. Measuring these two issues requires assigning two scores to each country. The higher the political risk, the more unstable political institutions are. The higher the economic policy risk, the farthest the political economy reforms put in place by the government are from those identified as optimal by economists and supranational institutions such as the IMF or the World Bank.

As to confidence indicators, sentiment or optimism may affect financial asset prices. Barberis et al. (2003) for instance survey the main implications of behavioral biases, underscoring the importance of sentiment in finance to help explain in particular the equity premium puzzle and the cross section of expected returns. Then, macroeconomic data may affect financial markets through two related but distinct channels, namely the shocks per se on the economy and the perception that market participants have of these shocks. It is thus of interest to assess whether confidence indicators help explain stock market reactions, given newly released macroeconomic data.

Let us then define:

- $EP_{t,p}$: the absolute value of the difference between economic policy risk in the two countries forming pair "p", in quarter t;
- $PR_{t,p}$: the absolute value of the difference between political risk in the two countries forming pair "p", in quarter t;
- $IC_{t,p}$, $BC_{t,p}$ and $CC_{t,p}$: the absolute value of the difference between, respectively, foreign investors' confidence, business confidence and consumers' confidence in the two countries forming pair "p", in quarter t;
- $\boldsymbol{x}_{Z\times 1}^{(t,p)}$: the vector that contains the absolute value of the difference for pair p at time t for all the Z control variables. For this purpose, the key control is the standard deviation of the strategy: if pairs returns were merely reflecting

pure reward to arbitrage, controlling for the volatility would render all the other coefficients statistically not different from zero.

With N quarterly observations for pairs returns ($t = 1, 2, ..., N$) and the independent variables, the strategy returns for pair $p = 1, 2, ..., P$, formed by assets A_p and B_p, at time t writes

$$r_{t,p} = \alpha_p + \beta_{1,p}\, EP_{t,p} + \beta_{2,p}\, PR_{t,p} + \beta_{3,p}\, IC_{t,p} + \beta_{4,p}\, BC_{t,p} + \beta_{5,p}\, CC_{t,p} + \boldsymbol{\gamma}_{1\times Z}\, \boldsymbol{x}_{Z\times 1}^{(t,p)} + \epsilon_{t,p} \tag{8}$$

controlling for pair fixed effects too. Furthermore, in order to investigate the predictive power of our target and control variables, we run the following set of panel regressions

$$\begin{aligned} r_{t,p} = \alpha_p + \beta_{1,p}\, EP_{t-h,p} + \beta_{2,p}\, PR_{t-h,p} + \beta_{3,p}\, IC_{t-h,p} + \\ + \beta_{4,p}\, BC_{t-h,p} + \beta_{5,p}\, CC_{t-h,p} + \boldsymbol{\gamma}_{1\times Z}\, \boldsymbol{x}_{Z\times 1}^{(t-h,p)} + \epsilon_{t,p} \end{aligned} \tag{9}$$

with $h \in H = \{1, 2, 3, 4\}$. This allows to gauge the predictive power of our target variables at four different horizons. More specifically, as a direct consequence of the quarterly frequency of the data, we assess the predictive power from 3 months up to 1 year.

In all panel regressions, the explained variable is represented by quarterly returns of the pairs trading strategy for each pair. We proceed as follows. We first stack in a column vector the pairs trading returns for all quarters for the second pair below the pairs returns for all quarters for the first pair. Then, likewise, the N quarterly returns for pair p are stacked below the N quarterly returns for pair *p-1*, including in the vector of the explained variable all possible pairs. As to the explanatory variables, we first standardize the regressors such that every one has mean zero for every country. Then for each pair we compute the absolute value of the difference between a given regressor's values for the two countries in the pair. For each and every regressor, we stack in a vector all the differences for pair p below all the differences for pair *p-1*, exactly as for the dependent variable.

Working with pair differences allows to figure out whether stock market co-movements are driven by some priced factors. Since we compute the absolute value of the difference in the two countries in the pair for each standardized regressor, those factors which

contribute in driving the co-movements in stock prices should display a *negative* and statistically significant coefficient. The reason is provided by the following example. Let us assume that the political risks for countries A and B stand, initially, at their respective mean values and that this information is correctly incorporated into stock prices. Suppose now that country A experiences a shock in political risk whose value jumps, say, from 0 to -2. The absolute difference in A's and B's political risk scores will therefore *increase* from 0 to -2 while their respective stock markets will co-move to a *lesser degree*, because the stock market in A will drop without the stock market of B being affected. Similarly, if the two countries later on start to re-converge in political terms, then the distance between the standardized scores will reduce while their stock markets will co-move to a larger extent.

Finally, one cannot expect any two stock markets to move in the exact same way at all times, even when no news are released, if only because sentiment fluctuates and noise trading is always present. More or less small differences thus will always exist. The ability to wipe out these pairwise differences in market performance crucially depends on the similarity between the two countries. Therefore, pairs trading returns are expected to be higher for stock markets that co-move more.

3 Data

This study analyzes daily returns for 32 international stock markets from January 2, 2006 to September 16, 2014. The countries included in the sample are the following: Australia, Austria, Belgium, Brazil, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Greece, Hong-Kong, Hungary, Indonesia, Ireland, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Russia, South Korea, Spain, Sweden, Switzerland, Turkey, UK and US. For the sake of consistency, MSCI data for each stock market are all converted in US dollars. Moreover, in order to make sure the strategy is replicable, simulations are run both with returns directly stemming from the stock market indices and with ETFs written on the same indices. The most liquid ETFs are appropriately chosen so as to avoid significant liquidity costs. Given n assets, the total number of pairs that can be formed are $\frac{n(n-1)}{2}$. Hence, in this sample $\frac{32 \cdot 31}{2} = 496$ pairs are formed. Data are downloaded from Datastream© and Bloomberg©. All the country-specific variables used to construct the regressors are at quarterly frequency.

As stated above, the set of regressors is subdivided into three categories:

1. *Target variables:* these are political and confidence factors, as already described in the previous section. Data for confidence indicators come from various sources, in particular from national statistics institutes, and are all available in Datastream. Regarding economic policy risk, data come from the IFO World Economic Survey, the details of which are described below. The political risk index is computed and provided by the EIU, acronym for "Economist Intelligence Unit", owned by The Economist. One of the key and innovative elements of this research is to highlight that political risk and economic policy risk are genuinely different factors, not even much correlated, and priced differently by the market. However, to substantiate our claim, we must make sure that these variables are constructed such that they reflect two really different aspects of politics. This is ensured on the one hand by the fact that the IFO polls respondents to evaluate very precisely how the government's economic policy affects the country's economy, and whether the former represents a threat to the latter or not. On the other hand, the political risk score provided by the EIU is computed by weighting elements related to the country's political and institutional life and uncorrelated with the government's economic policy. Among these, the biggest weights are given to governability, institutional effectiveness, political event risk and government commitment to

pay its debt. It is also precisely stated that quality of economic policy-making and fiscal policy flexibility do not enter the computation of the political risk score. Political risk and economic policy risk, as constructed here, present no overlap.

2. *Hard macro-data:* these are the GDP growth rates, 6-month CDS spreads and policy interest rates. GDP growth rate is computed with respect to the value of GDP in the previous quarter. For CDS spreads, we select the short-term 6-month horizon, as our longest trading period comprises 125 business days, i.e. half a trading year. If an investor were to open her position in a pair at the beginning of the trading period, she would be concerned about the probability of both countries defaulting *at most* up to the end of her trading period, when she will close the position in that pair. For this reason, the short-term duration has been preferred over longer horizons. CDS incorporates country risk, GDP controls for the growth of the economy, and short-term policy rate controls for the monetary policy conducted by the central bank.

3. *Experts' evaluations:* these data come from the IFO World Economic Survey, a confidence survey conducted by the IFO Institute for Economic Research in Munich, in cooperation with the Paris-based International Chambre of Commerce (ICC) and with the financial support of the European Commission.

The IFO survey provides comparable statistics on global economic confidence. The IFO polls economic experts from international and national organizations worldwide requiring an assessment of the main economic indicators. 45% of the economic experts interviewed work for international corporations, 15% for banks and 5% in the insurance sector. 10% work in economic research institutes, 10% for chambers of commerce, and 5% for consulates and embassies. The remaining 10% are affiliated with international organizations such as OECD and IMF, as well as with foundations, media and press. The IFO selects only highly qualified people as respondents: they are all in a leading position or conduct economic research within their institution. The participation to the survey is voluntary. In return, participants only get exclusively detailed and timely results of the survey, such that pure professional interest in the surveyed topic and the survey results are the sole incentive for the experts' participation. From 2002, around $1,000$ economists from more than 90 countries have been participating. The high quality of these data, ensured by the procedure outlined above, has motivated our choice to rely on the IFO reports.

Operationally, the surveys work as follows. Each respondent receives a questionnaire and can only choose one among three alternative answers to each question. Then, a quantitative score is attributed to each country by means of a simple computation. For example, the regressor termed *"Economic Situation in the Next 6 Months"* refers to the respondent's judgment about the evolution of the overall economy for the next 6 months in a specific country. The three possible answers are: *i)* "Good", *ii)* "Satisfactory" and *iii)* "Bad". The IFO then assigns a score to each of the 3 alternatives: 9 points if the choice is *i)*, 5 points for *ii)* and 1 point for *iii)*. Then, the scores derived from all the answers are averaged to compute a quarterly value for the variable, which therefore ranges between 1 and 9. A final score of 5 is interpreted by the IFO as a relevant threshold: values progressively below 5 denote an economic situation that is worrisome or deteriorating, whereas values above 5 progressively reveal a satisfactory or improving economic situation.

The regressor *"Expected Inflation in the Next 6 Months"* refers to the expectation about the consumer price index compared to the same period in the previous year. Respondents can choose either "Higher" (9 points), "About the Same" (5 points) and "Lower" (1 point). The final score is computed as above. However, the interpretation of values relative to the threshold of 5 as positive or negative news does not hold here, given that higher or lower inflation rates can be judged to be good or bad signals according to the specific situation of the relevant country. Closely related to the previous regressor, *"Currencies"* denotes the judgment about a country's currency relative to the US dollar. The possible choices are "Overvalued" (9 points), "About at proper value" (5 points) and "Undervalued" (1 point). The same applies to *"Expected Trade Balance in the Next 6 months"*, with the highest score denoting an expected improvement of the trade balance and the lowest one an expected deterioration. A trade deficit is usually considered negative during a recession but positive during an expansion. Accordingly, no direct conclusion can be inferred *a priori* from the final score about the magnitude of these ratings for each country. Yet, our use of *differences* between pairs of countries allows for a clear interpretation of the data: international stock markets are expected to co-move more when the (absolute value of) the difference between two variables displays low values or is decreasing.

The same set of possible choices are provided for the following regressors: *"Lack of Confidence in the Government's Economic Policy"*, which is our measure of economic policy risk, *"Unemployment"*, *"Lack of Skilled Labour"*, *"Public Deficits"* and *"Lack of International Competitiveness"*. The question in the IFO survey asks to assess

the importance of the problems above mentioned from which a country suffers. The answers can be "Most important" (9 points), "Also Very Important" (5 points) and "Not so important" (1 point). The overall score is again computed as the average across all respondents. The rationale is to detect which problems are identified as the most compelling by experts, and the relative magnitude of each of them compared to the others. Accordingly, the interpretation of economic policy risk differs from that of some variables described above: low values are associated with high-confidence policies (low economic policy risk), whereas high scores are associated with low-confidence policies (high economic policy risk).

