

Neuroticism, uncertainty, and foreign investment

Pawel Niszczoła

Poznań University of Economics
Department of International Finance
al. Niepodległości 10, 61-875 Poznań, Poland
pawel.niszczoła@ue.poznan.pl

Abstract

Building on previous research that has established a link between neuroticism and the tendency to avoid uncertainty, and revealed the way foreign securities are perceived by investors, we explore whether variation in the personality trait of neuroticism affects foreign portfolio investment. Contrary to typical studies of personality, we use cross-country observational data, which allows us to analyse the effects of individuals' decisions, and not merely the possibly biased responses of study participants. Results demonstrate that investors from countries that have a high mean neuroticism score generally invest less in foreign equities than investors from other countries, and that this tendency is also – but to a smaller extent – present when considering investments in foreign debt securities. The paper also contributes to the literature by showing that the individuals from countries with a higher mean level of neuroticism invest less in countries that are culturally dissimilar to the country the investor comes from. An analysis of the variation in the level of global market uncertainty, and the levels of uncertainty in the countries making and receiving the investment shows that neurotics' reluctance to invest is mostly driven (from a temporal perspective) by the level of uncertainty in their own country.

Keywords: personality traits; culture; portfolio investment; home bias

JEL Classification: G2; G15

This version: March 2014

1. Introduction

People differ in how they perceive ambiguity and uncertainty. The fact that sensitivity to uncertainty is not uniform across individuals has important consequences, as uncertainty has been shown to impact all forms of economic activity, ranging from consumer spending to trade (Bloom, 2013). Financial academics have recently started to acknowledge the fact that we don't all behave in the same way when facing uncertainty, by studying how differences in Hofstede's 'uncertainty avoidance' dimension of culture affect foreign portfolio investment, corporate takeovers and risk-taking, and hedging (Beugelsdijk & Frijns, 2010; Frijns, Gilbert, Lehnert, & Tourani-Rad, 2013; Li, Griffin, Yue, & Zhao, 2013; Lievenbrück & Schmid, 2014). In this study we take an alternative approach and explore the human psyche by analysing whether differences in neuroticism, a factor which combines various personality traits which have been linked with the propensity to avoid uncertainty, are to some extent responsible for cross-country investment patterns in equity and debt securities.

Although neuroticism (N) and its select components have been previously investigated from a financial decision-making context, studies that focus on this issue usually explore this link based on the responses of individuals that are presented with hypothetical scenarios (e.g., Mayfield, Perdue, & Wooten, 2008; Gambetti & Giusberti, 2012), and not their decisions. We use a different approach by studying the value of holdings in foreign stocks and bonds relative to a benchmark, which allows us to reveal if a higher mean level of neuroticism in a given country translates into a greater degree of underinvestment in foreign securities. Such an approach is warranted, given that previous cross-cultural studies of personality find that it is sensible to treat between-country scores similarly to how one would compare scores of individuals within a given country (e.g., van Hemert, van de Vijver, Poortinga, & Georgas, 2002; McCrae & Terracciano, 2005). Another advantage of analysing the patterns of foreign portfolio investment is that it allows us to investigate several issues, which have not been

previously explored in the literature that attempts to extract the effect of individual differences on investment behaviour. By studying foreign investments we are able to – indirectly – shine some light on what discourages individuals with a high level of aversion towards uncertainty to invest abroad. Put differently, our investigation enables us to extract the conditions in which emotionally unstable individuals felt comfortable enough to make a foreign investment. More specifically, we explore the role that cultural differences (proxied by genetic and somatic distance, as well as several other measures), trust, and informational asymmetries play in determining this decision. Additionally, we investigate how variation in uncertainty – at various levels – affects the choices made by individuals from countries scoring highly on neuroticism.