The regressor termed *"Foreign Investors' Confidence"* deserves a special discussion. Its values are provided by the IFO as well, and computed as above. The question asked to experts pertains to the business climate that can be perceived by *foreign* investors and their confidence about the country's political stability and the non-deterioration of its legal and administrative business restrictions. Hence, it is a proxy for foreign investors' confidence, since the question is not addressed directly to them. Nonetheless, it is relevant to gauge the willingness of foreign investors to venture resources in a specific country. The experts participating to the survey have most likely a direct contact with some foreign investors, given that they work for international institutions, banks, big firms, embassies, media and economic research centers. To our knowledge, this is the only available way to measure foreign investors' confidence.

By contrast, *Business Confidence* and *Consumers' Confidence* are direct measures since their scores are inferred from surveys conducted on firms' managers and consumers, respectively. Nevertheless, the interpretation of the three confidence indicators is essentially the same, as all three variables aim to describe and quantitatively translate how confident economic agents are about a country. *Business Confidence* reveals how optimistic or pessimistic firms' managers are about their business in the *near future*. Likewise, *Consumers' Confidence* is also a forward-looking variable that gauges the consumers' optimism or pessimism regarding the future economic environment and particularly their purchasing power. Data about business and consumers' confidence for all these countries come from several sources available on Datastream.

4 Empirical Results

4.1 Summary statistics

Inspection of individual stock markets reported in Table 3 reveals that the three best performing countries in the sample were Indonesia, Denmark and China, with annualized returns respectively equal to 13.38%, 9.84% and 9.19%, whereas the lowest annualized returns are observed in Greece, Austria and Ireland, respectively at -17.40%, -9.24% and -8.72%. As a comparison, the US stock market experienced an annualized return of 5.49%, while Germany's was 3.97% and France's 0.78%.

[Insert Table 3 Near Here]

Figures 1 and 2 show the dynamics of the cumulative returns for each country. All markets fell between 2008 and 2009: only some of them could then revert back to the values they had before the crisis. Tables 3 and 4 report the descriptive statistics for all the stock markets. Out of 32 countries, 11 of them display negative annualized returns. It is noticeable that the US as well as the South-American, Australian and Asian (except Japan) stock markets in the sample performed well as they managed to recover relatively swiftly after the 2008 slump and return to their pre-crisis levels. By contrast, 9 European countries out of 19 still display at the end of the sample lower values than at the beginning.

[Insert Table 4 Near Here]

Turning to the co-dynamics of all possible pairs of markets, Table 4 reports the values for a "Closeness Index", a measure of the extent two markets co-move. The closeness index CI_p for pair p comprising country A and B is defined as the sum of the squared differences between daily returns on market A and market B: with N observations, CI_p is equal to $\sum_{i=1}^{N} \left(r_i^A - r_i^B\right)^2$. France and the UK display the highest degree of co-movements in the sample. As expected, countries with similar macroeconomic fundamentals constitute top-ranking pairs. Not surprisingly either, the last ranks are occupied by Indonesia, which strongly outperformed the other stock markets, paired with the worst performing European markets.

4.2 Model specifications

In this section, four different model specifications are presented. Our main focus is on short-term narrow co-movements, to study which factors drive stock markets to obey similar dynamics in the short-run. Therefore, we adopt small values for the constant k used to construct the corridor, together with relatively short formation and trading periods. In each Table numbered from 9 to 20, columns 3 and 4 report the results obtained with 20-day formation and trading periods and with $k = 0.5$ and $k = 0.25$, respectively. We are primarily interested in the specification displayed in column 4 which measures very small co-movements, the results in column 3 serving as robustness checks. We refer to findings of these 2 columns as the short-term narrow co-movements.

Columns 1 and 2 are the two specifications that capture returns stemming from long-run wide co-movements. In these cases, the strategy will generate positive returns only when *i)* a *big shock* in the cointegration relationship happens, and *ii)* afterwards the markets re-converge to their equilibrium relationship (in a statistical sense). We always report in column 1 the specification using a 250-day formation period, a 125-day trading period and $k = 2$, following the seminal work of Gatev et al. (2006). Column 2 displays the results when k is lowered to 1.5, as a robustness check.

[Insert Tables 5, 6 and 7 Near Here]

Tables 5 to 7 display the descriptive statistics for the pairs trading returns for different levels of threshold k, formation period and trading period. The main (expected) message conveyed by these three tables is that pairs returns improve remarkably when decreasing both the threshold k and the formation and trading periods. The average across all pairs of monthly strategy returns varies from 0.84%, for the standard pairs trading strategy applied by Gatev et al. (2006) loading on long-term wide co-movements, to 7.13% for the most aggressive short-term strategy exploiting a very narrow corridor. The corresponding median values are 0.70% and 5.37%. As the threshold is progressively lowered and, at the same time, the horizon for the formation and trading periods is shortened, pairs trading returns become more right-skewed: the skewness lies between 1.26 and 1.79 for the three cases reported in the tables with formation period and trading period equal respectively to 250 and 125 trading days, against a skewness between 1.80 and 2.58 with both 20-day formation and trading pe-

riods. Also, they become less leptokurtic: the average kurtosis across the three cases is equal to 12.49 for the long formation and trading periods and only 10.29 for the short ones.

Exploiting short-term co-movements within a narrow corridor yields much higher gross returns than trading on large fluctuations of $d^{A,B}$. On the flip side, transaction costs are also larger, as the frequency at which transactions are executed is higher.

[Insert Table 8 Near Here]

Table 8 reports the same descriptive statistics for the strategy returns after transaction costs. For simplicity, we charge a fixed cost equal to 0.20% for any executed transaction, both for the long and short portfolios. We are aware that short-selling involves additional costs that the investor must bear, but deem this level of transaction costs a satisfactory and conservative approximation of the actual ones. Table 8 confirms our previous conclusions: net returns are still much higher for short-term small co-movements, meaning that the implied cost of frequent trading activity is far from erasing the large gap between gross returns. On average, quarterly returns for each pair after transaction costs range from around 1% with wide corridors and long formation and trading periods to a peak of 7.13% for the most aggressive short-term strategy.

Therefore, these net annualized returns are both statistically and economically significant. In this respect, it is worth recalling that the strategy is applied to all possible pairs, where some of them are formed by countries that are not even expected to co-move. We performed several robustness checks running the same simulations with different combinations of threshold levels, formation and trading periods. The interpretation of the results does not change: net returns are higher for small co-movements associated with narrower corridors, so that to increase profits one should use short formation and trading periods along with small values of k.

Another interesting stylized fact inferred from Tables 6 and 7 is the outperformance of the long leg of the strategy over its short leg. The long portfolio always displays a better performance than the short one. There is no *a priori* theoretical reason for which such a result should hold. The reversion towards the equilibrium is driven more by the outperformance of the underpriced asset than by the underperformance of the

overvalued. This may be due to behavioral biases on the part of investors who might prefer to buy a cheap asset than short-sell an expensive one and/or have the disposition to ride losers too long and sell winners too early, as pointed out in the seminal paper by Shefrin et al. (1985). Also, this may result from the larger transaction cost an investor would have to bear when short-selling a security rather than buying it. However, the comparison of our returns with and without transaction costs suggests that this explanation is weak. Either way, further research is needed to explain this result.

4.3 Determinants of pairs trading returns

Results displayed in Table 9 allow us to reject the common claim that pair returns are mere reward to arbitrage. For each regression we carefully checked for multi-colinearity or other statistical issues. In addition, for every panel regression we computed robust standard errors and accounted for possible country-specific fixed-effects. Most interestingly, political risk plays a crucial role in explaining short-term small co-movements, whereas foreign investors' confidence is key for long-term wide fluctuations and displays the highest t-stat in absolute value among all regressors (except of course the volatility of strategy returns, which is prevalent by construction). Both political risk and foreign investors' confidence are characterized by negative coefficients that are statistically significant at the 1% confidence level: the t-stats for political risk are equal to $-2.89^{(***)}$ and $-2.90^{(***)}$ for the two specifications of short-term small co-movements, and, for foreign investors' confidence, to $-4.22^{(***)}$ and $-4.45^{(***)}$ for the two specifications of long-term large fluctuations. Economic policy risk is also always negative, but not statistically significant. This vindicates one of our main claims that political risk and economic policy risk are different factors which are priced differently.

[Insert Table 9 Near Here]

Table 9 also highlights that GDP growth has negative and statistically significant coefficients across all 4 specifications and displays the highest explanatory power for short-term co-movements. It is the only variable with t-stats in absolute value larger than political risk, $-5.33^{(***)}$ and $-4.78^{(***)}$. The policy interest rate is also a significant variable, with a t-stats equal to $-3.66^{(***)}$ and $-1.98^{(**)}$ for the short-run small co-movements. This is in line with the extant literature: countries with macroeconomic commonalities are expected to have equity markets that co-move more. Table 9 thus

confirms that strategy returns are higher for pairs formed by countries with similar GDP growth rate and monetary policy. However, and interestingly, country risk (measured by CDS spreads) is not significant, unlike political risk, for large co-movements and only significant for one specification for small co-movements. Moreover, other regressors that analysts usually look at, as unemployment, public deficits (except once), international competitiveness and expected future economic situation are not relevant in any specification. The same result applies to currencies, an indication that exchange rate fluctuations do not explain stock market co-movements in the sample.

An issue that arises in the case $k = 2$ is that extreme deviations from the cointegration relationship are unlikely to happen. If the process describing the differences in normalized prices for two assets is Gaussian, then the corridor constructed with $k = 2$ contains 95% of the observations. It is therefore unlikely to observe a very large deviation followed by a complete reversion to the mean. Consequently, all pairs and especially those of two countries that are not expected to tightly co-move may present several zeros in the strategy returns, since the positions may never be opened. Given that strategy returns represent the dependent variable, this can pose an econometric problem. Moreover, results may be affected by negative strategy returns that would not actually occur but may show up in simulations, as explained in Section 2.

To overcome these issues, we transform the dependent variable in a binary variable which takes on the value 1 if the strategy return is strictly positive, and 0 otherwise. We then run a Probit model, using the same regressors as above. We thus estimate the probability that, for each regressor, a decrease in the absolute difference between two countries leads to an increase in the probability of the strategy to yield *positive* returns, *i.e.* in the probability to revert back to the average cointegration relationship after a large shock to this relationship has occurred. We do not report the results to save space, but provide the following brief comments. Foreign investors' confidence, GDP and inflation remain significant at the same statistical level. All the other regressors but one that were not significant in the previous linear regression remain insignificant in the Probit model. The exception is political risk, whose t-stat increases to $-2.05^{(**)}$. Hence, political risk, which was shown to be strongly significant in explaining short-term co-movements, also helps determining whether the strategy will yield positive returns when considering long-run co-movements.

As a robustness check, we perform the following spline-regression analysis. We divide the overall political risk into 5 groups by means of a linear spline, placing knots at the

20th, 40th, 60th and 80th percentiles of the data. We then regress pairs trading returns on these 5 different spline variables plus all the other regressors as above. Interestingly, the results show that the observations included in the first group, *i.e.* those ranked in the lowest 20% for the differences in political risk scores, are statistically significant, with a t-stat of $-2.18^{(**)}$. All the coefficients for the other 4 groups are insignificant. The interpretation of all the other regressors remains unchanged. The interpretation is that after a big shock to the cointegration relationship between two markets occurs, only those pairs formed by two countries with relatively small differences in standardized political risk are able to revert to their initial statistical relationship. This sheds light on the importance of political risk: not only it explains short-term narrow co-movements, but it also helps explain how the strategy yields positive returns when extreme deviations occur, as in Gatev et al. (2006). The relevance of political risk is vindicated in the remaining part of this section.

4.4 Pairs trading alphas

The previous results highlighted the explanatory power of political risk and foreign investors' confidence to explain pairs returns. It remains to see whether these factors are also able to explain the uncovered positive *abnormal* returns (alphas). Table 10 addresses this issue by regressing the alphas of the strategy over the macroeconomic variables. The alphas are computed via a two-step Fama-MacBeth regression of monthly returns on the strategy using the 4-factor model of Carhart (1997). Monthly alphas from this model are then compounded to make them quarterly and fit for the ensuing panel regression.

[Insert Table 10 Near Here]

The striking result, reported in Table 10, is that political risk and foreign investors' confidence are the two crucial factors (along with consumption) to explain both returns and abnormal returns in the two short-term co-movement specifications. The t-stats for political risk are $-2.71^{(***)}$ and $-2.75^{(***)}$, and $-1.84^{(*)}$ and $-2.39^{(**)}$ for foreign investors' confidence. They are the only two factors, out of 17, to exhibit statistically significant negative coefficients.

As foreign investors' confidence is measured asking to experts what can be the view of foreign investors regarding the specific country's political stability and its legal and

administrative restrictions to business, political and institutional issues appear to drive most of the co-movements in international stock markets. Almost the same conclusion had been drawn from Table 9 relative to pairs returns, not alphas, with virtually no role left for the other 15 variables, which strongly reinforces our main point.

At first sight, however, as in Table 9 political risk does not seem to help explain large long-run co-movements. To check the validity of this impression, we re-apply the linear spline method and subdivide political risk into 5 groups. We then run the same regression as in Table 10 but replacing the overall political risk with these 5 new spline variables. Again, the group associated with the lowest 20 percent of observations becomes statistically significant, with a t-statistic equal to $-1.81^{(*)}$. Political risk thus helps explain the alphas stemming from big shocks in the cointegration relationship to the extent that those pairs of countries displaying similar political risk can revert to their statistical relationship after an extreme deviation.

4.5 First differences in pairs returns

So far, the regression-based analyses reveal a clear relationship between contemporaneous pairs returns and political risk and foreign investors' confidence. The next step consists in investigating whether a time variation of these variables translates into a change in the returns. We thus regress the first differences in pairs returns from a quarter to the next on the first differences in the same regressors as above. Regressors helping determine the pairs returns are expected to display again a negative coefficient: if a variable matters, a reduction in the difference in absolute value between two countries for that regressor should be associated with an increase in pairs returns, according to the same logic that underlies all previous regressions.

[Insert Table 11 Near Here]

Table 11 confirms this intuition. Regarding short-term small co-movements, a decrease in the difference of political risk is associated with an increase in pairs returns: in the two specifications reported in columns 3 and 4, its t-stats are $-2.09^{(**)}$ and $-2.68^{(***)}$. GDP growth is still also relevant, with t-stats $-3.76^{(***)}$ and $-4.43^{(***)}$. Once more, CDS spreads, public deficits and analysts' expectation of the future situation play no role. As to long-term large co-movements, the first two columns of Table

11 reveal that, once again, the most important variable, statistically and economically, is foreign investors' confidence, with t-stats $-3.33^{(***)}$ and $-3.18^{(***)}$. Almost no other regressor has explanatory power. Hence, the analysis emphasizes how essential it is to disentangle the global confidence and political indicators usually found in the literature into their main components, given that economic policy risk, business confidence and consumers' confidence are almost never significant. These results are in line with those stemming from the previous contemporaneous regressions regarding returns and alphas.

4.6 Robustness checks

To further check the crucial role of confidence indicators, we project each of these indicators on all purely quantitative macroeconomic variables. Then, we separate the predicted part from the residual, which are by construction orthogonal components. Regressing pairs returns on both components allows us to disentangle the extent to which confidence indicators impact returns only because they reflect the reaction of market participants to macroeconomic news, from the part due to sentiment or other behavioral traits. Table 12 reports the results of such regressions. The predicted business confidence has been omitted because its correlation with the predicted consumers' confidence is extremely high, the empirical evidence that firms and consumers do react very similarly to macroeconomic news. This, interestingly, does not hold for the predicted foreign investors' confidence which exhibits a low correlation with the other two predicted indicators.

[Insert Table 12 Near Here]

One may argue that country risk includes political risk intrinsically, which may give rise to redundancy. To address this potential issue and to include only the part of country risk that is not explained by political risk, the same regressions have been run replacing CDS spreads by their residuals stemming from the linear projection of country risk onto the space spanned by the two political indicators. Likewise, confidence indicators have been replaced by the residual part that does not depend on all the other regressors. These results are not reported as they do not differ materially from those previously discussed. The key message therefore remains that confidence indicators play a crucial role and do not merely reflect the objective fundamentals of

the economy. Foreign investors, firms and consumers of course react to these fundamentals, but the way they operate in and affect the stock markets cannot be explained by looking at the macroeconomic variables only. Understanding in more depth the behavioral reasons underlying this result is beyond the scope of this paper.

4.7 Predictability of pairs returns and alphas

We now investigate whether pairs returns are predictable. Stock return predictability is a longstanding and controversial issue widely debated in the literature. Theoretically, Samuelson (1965) proved that properly anticipated asset prices fluctuate randomly. Empirically, however, Fama and French (1988) were among the first to present evidence of such a predictability, due to the time-varying nature of risk premia. Pesaran et al. (1995) document quite a low degree of predictability during the relatively calm market situation of the 1960s, but an increased and exploitable predictability in the volatile markets of the 1970s. Lioui and Poncet (2003) claim that stock market returns seem not predictable at short horizons, but become predictable at longer horizons. The channel can be identified in some slow-moving variables driving short returns predictability, which builds up as the horizon enlarges. In this paper, we simply investigate the predictability possibly embedded in stock market *co*-movements. We assess whether mean-reversion in pairs of stock markets can be predicted by pair differences in our proposed factors.

[Insert Tables 13, 14, 15 and 16 Near Here]

Results reported in Tables 13 to 16 (using 1 to 4 time-lags, respectively, for the explanatory variables) show that international stock-market co-movements can be predicted so that investors should be able to systematically benefit from this predictability.

[Insert Tables 17, 18, 19 and 20 Near Here]

Moreover, results displayed in Tables 17 to 20 (also using 1 to 4 lags, respectively) convey the same conclusion when the explained variables are alphas rather than returns. Political risk in particular has high predictive power in the long run for short-term small

co-movements: its t-stats are strongly significant (at the 1% level) when it is lagged 3 and 4 periods.

In addition, consumers' confidence exhibits a large predictive power, displaying significance for all four lags in forecasting pairs returns. It is noteworthy that this variable lagged one period replaces foreign investors' confidence for predicting both returns and alphas: in the first columns of Tables 13 and 17, it is significant at the 1% confidence level for both alphas and returns within the parameter setting put forward by Gatev et al. (2006) to study long-term wide co-movements. We recall that foreign investors' confidence was significant at the 1% confidence level for the contemporaneous regression within this setting.

A plausible explanation for the substitution is that consumers' confidence is by nature a forward-looking variable, unlike foreign investors' confidence: the former looks at consumers' expectations regarding the *future* economic situation, whereas the latter describes the business confidence of foreign investors as perceived *presently* by experts. A forward-looking variable tends naturally to display more predictive power than variables reflecting the contemporaneous situation. The same results remarkably hold when replacing the confidence indicators by their residual components reflecting sentiment alone, orthogonal to all macroeconomic variables.

Few regressors display predictive power, vindicating the importance of identifying the appropriate variables when trying to forecast future price co-movements. Regarding alphas, in addition to political risk and unemployment, interest rates also play a crucial role for long-term large fluctuations (column 1 in Tables): they display significance at the 1% confidence level for lags two to four, and at the 5% level for the first lag. The key finding nonetheless is that political risk displays high predictive power, in particular for long-term forecasts. Unemployment and interest rates should also be considered, as well as country risk to a much lesser extent. In sharp contrast, virtually none of the other variables we have introduced exhibits predictive power.

4.8 CDS spreads and politics-related risks

Our final contribution concerns the CDS market. We investigate which factors affect country risk by running contemporaneous and predictive regressions of CDS spreads

on all the political and macroeconomic variables used so far. Our results are reported in Table 21.

[Insert Table 21 Near Here]

The first column displays the results of the contemporaneous regression, and the other four columns refer to the predictive regressions with lags from one to four. It is striking how essential it is, once more, to take into account politics. Economic policy risk is the only variable that is highly significant in all five model specifications. Moving from the contemporaneous regression to the specification with four lags, its t-stats are respectively equal to $4.57^{(***)}$, $4.46^{(***)}$, $3.17^{(***)}$, $3.07^{(***)}$ and $2.46^{(**)}$. The same strong result applies to interest rates. Economic policy risk and interest rates thus are the two most relevant variables by which the difference in country risks, priced by the market through CDS spreads, can be forecast. Also, political risk is the most statistically significant variable for the contemporaneous regression with a t-stat equal to $4.83^{(***)}$, and it can help predict country risk at lags two and three, with t-stats $1.84^{(*)}$ and $2.56^{(**)}$, although not at lags one and four. Likewise, contemporaneous "public deficits" is very significant, but there is no clear evidence of predictive power for any of the four lags. Overall, the message conveyed by Table 21 is that politics, in its two dimensions, plays a crucial role also in determining country risk, whereas many macroeconomic variables, such as private consumptions, trade balance, unemployment and inflation, have a much more limited explanatory and predictive power.

5 Concluding remarks

This paper has investigated the main factors driving international stock market co-movements. A pairs trading strategy has been applied to assess how and to what extent an investor can benefit from this interdependence. The empirical evidence strongly supports the hypothesis of statistically and economically significant pairs returns. As expected, these profits substantially increase as the investor exploits narrower and short-term co-movements. This finding is particularly relevant because this strategy *(i)* is self-financing, *(ii)* is market-neutral, and *(iii)* does not require the investor to forecast the future market direction. Moreover, although all possible pairs have been formed among 32 markets, including those comprising countries with no a priori reason to co-move, the strategy overall generates significantly positive abnormal returns (alphas).

The contribution of this paper is threefold. First, we have proposed a new definition of politics, disentangling two separate channels through which political issues affect financial markets: on the one hand political risk, defined as the level of government instability and institutional frictions, and on the other economic policy risk, specifically capturing the quality of the economic reforms put in place by the government and their expected effects on the economic environment. The objective was to assess whether the market differentiates between political and institutional instability and the appropriateness of governmental economic policies, and whether it prices these two risks. We have shown that separating these two politics-related factors contributes to a better understanding of the linkages between international financial markets. Political risk is one of the main drivers of the abnormal returns generated by a pairs strategy loading on these co-movements. Economic policy risk does not play a significant role in that strategy but exhibits very strong explanatory and predictive power regarding country risk as priced by CDS spreads. Neglecting these two factors would lead to less accurate results and misleading interpretation about which factors are priced by the market and to what extent. Second, we have separately analyzed the impact conveyed to financial markets by three indicators reflecting the confidence of the three main types of economic players: firms, consumers and foreign investors. Our empirical evidence underscores the explanatory power of foreign investors' confidence and the predictive power of the two forward-looking variables that are consumers' confidence and business confidence. Third, if CDS spreads, as expected, are explained by interest rates reflecting monetary policies, economic policy risk provides an equally important explanation in contemporaneous regressions and is the best predictor of country risk

at all lags considered. In addition, political risk is the most significant explanatory variable for the contemporaneous regression, and can even help predict country risk at some lags.

The main findings of this paper can be therefore summarized as follows. Pairs trading strategies that load on international stock market co-movements can systematically beat the market, generating statistically and economically high profits. These positive abnormal returns decrease with the width of the adopted corridor and the length of the formation and trading periods. Stated differently, reducing simultaneously the width of the corridor and the length of the formation and trading periods progressively leads to higher returns, even after transaction costs.