2. Neuroticism and the propensity to invest abroad

Researchers have suggested several ways of quantifying one's personality, based on model-specific sets of dimensions (scales), which consist of from as little as three, to as much as thirty scales (Draycott & Kline, 1995). Notwithstanding such apparent variation, personality models typically show a high degree of commonality among each other. A constantly recurring aspect of these models relates to the consistency of an individual's behaviour in adverse conditions and susceptibility to negative mood, traits which are typically clustered under the term 'neuroticism' (Claridge & Davis, 2001). The fundamentality of this factor in the studies of personality can be inferred from the observation that it is quite likely the most thoroughly researched one (Widiger, 2009), as well as from the fact that it is a component of the two dominant taxonomies of personality i.e. the 'Big Five' (Digman, 1990) and the 'Big Three' (Eysenck 1947, 1967) models.

Emotional instability, preferred by some researchers over the term neuroticism¹, is a useful synonym for the concept under question, that incorporates both the nature of an individual's internal states (or moods), and the nature of his or her interaction with others. The mood instability of individuals that score highly on the neuroticism trait (i.e. neurotics) demonstrates itself by the easiness in which they enter negative emotional states, that can often be experienced for prolonged periods. Given that neurotics react poorly to stress and have a tendency to feel threatened or anxious very easily, it is not surprising that they have a greater propensity to avoid situations, which have the potential of producing negative outcomes. In other words, individuals with low levels of emotional stability exhibit fear (Cloniger, 2000) or intolerance (Berenbaum, Bredemeier, & Thompson, 2008) of uncertainty, which contrasts with the typical 'mere' preference for certain outcomes (or ambiguity aversion) that the more typical (non-neurotic) individuals exhibit.²

Extant research shows that neurotic individuals reveal their attitude toward uncertainty and risk both at the physiological level, and through their choices. The former point is best illustrated by the study of Hirsch and Inzlich (2008), who have demonstrated that the brain activity of neurotic individuals shows that they react more vividly to uncertain feedback concerning their performance than to negative feedback, conversely to the reactions of individuals that have low levels of neuroticism. These results encourage the authors to conclude that uncertainty for neurotics is so discomforting, that they seem to prefer 'the devil they know' (unambiguously negative information) over an uncertain outcome. This uncertainty avoiding nature of neurotics is reflected in the decisions they make. Lommen, Engelhard, and van den Hout (2010) show that highly neurotic individuals have a greater tendency to avoid ambiguous signals, but – in contrast to Hirsch and Inzlich (2008), who

¹ Researchers also use the terms 'emotionality' or 'negative emotionality' (Widiger, 2009).

² Cloniger (2000) relates to uncertainty explicitly by identifying 'fear of uncertainty' as a facet (subscale) of the 'harm avoidance' dimension of personality that corresponds with the neuroticism trait in the dominant models of personality.

suggest that the reactions of neurotics are due to a rapid, automated (and thus also difficult to control) process – they argue that their decisions are made strategically.³ Further evidence of a link between neuroticism and uncertainty aversion can be found in the analyses that focus on the trait anxiety levels of individuals, an association that seems warranted given that anxiety is one of the subscales (facets) of neuroticism in many models of personality. While Maner et al. (2007) show that anxious individuals tend to be risk-averse in a general sense⁴, Gambetti and Giusberti (2012) explore the relationship between variation in anxiety and anger and investment decisions. The authors show – among other findings – that individuals that score highly on trait anxiety are more reluctant to acquire equity or debt securities, and have a greater preference for less risky portfolios than other individuals.

Overall, the evidence on the behaviour of neurotic individuals suggests that they should have a propensity to avoid exposure to risk, in large part due to the fact that they tend to focus more on the negative outcomes (threats) than the positive ones (opportunities). If this observation were indeed true in a general sense, it should be reflected in foreign investment patterns, as a result of how foreign securities seem to be perceived in relation to their domestic counterparts. One example of how foreign assets are perceived is provided by the study of Kilka and Weber (2001), who show that investors feel less competent in regard to foreign stocks, which yields lower expected returns (or less optimism towards the stocks' prospects; a similar result is provided by Shiller, Kon-Ya, and Tsutsui (2006)) and a greater expected dispersion of returns (riskiness). In other words, current research seems to suggest that investment in foreign securities – resulting quite likely from a feeling of unfamiliarity (Huberman, 2001) – adds another layer of risk for investors. By extrapolating the patterns observed in the Gambetti and Giusberti (2012) study, we expect individuals scoring highly on

³ These explanations are not mutually exclusive – neurotics can show greater physiological reactivity to certain stimuli, but – just as any individual – may require time to make an appropriate decision.