Researchers and investors thus should not rely on hard macroeconomic data only. Confidence indicators, especially foreign investors' confidence, constitute a powerful determinant of stock price formation. Consumers and investors should be aware that the relative dynamics of their national stock market with respect to those of foreign markets are hugely affected by political and economic policy risks. The lack of convincing and effective economic policies is the most significant variable that affects the country risk perceived and priced by the market through CDS spreads. Society at large should be concerned, in view of the strong feedback effect from the stock and CDS markets to the real economy during financial crises.

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A Appendix

Table 1:
Rankings for economic policy risk and political risk.

We report the average of the quarterly scores for economic policy risk and political risk for each of 32 countries over the sample period Q1-2008 to Q3-2014. Data for economic policy risk come from the surveys of the IFO Reserch Center, whereas political risk data are provided by the Economist Intelligence Unit (EIU). The top performing countries display the smallest values for both indicators, *i.e.* low scores for government economic policy risk and political risk.

Ranking	Country	Policy Risk	Ranking	Country	Political Risk
1	Norway	1.36	1	Norway	5.41
2	Sweden	1.68	2	Denmark	5.93
3	Switzerland	2.03	3	Finland	7.89
4	Chile	2.38	4	New Zealand	8.37
5	Denmark	2.54	5	Switzerland	8.78
6	Finland	2.67	6	France	10.15
7	New Zealand	2.88	7	Sweden	11.44
8	China	2.89	8	Germany	12.63
9	Australia	3.52	9	Japan	13.00
10	Austria	3.54	10	Netherlands	15.00
11	Netherlands	3.59	11	USA	15.96
12	South Korea	3.67	12	Austria	16.44
13	Germany	3.78	13	Australia	18.22
14	Brazil	3.82	14	UK	19.44
15	Poland	4.09	15	Hong-Kong	20.30
16	Turkey	4.11	16	Chile	21.59
17	Ireland	4.68	17	Ireland	24.52
18	Belgium	4.79	18	Hungary	27.04
19	UK	4.84	19	Poland	27.15
20	Czech Republic	4.96	20	Spain	27.67
21	France	5.15	21	Czech Republic	28.63
22	Mexico	5.20	22	Portugal	29.85
23	Hong-Kong	5.27	23	Belgium	31.96
24	Russia	5.30	24	Italy	34.04
25	Japan	5.54	25	Brazil	37.19
26	USA	5.84	26	South Korea	37.52
27	Italy	5.95	27	Mexico	40.78
28	Indonesia	6.00	28	Greece	47.41
29	Spain	6.01	29	Turkey	49.22
30	Greece	6.04	30	China	54.00
31	Portugal	6.06	31	Russia	56.00
32	Hungary	7.25	32	Indonesia	57.00

Table 2:

Rankings of investors' confidence, business confidence and consumer confidence.

We rank the countries in the sample according to foreign investor confidence (INV), business confidence (BUS) and consumer confidence (CONS), over the sample period Q1-2008 to Q3-2014. Data for foreign investors confidence come from the surveys of the IFO Research Center. Regarding business confidence and consumer confidence, as data come from a variety of sources (available in Datastream), the values for each country have been standardized for the sake of comparability, with zero mean over time. We report the average score over time for each country's foreign investor confidence, and the median value for business and consumer confidence. High (low) scores reflect high (low) economic policy risk and high (low) political risk.

#	Country	INV	Country	BUS	Country	CONS
1	Finland	7.74	Czech Republic	1.34	Finland	1.28
2	Austria	7.65	South Korea	1.33	Hong-Kong	1.19
3	Sweden	7.60	Indonesia	1.32	Sweden	1.07
4	Denmark	7.42	China	1.32	Italy	1.07
5	Switzerland	7.25	Russia	1.31	Brazil	1.05
6	Norway	7.16	Portugal	1.29	China	1.04
7	Germany	6.94	Greece	1.28	Australia	1.00
8	Chile	6.88	Chile	1.28	Mexico	1.00
9	Ireland	6.85	Sweden	1.28	Turkey	0.98
10	New Zealand	6.62	Italy	1.27	France	0.96
11	Hong-Kong	6.48	Austria	1.25	Czech Republic	0.95
12	Netherlands	6.47	Greece	1.21	Poland	0.94
13	UK	6.36	Mexico	1.19	New Zealand	0.90
14	Portugal	6.29	USA	1.13	Norway	0.89
15	France	6.28	Brazil	1.09	Japan	0.85
16	USA	6.21	Hong-Kong	0.81	Chile	0.83
17	Poland	6.16	New Zealand	0.50	Indonesia	0.83
18	Spain	5.98	Norway	0.45	USA	0.69
19	Australia	5.98	Poland	0.14	Denmark	-0.38
20	Brazil	5.83	Turkey	0.14	Germany	-0.42
21	Turkey	5.35	Ireland	0.06	Switzerland	-0.54
22	South Korea	5.25	UK	-0.04	Netherlands	-0.64
23	Japan	5.13	Denmark	-0.09	South Korea	-0.76
24	Hungary	5.08	Japan	-0.24	Austria	-0.90
25	Czech Republic	5.04	Netherlands	-0.55	Belgium	-0.95
26	Belgium	5.03	Finland	-0.82	Greece	-0.99
27	Mexico	4.87	Hungary	-0.85	Portugal	-1.03
28	Greece	4.56	Switzerland	-0.95	UK	-1.08
29	China	4.55	Australia	-1.00	Spain	-1.13
30	Italy	4.37	France	-1.06	Russia	-1.22
31	Russia	3.99	Belgium	-1.08	Hungary	-1.62
32	Indonesia	3.73	Spain	-1.68	Ireland	-1.64

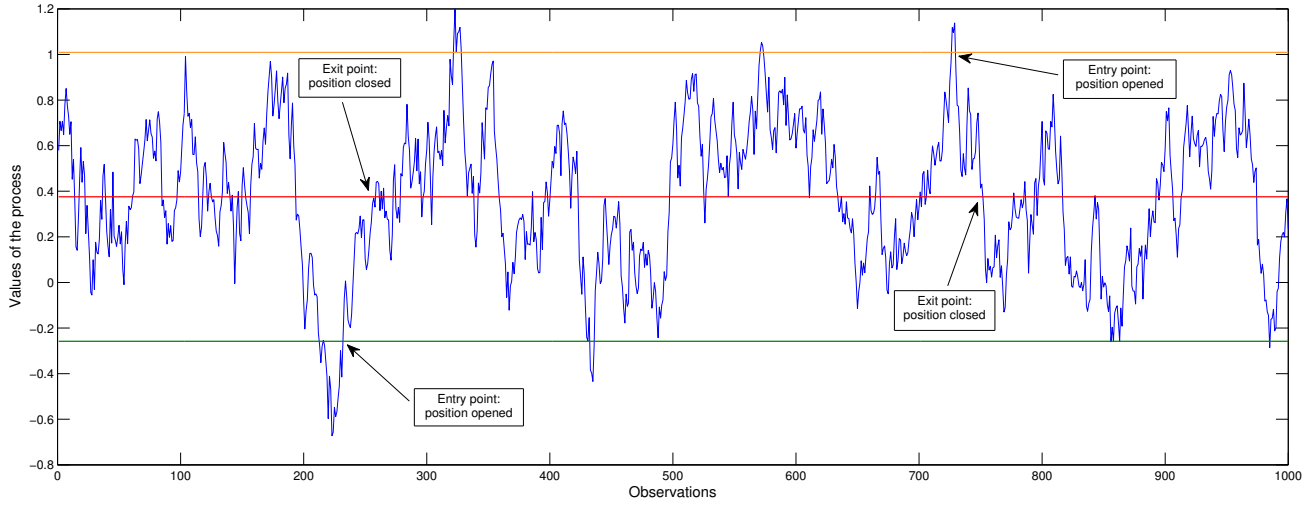

Figure 1: Entry and exit points for the strategy. To illustrate how the strategy works, this figure displays the dynamics of 1,000 observations simulated from an Ornstein-Uhlenbeck process. A position is opened when the process crosses the upper (lower) boundary *from above (below)*. It is then closed either when it reverts back to the mean of the corridor and hits the latter, or as soon as it crosses once again the upper (lower) threshold stepping out of the corridor. A profit is ensured in case the process reverts to the mean of the corridor, as in the two cases illustrated.

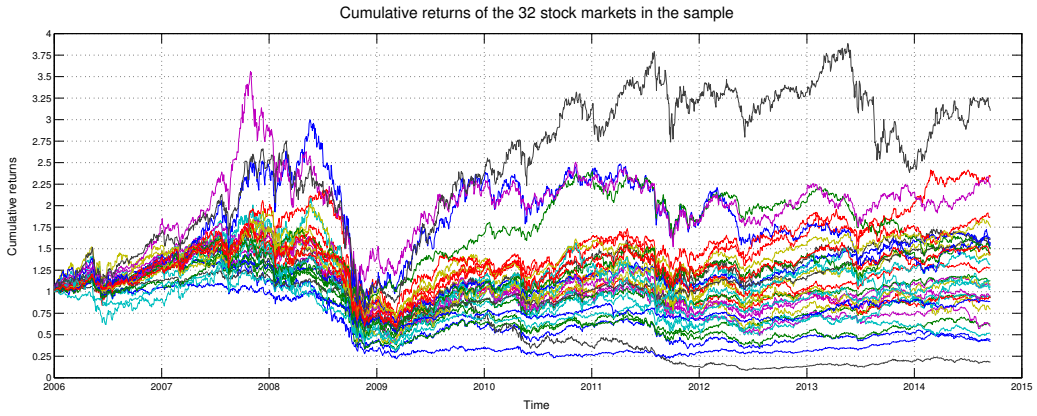

Figure 2: Cumulative returns for all the 32 stock markets in the sample. Daily data from January 2, 2006 to September 16, 2014.

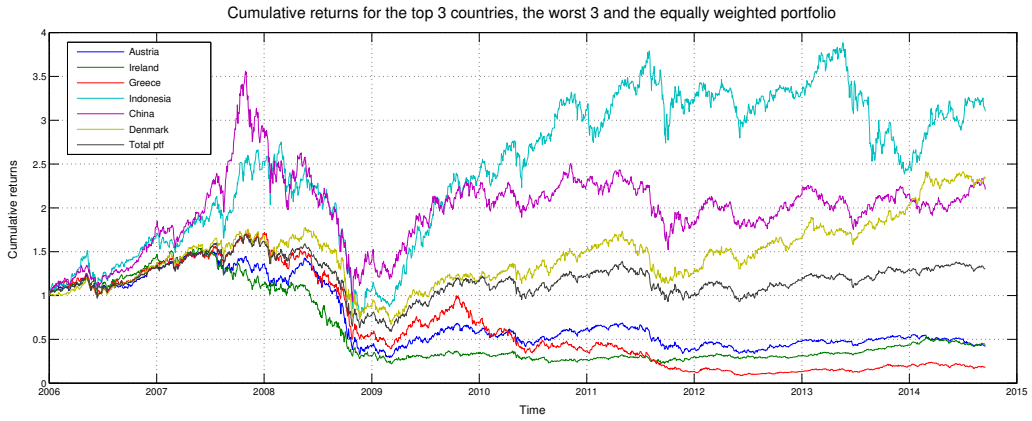

Figure 3: Cumulative returns for the following countries only: the top 3 performing countries in the sample (Indonesia, Denmark and China), the worst 3 performing (Greece, Austria and Ireland), and an equally weighted portfolio comprising all the 32 countries. The ranking hinges on the final cumulated returns at the end of the sample. Daily data cover the period from January 2, 2006 to September 16, 2014.

Table 3:
Performance measures for each national stock market.

We report the annualized returns and Sharpe ratios for the daily returns of the 32 countries in the sample from January 2, 2006 to September 16, 2014. The complete description of our sample appears in Section 3.

Country	r_{yearly}	Sharpe
Austria	−9.24%	−0.27
Belgium	0.67%	−0.02
Denmark	9.84%	0.38
Finland	−0.83%	−0.02
France	0.78%	0.03
Germany	3.97%	0.14
Greece	−17.40%	−0.43
Ireland	−8.72%	−0.25
Italy	−5.15%	−0.17
Netherlands	2.73%	0.10
Norway	3.08%	0.09
Portugal	−5.59%	−0.22
Spain	0.93%	0.03
Sweden	5.15%	0.16
Switzerland	5.55%	0.27
UK	1.29%	0.05
Czech Republic	−0.86%	−0.03
Hungary	−6.98%	−0.17
Poland	−0.49%	−0.01
Russia	−2.40%	−0.06
USA	5.49%	0.26
Brazil	5.16%	0.14
Chile	4.73%	0.23
Mexico	7.19%	0.25
Turkey	0.67%	0.02
China	9.19%	0.30
Hong-Kong	6.43%	0.29
Indonesia	13.38%	0.43
Japan	−1.35%	−0.06
South Korea	4.25%	0.13
Australia	4.04%	0.14
New Zealand	0.25%	0.01

Table 4:
Ranking among all possible pairs of countries according to the "Closeness Index".

Denoting by r_i^A and r_i^B the daily returns for securities A and B at time i, the closeness index for assets A and B in pair p is defined as $CI_p = \sum_{i=1}^{N} \left(r_i^A - r_i^B\right)^2$. The lower is the closeness index, the higher is the degree of interdependence and co-movements. The sample comprises the 496 pairs of countries that can be formed from the 32 national stock markets described in Section 3. The sample period goes from Q1-2006 to Q3-2014.

Ranking	Country 1	Country 2	Closeness Index
1	France	UK	16.50
2	France	Netherlands	18.39
3	Austria	Italy	23.75
4	Netherlands	UK	26.83
5	Sweden	Switzerland	30.60
6	Finland	Portugal	30.61
7	Germany	Norway	31.94
8	Sweden	Australia	32.39
9	France	Poland	34.17
10	Japan	New Zealand	34.66
⋮	⋮	⋮	⋮
487	Portugal	Indonesia	7245.30
488	Finland	Indonesia	7354.90
489	New Zealand	Indonesia	7424.80
490	Hungary	Indonesia	7661.00
491	Japan	Indonesia	7875.30
492	Belgium	Indonesia	8157.10
493	Italy	Indonesia	8828.40
494	Austria	Indonesia	9321.90
495	Ireland	Indonesia	10742.00
496	Greece	Indonesia	10787.00

Table 5:
Descriptive statistics of pairs trading returns:
Total portfolio (long and short legs).

Descriptive statistics for the monthly pairs trading strategy on the 32 stock markets in the sample: k denotes the number of standard deviations used to construct the corridor, FP and TP represent the formation period and the trading period expressed in days. All results refer to the total final return on the strategy, defined as the sum of the returns for the long and short portfolios. Total returns for each pairs are computed and for each month we average the returns across all pairs. These descriptive statistics are therefore computed on the average monthly return across pairs for each month. The sample period is Q1-2006 to Q3-2014.

Periods	FP=250; TP=125			FP=20; TP=20		
Bandwidth	k=2	k=1.5	k=1	k=1	k=0.5	k=0.25
Mean	0.84%	0.88%	1.03%	1.32%	5.65%	7.13%
StDev	4.20%	6.28%	4.60%	3.87%	7.76%	9.17%
Skewness	1.49	1.26	1.79	2.58	1.80	1.85
Kurtosis	12.48	11.75	13.26	14.02	8.62	8.24
Min	-0.34%	-0.56%	-0.21%	-0.16%	0.43%	0.53%
Quantile 1	-0.17%	-0.36%	-0.09%	0.15%	0.72%	0.76%
Quantile 5	0.03%	-0.13%	0.13%	0.30%	1.35%	1.47%
Quantile 25	0.34%	0.29%	0.51%	0.65%	2.84%	3.08%
Median	0.70%	0.73%	0.84%	1.02%	4.58%	5.37%
Quantile 75	1.10%	1.31%	1.35%	1.69%	7.03%	8.95%
Quantile 95	2.31%	2.40%	2.39%	2.98%	13.72%	18.13%
Quantile 99	3.72%	3.79%	3.76%	5.21%	22.60%	32.68%
Max	5.24%	6.73%	10.32%	16.36%	28.33%	45.28%

Table 6:
Descriptive statistics of pairs trading returns:
Long portfolio only.

Descriptive statistics for the long leg of the pairs trading strategy built on the 32 stock markets in the sample: k denotes the number of standard deviations used to construct the corridor, FP and TP represent the formation period and the trading period expressed in days. These descriptive statistics are computed on the average monthly return across pairs for each month. The sample period is Q1-2006 to Q3-2014.

Periods	FP=250; TP=125			FP=20; TP=20		
Bandwidth	k=2	k=1.5	k=1	k=1	k=0.5	k=0.25
Mean	0.51%	0.20%	0.36%	0.66%	3.01%	3.54%
StDev	4.85%	2.56%	3.13%	3.55%	6.13%	6.28%
Skewness	-0.11	-0.69	-0.36	0.72	1.04	1.50
Kurtosis	12.44	15.17	13.65	13.19	10.84	10.62
Min	-0.84%	-0.64%	-0.75%	-0.79%	-0.09%	-0.07%
Quantile 1	-0.71%	-0.50%	-0.49%	-0.38%	0.10%	0.12%
Quantile 5	-0.48%	-0.32%	-0.30%	-0.18%	0.38%	0.52%
Quantile 25	-0.05%	-0.10%	0.00%	0.14%	1.22%	1.29%
Median	0.35%	0.13%	0.26%	0.45%	2.11%	2.48%
Quantile 75	0.89%	0.41%	0.57%	0.95%	3.93%	4.27%
Quantile 95	2.10%	1.00%	1.35%	1.99%	8.46%	9.28%
Quantile 99	3.84%	1.54%	2.30%	3.38%	15.71%	21.08%
Max	5.53%	1.98%	9.70%	15.65%	24.05%	37.22%

Table 7:
Descriptive statistics of pairs trading returns:
Short portfolio only.

Descriptive statistics for the short leg of the pairs trading strategy built on the 32 stock markets in the sample: k denotes the number of standard deviations used to construct the corridor, FP and TP represent the formation period and the trading period expressed in days. These descriptive statistics are computed on the average monthly return across pairs for each month. The sample period is Q1-2006 to Q3-2014.

Periods	FP=250; TP=125			FP=20; TP=20		
Bandwidth	k=2	k=1.5	k=1	k=1	k=0.5	k=0.25
Mean	0.33%	0.68%	0.67%	0.66%	2.64%	3.59%
StDev	3.71%	7.53%	5.62%	3.60%	5.90%	6.82%
Skewness	1.35	1.05	1.43	2.10	1.33	1.50
Kurtosis	15.07	12.11	14.35	18.08	8.29	8.10
Min	-0.55%	-0.98%	-0.57%	-0.43%	0.14%	0.07%
Quantile 1	-0.38%	-0.75%	-0.46%	-0.20%	0.22%	0.34%
Quantile 5	-0.28%	-0.49%	-0.27%	-0.06%	0.47%	0.70%
Quantile 25	-0.03%	0.01%	0.15%	0.24%	1.16%	1.40%
Median	0.24%	0.48%	0.51%	0.48%	2.08%	2.62%
Quantile 75	0.54%	1.10%	1.03%	0.90%	3.47%	4.67%
Quantile 95	1.32%	2.46%	2.14%	1.99%	7.08%	10.38%
Quantile 99	1.78%	3.90%	3.16%	3.01%	10.71%	16.83%
Max	3.04%	7.15%	6.01%	5.41%	12.73%	20.72%

Table 8:
Descriptive statistics of pairs trading returns:
Accounting for transaction costs.

This Table is analogous to Table 7 except that **net returns have been computed after a 0.20% cost for each transaction for both the long and the short portfolio**, such that the strategy bears a 0.40% total transaction cost when the positions are opened or closed.

Periods	FP=250; TP=125			FP=20; TP=20		
Bandwidth	k=2	k=1.5	k=1	k=1	k=0.5	k=0.25
Mean	0.84%	0.88%	1.03%	1.32%	5.65%	7.13%
StDev	4.20%	6.28%	4.60%	3.87%	7.76%	9.17%
Skewness	1.49	1.26	1.79	2.58	1.80	1.85
Kurtosis	12.48	11.75	13.26	14.02	8.62	8.24
Min	-0.34%	-0.56%	-0.21%	-0.16%	0.43%	0.53%
Quantile 1	-0.17%	-0.36%	-0.09%	0.15%	0.72%	0.76%
Quantile 5	0.03%	-0.13%	0.13%	0.30%	1.35%	1.47%
Quantile 25	0.34%	0.29%	0.51%	0.65%	2.84%	3.08%
Median	0.70%	0.73%	0.84%	1.02%	4.58%	5.37%
Quantile 75	1.10%	1.31%	1.35%	1.69%	7.03%	8.95%
Quantile 95	2.31%	2.40%	2.39%	2.98%	13.72%	18.13%
Quantile 99	3.72%	3.79%	3.76%	5.21%	22.60%	32.68%
Max	5.24%	6.73%	10.32%	16.36%	28.33%	45.28%

Table 9:

Panel regression of quarterly strategy returns.

This table presents panel regression results about the determinants of the quarterly returns stemming from the pairs trading strategy applied to international stock markets. The sample is made of 32 countries from January 2006 to September 2014. The strategy is applied to all the 496 possible pairs. Both the left-hand and right-hand sides of the regression are at quarterly frequency. Each pair is tracked with 27 quarterly observations. The l.h.s. variable is the return from the pairs trading strategy. The r.h.s. variables include the following factors. *Sigma* stands for the standard deviation of the pairs trading returns. Under the hypothesis that pairs returns simply reflect reward to arbitrage, the coefficient of this regressor should be the only one to be significant. Then follow our target variables of interest: the two indicators stemming from the political sphere, *Lack of Government Economic Policy* and *Political Risk*, and the three confidence indicators (relative to foreign investors, firms and consumers respectively). Last follow the control variables: *CDS spreads* controls for country risk; *Unemployment* and *Lack of Skilled Labour* control for the labour market characteristics; *Rates* and *Inflation* control for the monetary policies implemented by Central Banks and their effects; *Consumptions* controls for the private expenditures of consumers; *Future Situation* controls for analysts expectations about the situation of the paired countries in the next 6 months; *Trade Balance* controls for the openness of the paired economies; *GDP* and *Public Deficits* control for the growth of the country and its sustainability in the long-run. All r.h.s. variables are computed as follows. Let X be one of the standardized regressors, and A and B the paired countries. At time t, the explanatory variable takes on the form $\mid X_A - X_B \mid$. All explanatory variables have been standardized. TP and FP are the acronyms for "Trading Period" and "Formation Period", the length of which is expressed in days. k denotes the bandwidth used to construct the corridor for the pairs trading strategy. Section 3 provides a complete description of all regressors used. Each regression takes into account fixed effects. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
	(1)			(2)			(3)			(4)		
Bandwidth	k=2			k=1.5			k=0.5			k=0.25		
	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test
Sigma	2.8849	15.97	(***)	3.8644	25.09	(***)	5.7903	47.8	(***)	4.9526	43.28	(***)
Lack Policy	-0.0002	-0.12		-0.0009	-0.75		-0.0013	-1.08		-0.0012	-0.92	
Political Risk	-0.0007	-0.39		-0.0009	-0.55		-0.0049	-2.89	(***)	-0.0053	-2.9	(***)
Investors' Conf	-0.0107	-4.22	(***)	-0.0104	-4.45	(***)	-0.0001	-0.03		-0.0007	-0.24	
Business Conf	0.0011	2.49	(**)	0.0005	1.2		-0.0006	-1.46		-0.0005	-1.05	
Consumers' Conf	-0.0002	-0.54		0.0001	0.29		-0.0001	-0.46		-0.0003	-0.83	
CDS Spreads	0.0004	0.57		0.0002	0.3		-0.0017	-2.19	(**)	-0.0014	-1.63	
GDP Growth	-0.0137	-2.06	(**)	-0.0131	-1.91	(*)	-0.0468	-5.33	(***)	-0.0458	-4.78	(***)
Public Deficits	0.0007	0.51		-0.0001	-0.1		-0.0021	-1.81	(*)	-0.0022	-1.57	
Unemployment	-0.0013	-1.15		0.0004	0.39		0.0010	1.07		0.0007	0.69	
Lack Labour	-0.0019	-1.48		0.0001	0.08		-0.0027	-2.06	(**)	-0.0034	-2.44	(**)
Competitiveness	0.0010	0.72		0.0013	0.98		-0.0002	-0.14		0.0001	0.05	
Future situation	0.0006	0.37		0.0005	0.29		0.0004	0.24		0.0005	0.24	
Consumptions	-0.0021	-2.19	(**)	-0.0002	-0.23		0.0022	2.07	(**)	0.0024	2.05	(**)
Rates	-0.0011	-0.95		-0.0021	-1.91	(*)	-0.0042	-3.66	(***)	-0.0026	-1.98	(**)
Inflation	-0.0038	-3.16	(***)	-0.R0029	-2.88	(***)	0.0023	1.86	(*)	0.0006	0.41	
Currencies	-0.0031	-1.56		-0.0005	-0.25		0.0036	1.66	(*)	0.0035	1.52	
Trade Balance	-0.0016	-1.07		-0.0008	-0.56		-0.0047	-2.47	(**)	-0.0044	-2.19	(**)
Constant	0.0064	2.62	(***)	0.0001	0.04		0.0018	0.48		0.0138	3.6	(***)

Table 10:

Panel regression of quarterly alphas from the model of Carhart (1997)

This Table is analogous to Table 9 except that abnormal return rather than return is the explained variable and that *Sigma*, the standard deviation of the pairs trading returns, is removed from the list of regressors. Monthly abnormal returns are computed via a two-step Fama-MacBeth regression applying the 4-factor model of Carhart (1997). Monthly alphas are then compounded to compute the quarterly alphas that are used as the explained variable in the panel regression. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
Bandwidth	(1) k=2			(2) k=1.5			(3) k=0.5			(4) k=0.25		
	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test
Lack Policy	0.0007	0.57		-0.0014	-1.39		0.0028	1.41		0.0061	1.30	
Political Risk	-0.0018	-1.07		-0.0014	-0.90		-0.0099	-2.81	(***)	-0.0154	-2.75	(***)
Investors' Conf	-0.0055	-2.51	(**)	-0.0026	-1.48		-0.0069	-1.84	(*)	-0.0184	-2.39	(**)
Business Conf	0.0004	0.87		0.0002	0.58		0.0001	0.08		0.0014	0.88	
Consumers' Conf	-0.0006	-1.72	(*)	0.0003	0.89		-0.0001	-0.17		-0.0001	-0.12	
CDS Spreads	0.0002	0.28		0.0001	0.26		0.0007	0.62		0.0007	0.30	
GDP Growth	0.0149	2.89	(***)	0.0046	1.02		-0.0090	-1.08		0.0049	0.28	
Public Deficits	0.0001	0.09		0.0025	2.14	(**)	0.0035	1.69	(*)	0.0041	1.03	
Unemployment	0.0006	0.48		-0.0016	-1.49		-0.0008	-0.43		-0.0053	-1.69	(*)
Lack Labour	-0.0002	-0.19		-0.0019	-1.95	(*)	-0.0044	-1.93	(*)	-0.0059	-1.32	
Competitiveness	0.0009	0.63		0.0006	0.49		-0.0027	-1.11		0.0002	0.05	
Future situation	0.0008	0.40		0.0015	1.08		-0.0033	-1.40		-0.0019	-0.61	
Consumptions	0.0002	0.22		-0.0002	-0.18		0.0044	2.54	(**)	0.0053	1.76	(*)
Rates	-0.0018	-1.64		-0.0013	-1.28		0.0009	0.40		0.0000	0.01	
Inflation	-0.0028	-2.63	(***)	0.0004	0.37		-0.0030	-1.36		-0.0002	-0.05	
Currencies	-0.0001	-0.09		-0.0012	-0.74		-0.0023	-0.79		-0.0030	-0.50	
Trade Balance	-0.0015	-1.00		0.0003	0.27		-0.0016	-0.60		-0.0001	-0.01	
Constant	0.0081	4.62	(***)	0.0057	3.64	(***)	0.0315	8.89	(***)	0.0442	8.30	(***)

Table 11:

Panel regression of quarterly returns with explained and explanatory variables in first differences.

This Table presents panel regression results about the predictability of the returns stemming from the pairs trading strategy applied to international stock markets. It is analogous to Table 10 except that both the explained and the explanatory variables are in first differences rather than levels. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
	(1)			(2)			(3)			(4)		
Bandwidth	k=2			k=1.5			k=0.5			k=0.25		
	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test
Lack Policy	0.0035	1.32		0.0010	0.41		0.0029	1.00		0.0034	1.12	
Political Risk	-0.0002	-0.06		0.0047	1.46		-0.0080	-2.09	(**)	-0.0105	-2.68	(***)
Investors' Conf	-0.0143	-3.33	(***)	-0.0143	-3.18	(***)	0.0078	1.33		0.0135	2.21	(**)
Business Conf	0.0005	0.49		-0.0007	-0.51		-0.0005	-0.41		-0.0005	-0.41	
Consumers' Conf	-0.0018	-1.47		-0.0028	-2.13	(**)	-0.0020	-0.99		-0.0024	-1.16	
CDS Spreads	0.0018	1.72	(*)	0.0005	0.47		-0.0012	-0.83		-0.0013	-0.79	
GDP Growth	0.0052	0.56		-0.0100	-1.07		-0.0547	-3.76	(***)	-0.0667	-4.43	(***)
Public Deficits	-0.0038	-1.44		0.0002	0.06		-0.0025	-0.74		-0.0043	-1.21	
Unemployment	0.0012	0.46		0.0011	0.44		-0.0037	-1.12		-0.0063	-1.76	(*)
Lack Labour	-0.0053	-2.09	(**)	-0.0025	-1.01		-0.0104	-2.98	(***)	-0.0088	-2.36	(**)
Competitiveness	-0.0019	-0.71		0.0054	1.95	(*)	0.0064	1.81	(*)	0.0092	2.41	(**)
Future situation	0.0015	0.59		0.0004	0.14		-0.0007	-0.22		-0.0015	-0.44	
Consumptions	-0.0015	-0.79		-0.0031	-1.45		0.0111	3.77	(***)	0.0099	3.08	(***)
Rates	-0.0070	-1.86	(*)	-0.0051	-1.35		-0.0065	-1.25		-0.0087	-1.64	
Inflation	-0.0039	-1.52		-0.0039	-1.80	(*)	0.0086	2.70	(***)	0.0116	3.18	(***)
Currencies	-0.0010	-0.35		0.0004	0.16		0.0099	3.06	(***)	0.0134	3.73	(***)
Trade Balance	-0.0046	-2.07	(**)	-0.0029	-1.30		-0.0069	-2.14	(**)	-0.0066	-1.94	(*)
Constant	-0.0015	-5.21	(***)	-0.0011	-3.61	(***)	-0.0056	-14.04	(***)	-0.0059	-13.69	(***)

Table 12:

Regression of pairs trading returns over confidence indicators orthogonalized with respect to all macroeconomic variables

This Table reports the regression of quarterly pairs trading returns on the predicted and residual parts stemming from the projections of, respectively, foreign investors' confidence, business confidence and consumers' confidence on the space spanned by the macroeconomic variables described in Section 3. In the first step, the three confidence indicators are projected on all the macroeconomic variables, including political indicators. In the second step, the predicted values and the residuals are saved for each of the three regressions. In the third step, the object of this Table, pairs trading returns are regressed over both the predicted and residual components for all 3 confidence indicators. The exception is that the predicted business confidence is omitted since it displays extremely high correlation with the predicted consumers' confidence. For brevity, *"Pred"* stands for *"Predicted"* and *"Res"* stands for *"Residual"*. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
	(1)			(2)			(3)			(4)		
Bandwidth	k=2			k=1.5			k=0.5			k=0.25		
	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test	Coeff	*t*-Stat	Test
Investors' Pred	0.0111	2.72	(***)	0.0197	5.02	(***)	0.0531	7.76	(***)	0.0596	7.88	(***)
Investors' Res	-0.0035	-1.52		-0.0054	-2.07	(**)	0.0020	0.58		0.0032	0.84	
Business Res	0.0009	2.07	(**)	0.0000	0.03		-0.0016	-2.45	(**)	-0.0021	-2.87	(***)
Consumers' Pred	-0.0054	-4.53	(***)	-0.0039	-3.16	(***)	-0.0164	-7.92	(***)	-0.0196	-8.69	(***)
Consumers' Res	-0.0015	-3.86	(***)	-0.0009	-2.42	(**)	-0.0021	-3.55	(***)	-0.0025	-3.79	(***)
Constant	0.0261	10.64	(***)	0.0278	11.63	(***)	0.1100	28.19	(***)	0.1202	28.84	(***)

Table 13:

Predictive regressions of strategy returns:
Pairs trading returns at time t and all explanatory variables at time $t-1$

This Table is analogous to Table 9, except that, while pairs returns, the explained variable, are still taken as of time $\boldsymbol{t}$, the explanatory variables are taken as of time $\boldsymbol{t-1}$. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
	(1)			(2)			(3)			(4)		
Bandwidth	k=2			k=1.5			k=0.5			k=0.25		
	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test
Sigma	0.1110	1.11		0.7175	6.93	(***)	0.5781	4.38	(***)	0.5175	4.20	(***)
Lack Policy	0.0000	0.01		-0.0014	-0.77		0.0048	1.80	(*)	0.0049	1.82	(*)
Political Risk	0.0019	0.90		0.0017	0.75		-0.0030	-0.84		-0.0030	-0.84	
Investors' Conf	0.0035	0.82		-0.0093	-2.64	(***)	0.0094	1.87	(*)	0.0093	1.84	(*)
Business Conf	0.0014	2.30	(**)	-0.0001	-0.21		-0.0021	-2.63	(***)	-0.0021	-2.61	(***)
Consumers' Conf	-0.0023	-3.91	(***)	-0.0006	-1.04		-0.0018	-2.40	(**)	-0.0018	-2.39	(**)
CDS Spreads	-0.0010	-1.17		0.0001	0.13		-0.0060	-5.18	(***)	-0.0060	-5.17	(***)
GDP Growth	0.0061	0.95		0.0153	1.91	(*)	0.0276	2.62	(***)	0.0275	2.61	(***)
Public Deficits	-0.0008	-0.50		0.0040	2.14	(**)	0.0000	0.00		0.0000	0.00	
Unemployment	-0.0061	-4.21	(***)	-0.0074	-4.66	(***)	-0.0082	-4.11	(***)	-0.0082	-4.10	(***)
Lack Labour	0.0033	1.91	(*)	0.0041	2.25	(**)	-0.0037	-1.62		-0.0037	-1.64	
Competitiveness	0.0011	0.60		-0.0026	-1.34		0.0048	1.83	(*)	0.0048	1.85	(*)
Future situation	0.0040	1.65	(*)	0.0045	1.90		0.0023	0.79		0.0024	0.80	
Consumptions	0.0001	0.09		0.0020	1.38		0.0007	0.32		0.0007	0.31	
Rates	0.0023	1.59		-0.0006	-0.33		-0.0038	-1.70	(*)	-0.0036	-1.61	
Inflation	-0.0082	-6.06	(***)	-0.0061	-4.41		0.0034	1.69	(*)	0.0032	1.58	
Currencies	-0.0014	-0.61		-0.0029	-1.24		-0.0087	-3.05	(***)	-0.0087	-3.05	(***)
Trade Balance	0.0061	3.01	(***)	0.0054	2.79	(***)	0.0036	1.32		0.0036	1.33	
Constant	0.0215	6.81	(***)	0.0247	8.12	(***)	0.0971	19.33	(***)	0.0978	19.48	(***)

Table 14:

Predictive regressions of strategy returns:
Pairs trading returns at time t and all explanatory variables at time $t-2$

This Table is analogous to Table 13 except that the explanatory variables are taken as of time $\boldsymbol{t-2}$. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
	(1)			(2)			(3)			(4)		
Bandwidth	k=2			k=1.5			k=0.5			k=0.25		
	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test
Sigma	-0.5242	-6.60	(***)	-0.0964	-0.91		0.0063	0.06		0.0569	0.58	
Lack Policy	0.0029	1.31		0.0045	1.76	(*)	0.0059	2.07	(**)	0.0059	2.07	(**)
Political Risk	-0.0041	-2.01	(**)	-0.0011	-0.46		0.0003	0.07		0.0002	0.05	
Investors' Conf	-0.0009	-0.24		-0.0039	-0.91		0.0192	3.15	(***)	0.0191	3.14	(***)
Business Conf	-0.0001	-0.09		-0.0012	-1.68	(*)	-0.0018	-1.77	(*)	-0.0018	-1.78	(*)
Consumers' Conf	-0.0012	-1.66	(*)	0.0004	0.54		-0.0036	-3.74	(***)	-0.0035	-3.73	(***)
CDS Spreads	0.0002	0.15		-0.0013	-1.33		-0.0019	-1.67	(*)	-0.0019	-1.68	(*)
GDP Growth	0.0246	2.97	(***)	0.0089	0.99		0.0724	6.19	(***)	0.0719	6.11	(***)
Public Deficits	-0.0028	-1.56		-0.0021	-1.04		-0.0041	-1.41		-0.0042	-1.43	
Unemployment	-0.0031	-1.78		-0.0032	-1.67	(*)	-0.0092	-3.41	(***)	-0.0091	-3.40	(***)
Lack Labour	0.0010	0.61		0.0040	1.89	(*)	0.0083	2.66	(***)	0.0083	2.67	(***)
Competitiveness	-0.0010	-0.57		-0.0021	-0.93		0.0044	1.43		0.0044	1.41	
Future situation	-0.0044	-1.97	(**)	-0.0060	-2.29	(**)	0.0003	0.10		0.0003	0.09	
Consumptions	-0.0046	-2.92	(***)	-0.0022	-1.11		0.0077	3.24	(***)	0.0077	3.24	(***)
Rates	-0.0006	-0.33		-0.0034	-1.67	(*)	-0.0005	-0.13		-0.0004	-0.12	
Inflation	-0.0025	-1.65	(*)	-0.0028	-1.61		-0.0045	-1.80	(*)	-0.0046	-1.83	(*)
Currencies	0.0035	1.31		0.0042	1.45		0.0115	2.57	(**)	0.0115	2.57	(**)
Trade Balance	0.0051	2.19	(**)	0.0094	3.41	(***)	0.0096	2.91	(***)	0.0095	2.89	(***)
Constant	0.0312	9.00	(***)	0.0340	7.50	(***)	0.0799	12.67	(***)	0.0791	12.25	(***)

Table 15:

Predictive regressions of strategy returns:
Pairs trading returns at time t and all explanatory variables at time $t-3$

This Table is analogous to Table 14 except that the explanatory variables are taken as of time $\boldsymbol{t-3}$. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
	(1)			(2)			(3)			(4)		
Bandwidth	k=2			k=1.5			k=0.5			k=0.25		
	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test
Sigma	-0.4124	-5.02	(***)	-0.4626	-4.73	(***)	-0.3172	-2.92	(***)	-0.2940	-3.00	(***)
Lack Policy	0.0031	1.59		0.0008	0.42		0.0019	0.77		0.0018	0.75	
Political Risk	-0.0065	-2.99	(***)	-0.0078	-3.56	(***)	-0.0084	-2.45	(**)	-0.0083	-2.44	(**)
Investors' Conf	0.0065	2.05	(**)	0.0084	2.51	(**)	0.0065	1.42		0.0065	1.44	
Business Conf	-0.0010	-1.35		-0.0001	-0.19		-0.0034	-3.38	(***)	-0.0034	-3.39	(***)
Consumers' Conf	-0.0013	-1.75	(*)	-0.0004	-0.52		-0.0039	-4.11	(***)	-0.0040	-4.12	(***)
CDS Spreads	0.0026	2.41	(**)	0.0009	0.87		-0.0013	-0.98		-0.0013	-0.99	
GDP Growth	0.0061	0.78		-0.0010	-0.13		-0.0051	-0.46		-0.0049	-0.44	
Public Deficits	-0.0055	-3.17	(***)	-0.0050	-2.61	(***)	0.0023	0.94		0.0023	0.94	
Unemployment	0.0021	1.20		-0.0015	-0.79		-0.0041	-1.84	(*)	-0.0041	-1.84	(*)
Lack Labour	-0.0044	-2.53	(**)	-0.0034	-2.00	(**)	0.0009	0.34		0.0009	0.35	
Competitiveness	0.0021	1.26		0.0015	0.68		-0.0016	-0.62		-0.0017	-0.63	
Future situation	-0.0017	-0.67		-0.0056	-2.39	(**)	-0.0120	-3.79	(***)	-0.0121	-3.80	(***)
Consumptions	-0.0024	-1.66	(*)	-0.0008	-0.49		-0.0024	-1.19		-0.0024	-1.19	
Rates	0.0002	0.11		-0.0023	-1.32		-0.0017	-0.57		-0.0018	-0.61	
Inflation	-0.0038	-2.26	(**)	-0.0016	-0.91		0.0010	0.45		0.0011	0.51	
Currencies	0.0031	1.21		0.0031	1.20		0.0129	3.60	(***)	0.0129	3.61	(***)
Trade Balance	0.0022	1.08		0.0009	0.50		0.0014	0.51		0.0014	0.52	
Constant	0.0274	8.08	(***)	0.0394	11.04	(***)	0.1155	21.51	(***)	0.1153	21.54	(***)

Table 16:

Predictive regressions of strategy returns:
Pairs trading returns at time t and all explanatory variables at time $t-4$

This Table is analogous to Table 15 except that the explanatory variables are taken as of time $\boldsymbol{t-4}$. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
	(1)			(2)			(3)			(4)		
Bandwidth	k=2			k=1.5			k=0.5			k=0.25		
	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test
Sigma	-0.5932	-6.40	(***)	-0.6296	-6.72	(***)	-0.4406	-3.82	(***)	-0.3388	-3.35	(***)
Lack Policy	-0.0006	-0.34		-0.0009	-0.43		-0.0004	-0.16		-0.0006	-0.21	
Political Risk	-0.0049	-2.04	(**)	-0.0024	-1.03		-0.0098	-3.16	(***)	-0.0099	-3.19	(***)
Investors' Confidence	-0.0005	-0.14		-0.0054	-1.56		-0.0066	-1.42		-0.0067	-1.44	
Business Confidence	-0.0022	-2.96	(***)	-0.0025	-3.48	(***)	-0.0038	-3.47	(***)	-0.0039	-3.50	(***)
Consumers' Confidence	-0.0024	-3.34	(***)	-0.0009	-1.07		-0.0041	-4.23	(***)	-0.0041	-4.20	(***)
CDS Spreads	0.0038	3.47	(***)	0.0015	1.37		0.0000	0.02		0.0000	-0.03	
GDP Growth	0.0172	2.52	(**)	0.0004	0.05		0.0011	0.12		0.0008	0.09	
Public Deficits	-0.0041	-2.28	(**)	-0.0024	-1.26		-0.0065	-2.59	(**)	-0.0066	-2.64	(***)
Unemployment	-0.0004	-0.23		-0.0029	-1.58		-0.0035	-1.46		-0.0034	-1.44	
Lack Labour	-0.0028	-1.47		-0.0069	-3.69	(***)	0.0022	0.75		0.0022	0.76	
Competitiveness	0.0005	0.30		0.0035	1.57		-0.0023	-0.82		-0.0025	-0.87	
Future Situation	0.0008	0.30		-0.0039	-1.51		-0.0024	-0.75		-0.0025	-0.78	
Consumptions	0.0000	-0.02		0.0007	0.42		-0.0002	-0.09		-0.0002	-0.09	
Rates	-0.0006	-0.30		-0.0011	-0.56		-0.0083	-2.93	(***)	-0.0085	-3.02	(***)
Inflation	-0.0062	-3.31	(***)	-0.0023	-1.31		0.0036	1.56		0.0037	1.59	
Currencies	0.0023	0.91		-0.0024	-0.96		0.0020	0.54		0.0021	0.57	
Trade Balance	-0.0017	-0.88		-0.0032	-1.41		0.0026	1.00		0.0026	0.99	
Constant	0.0358	11.77	(***)	0.0497	13.66	(***)	0.1269	22.15	(***)	0.1256	22.44	(***)

Table 17:

Predictive regressions of abnormal returns:
Pairs trading alphas at time t and all explanatory variables at time $t-1$

This Table is analogous to Table 13 except that the explained variables are alphas (abnormal returns) computed from the model of Carhart (1997) rather than returns. Alphas are taken as of time $\boldsymbol{t}$, whereas the explanatory variables are taken as of time $\boldsymbol{t-1}$. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
Bandwidth	(1) k=2			(2) k=1.5			(3) k=0.5			(4) k=0.25		
	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test
Lack Policy	0.0003	0.22		0.0002	0.13		0.0056	2.27	(**)	0.0120	2.49	(**)
Political Risk	-0.0017	-1.01		-0.0013	-0.95		-0.0091	-2.24	(**)	-0.0089	-1.52	
Investors' Conf	0.0005	0.18		-0.0012	-0.50		0.0019	0.42		-0.0006	-0.09	
Business Conf	0.0004	0.97		0.0006	1.65	(*)	0.0004	0.46		0.0006	0.48	
Consumers' Conf	-0.0011	-2.74	(***)	-0.0001	-0.26		0.0004	0.54		0.0009	0.79	
CDS Spreads	0.0008	1.16		0.0001	0.12		-0.0035	-2.62	(***)	-0.0079	-3.45	(***)
GDP Growth	-0.0162	-3.53	(***)	-0.0005	-0.09		-0.0219	-2.01	(**)	-0.0408	-2.04	(**)
Public Deficits	-0.0018	-1.32		0.0018	1.38		0.0075	3.45	(***)	0.0106	2.53	(**)
Unemployment	-0.0005	-0.45		-0.0016	-1.40		-0.0036	-1.78	(*)	-0.0088	-2.84	(***)
Lack Labour	0.0021	1.62		-0.0001	-0.10		-0.0043	-1.93	(*)	-0.0077	-2.20	(**)
Competitiveness	-0.0013	-0.93		0.0009	0.55		0.0021	0.81		0.0050	1.10	
Future situation	0.0021	1.15		-0.0002	-0.14		0.0010	0.35		0.0036	0.94	
Consumptions	0.0003	0.23		-0.0001	-0.07		-0.0016	-0.92		-0.0022	-0.70	
Rates	-0.0035	-2.45	(**)	-0.0016	-1.49		0.0013	0.61		0.0034	1.05	
Inflation	-0.0028	-2.38	(**)	-0.0013	-1.22		-0.0014	-0.68		0.0005	0.19	
Currencies	-0.0023	-1.34		0.0011	0.68		-0.0030	-1.09		-0.0002	-0.05	
Trade Balance	0.0016	1.15		0.0024	1.98	(**)	-0.0034	-1.19		-0.0077	-1.69	(*)
Constant	0.0109	5.04	(***)	0.0041	2.14	(**)	0.0304	7.20	(***)	0.0459	8.16	(***)

Table 18:

Predictive regressions of abnormal returns:
Pairs trading alphas at time t and all explanatory variables at time $t-2$

This Table is analogous to Table 17 except that the explanatory variables are taken as of time $\boldsymbol{t-2}$. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
	(1)			(2)			(3)			(4)		
Bandwidth	k=2			k=1.5			k=0.5			k=0.25		
	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test
Lack Policy	0.0016	0.94		-0.0003	-0.19		-0.0021	-0.77		-0.0019	-0.44	
Political Risk	-0.0022	-1.21		-0.0035	-2.39	(**)	-0.0110	-2.43	(**)	-0.0125	-1.99	(**)
Investors' Conf	0.0001	0.04		-0.0023	-0.74		-0.0043	-0.96		-0.0064	-1.08	
Business Conf	0.0000	0.07		0.0001	0.21		0.0011	1.29		0.0021	1.54	
Consumers' Conf	-0.0004	-0.71		0.0002	0.45		-0.0006	-0.64		-0.0008	-0.66	
CDS Spreads	-0.0006	-0.69		0.0001	0.21		0.0028	2.06	(**)	0.0032	1.47	
GDP Growth	-0.0084	-1.35		-0.0095	-1.61		0.0057	0.57		0.0118	0.86	
Public Deficits	-0.0010	-0.71		-0.0006	-0.41		0.0038	1.49		0.0022	0.61	
Unemployment	-0.0003	-0.19		0.0006	0.47		-0.0067	-2.64	(***)	-0.0106	-2.76	(***)
Lack Labour	0.0019	1.46		0.0011	0.84		-0.0016	-0.55		-0.0045	-0.98	
Competitiveness	-0.0003	-0.24		0.0017	1.43		0.0047	1.38		0.0091	1.81	(*)
Future situation	-0.0004	-0.23		0.0013	0.71		0.0009	0.28		0.0031	0.60	
Consumptions	-0.0006	-0.50		-0.0004	-0.34		-0.0004	-0.19		0.0032	1.13	
Rates	-0.0062	-3.95	(***)	-0.0024	-2.15	(**)	0.0016	0.62		0.0046	1.32	
Inflation	0.0009	0.63		-0.0003	-0.26		-0.0045	-1.67	(*)	-0.0038	-0.95	
Currencies	0.0002	0.11		-0.0010	-0.54		0.0011	0.24		-0.0058	-0.75	
Trade Balance	0.0066	3.61	(***)	0.0031	1.76	(*)	-0.0043	-1.32		-0.0102	-2.00	(**)
Constant	0.0078	2.64	(***)	0.0062	2.38	(**)	0.0302	5.48	(***)	0.0450	6.26	(***)

Table 19:

Predictive regressions of abnormal returns:
Pairs trading alphas at time t and all explanatory variables at time $t-3$

This Table is analogous to Table 18 except that the explanatory variables are taken as of time $\boldsymbol{t-3}$. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
	(1)			(2)			(3)			(4)		
Bandwidth	k=2			k=1.5			k=0.5			k=0.25		
	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test
Lack Policy	0.0030	2.08	(**)	0.0004	0.28		0.0017	0.64		0.0012	0.29	
Political Risk	0.0025	1.32		-0.0060	-3.44	(***)	-0.0179	-4.19	(***)	-0.0201	-3.30	(***)
Investors' Conf	0.0032	1.11		0.0043	1.55		0.0064	1.44		0.0040	0.60	
Business Conf	0.0003	0.46		0.0005	1.06		0.0008	0.86		0.0003	0.24	
Consumers' Conf	0.0003	0.56		0.0011	2.22	(**)	-0.0009	-1.05		-0.0007	-0.54	
CDS Spreads	0.0034	3.67	(***)	-0.0002	-0.32		-0.0017	-1.14		-0.0014	-0.63	
GDP Growth	0.0071	1.06		0.0211	3.24	(***)	-0.0402	-3.68	(***)	-0.0588	-4.11	(***)
Public Deficits	-0.0013	-1.03		-0.0006	-0.44		0.0039	1.51		0.0022	0.54	
Unemployment	0.0027	1.71		0.0007	0.57		-0.0102	-4.05	(***)	-0.0164	-3.73	(***)
Lack Labour	-0.0025	-1.79		0.0005	0.43		0.0002	0.07		-0.0003	-0.07	
Competitiveness	-0.0007	-0.42		0.0049	2.54	(**)	0.0050	1.51		0.0142	2.13	(**)
Future situation	-0.0016	-0.79		-0.0012	-0.65		-0.0046	-1.16		0.0011	0.16	
Consumptions	0.0010	0.84		-0.0008	-0.70		-0.0060	-2.75	(***)	-0.0049	-1.48	
Rates	-0.0067	-4.73	(***)	-0.0042	-3.59	(***)	-0.0001	-0.02		0.0049	1.30	
Inflation	-0.0027	-1.95	(*)	-0.0014	-1.06		-0.0015	-0.58		-0.0019	-0.53	
Currencies	0.0035	1.63		-0.0004	-0.22		-0.0097	-2.50	(**)	-0.0107	-1.92	(*)
Trade Balance	0.0020	1.07		-0.0004	-0.28		0.0032	1.01		0.0149	2.19	(**)
Constant	0.0015	0.53		0.0029	1.22		0.0454	7.97	(***)	0.0525	6.67	(***)

Table 20:

Predictive regressions of abnormal returns:
Pairs trading alphas at time t and all explanatory variables at time $t-4$

This Table is analogous to Table 19 except that the explanatory variables are taken as of time $\boldsymbol{t-4}$. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Periods Lengths	FP=250 & TP=125						FP=20 & TP=20					
	(1)			(2)			(3)			(4)		
Bandwidth	k=2			k=1.5			k=0.5			k=0.25		
	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test	Coeff	t-Stat	Test
Lack Policy	0.0011	0.73		0.0000	0.03		0.0000	0.02		-0.0021	-0.60	
Political Risk	0.0029	1.46		-0.0026	-1.55		-0.0138	-3.49	(***)	-0.0170	-2.85	(***)
Investors' Conf	-0.0041	-1.52		-0.0051	-1.93	(*)	0.0006	0.15		0.0005	0.08	
Business Conf	0.0000	0.08		-0.0002	-0.47		0.0007	0.64		0.0023	1.23	
Consumers' Conf	0.0005	0.79		0.0012	2.19	(**)	-0.0013	-1.24		-0.0008	-0.51	
CDS Spreads	0.0036	3.70	(***)	0.0013	1.84	(*)	-0.0027	-1.71	(*)	-0.0036	-1.84	(*)
GDP Growth	0.0175	3.35	(***)	0.0080	1.70	(*)	-0.0079	-0.92		-0.0161	-1.07	
Public Deficits	-0.0006	-0.45		-0.0015	-1.19		-0.0037	-1.22		-0.0066	-1.30	
Unemployment	0.0015	0.95		0.0002	0.22		-0.0140	-4.49	(***)	-0.0188	-3.44	(***)
Lack Labour	-0.0011	-0.73		-0.0004	-0.32		0.0030	1.04		0.0048	1.33	
Competitiveness	-0.0033	-1.99	(**)	0.0050	2.94	(***)	-0.0013	-0.40		-0.0020	-0.32	
Future situation	0.0004	0.20		0.0009	0.51		-0.0019	-0.50		-0.0004	-0.06	
Consumptions	-0.0021	-1.62		0.0003	0.36		0.0037	1.36		0.0083	1.65	
Rates	-0.0048	-3.04	(***)	-0.0015	-1.22		0.0005	0.24		0.0023	0.84	
Inflation	-0.0018	-1.15		-0.0015	-1.41		0.0025	1.17		0.0030	0.84	
Currencies	0.0011	0.54		0.0019	1.06		0.0015	0.43		0.0023	0.41	
Trade Balance	0.0032	2.08	(**)	0.0010	0.69		-0.0013	-0.49		-0.0042	-1.15	
Constant	0.0033	1.34		0.0019	0.84		0.0390	6.56	(***)	0.0525	5.68	(***)

Table 21:

Explaining country risk:

Regressions of CDS spreads on all the political and macroeconomic variables.

This Table reports the panel regressions of pairwise differences (in absolute value) in country risk proxied by CDS spreads on pairwise differences (in absolute value) in political and macroeconomic factors (but not confidence indices) defined in the text and in the caption of Table 9. Each regression takes into account fixed effects. The t-stats are obtained using robust standard errors. Symbols ***, ** and * denote significance at 1, 5 and 10%, respectively.

Regression	Contemporaneous			Predictive											
	(1)			(2)			(3)			(4)			(5)		
Nr of lags L	L=0			L=1			L=2			L=3			L=4		
	Coeff	t-stat	Test	Coeff	t-stat	Test	Coeff	t-stat	Test	Coeff	t-stat	Test	Coeff	t-stat	Test
Lack Policy	0.11	4.57	(***)	0.12	4.46	(***)	0.09	3.17	(***)	0.08	3.07	(***)	0.06	2.46	(**)
Political Risk	0.18	4.83	(***)	0.04	1.15		0.07	1.84		0.10	2.56	(**)	-0.02	-0.50	
GDP Growth	-0.36	-5.01	(***)	-0.40	-10.03	(***)	-0.46	-12.15	(***)	-0.40	-10.51	(***)	0.20	4.57	(***)
Public Deficits	0.17	6.71	(***)	0.17	5.99	(***)	0.04	1.47		0.03	1.03		0.07	2.22	(**)
Unemployment	0.08	3.58	(***)	0.00	-0.18		-0.09	-4.06	(***)	-0.07	-3.11	(***)	-0.04	-1.63	
Lack Labour	-0.05	-2.06	(**)	0.03	1.26		0.07	2.90	(***)	0.07	3.24	(***)	0.03	1.46	
Competitiveness	0.05	2.16	(**)	0.07	2.67	(***)	0.04	1.55		-0.01	-0.42		-0.05	-1.88	(*)
Consumptions	-0.03	-1.26		0.00	-0.21		0.02	0.84		0.07	3.53	(***)	0.14	6.80	(***)
Interest Rates	0.07	3.39	(***)	0.10	4.52	(***)	0.20	8.90	(***)	0.20	8.93	(***)	0.13	5.10	(***)
Inflation	0.06	2.60	(***)	0.07	2.94	(***)	0.03	1.08		-0.02	-0.67		-0.02	-0.62	
Trade Balance	-0.11	-4.45	(***)	-0.14	-6.33	(***)	-0.10	-4.56	(***)	-0.04	-1.43		0.02	0.93	
Intercept	0.78	21.58	(***)	0.82	21.85	(***)	0.90	24.43	(***)	0.89	25.25	(***)	0.84	21.62	(***)

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