⁴ It should be noted, however, that in some studies the evidence on this link is mixed (Hockey, Maule, Clough, & Bdzola, 2000; Mitte, 2007).

neuroticism to be severely affected by this addition. Put differently, the additional uncertainty infused into investors' decision-making process while considering foreign securities is likely to be a strong inhibitor for neurotics. Thus, we hypothesize that the level of investment from countries whose individuals have a high mean neuroticism score will be relatively smaller than investment from other countries.

While testing such a hypothesis will allow us to either reject or reinforce the neuroticism-uncertainty aversion link in an international context, it yields no insight into what specific aspect of foreignness seem to fuel the propensity to avoid foreign securities.⁵ To fill this void, we examine the interactions between neuroticism and different groups of variables that relate either to between-country intricacies, or to issues related solely to the country receiving the investment. Firstly, we investigate whether cultural differences between the country making the investment (henceforth: the home country) and the country receiving the investment (henceforth: the host country) affects the perceived uncertainty while making foreign portfolio investments. Guiso, Sapienza, and Zingales (2009) argue that genetic and somatic distance are measures that dig deeply into the differences between countries from a cultural stand point. While the former measure (which is sourced from Cavalli-Sforza, Menozzi, and Piazza (1994)) establishes between-country differences in DNA based on how frequently certain alleles are found in the population of each country, the latter measure (based on data from Biasutti (1954)) aggregates differences in physical traits between individuals from different countries, based on their height, the colour of their skin, and the length-to-width ratio of their skulls. We also consider measures that refer to more specific aspects in which two countries can differ from one another, by utilizing the measures used by Dow and Karunaratna (2006), who have analysed how the level of trade between two countries is the result of the differences in their language, religion, education level,

⁵ Moreover, it is possible that the effect of neuroticism will not be strong enough to have a significant impact on investment in general, and will only be revealed while making investments in more extreme, unfavourable scenarios.

democratic values (political freedom), and ideology (the degree of preference for socialist policies). A general expectation is that the greater the differences between the two countries become, the more uneasy it will be for emotionally unstable individuals to invest in the securities of foreign origin. Adopting an alternative perspective, we expect that a high degree of similarity between the country that a neurotic individual comes from and the country where he considers making an investment should mitigate uncertainty, and thus produce more favourable conditions for a foreign investment.

Secondly, we analyse whether N interacts with trust, given that it has been shown in Guiso, Sapienza, and Zingales (2009) that the level of trust between inhabitants of different countries affects various forms of economic activity. It seems plausible that neuroticism will interact with the mean level of trust that investors have towards individuals from the country in which they consider investing. Intuitively, emotionally unstable individuals seem more unlikely than the remainder of individuals to invest in the stocks or bonds originating from a country, whose citizens are generally distrusted in his own country, an argument which we believe deserves to be tested empirically.

Thirdly, we investigate whether familiarity or non-cultural similarity between countries produce differences in the effect of neuroticism on investment in foreign securities. The first variable worth investigating is the level of trade between the home and host country, which undeniably helps individuals from each country to accumulate various forms of knowledge concerning the partner country. Another factor that may make a foreign country feel familiar to an investor is if the legal system of the home and host country are of the same origin, a characteristic that we operationalize by constructing a dummy variable that takes the value of one when this is the case and interact it with N . It is also possible, that investors – especially neurotic ones – might feel more confident while investing in countries with a

similar level of economic development. We test this possibility by interacting N with the log of the difference between GDP per capita in the home and host country.

Lastly, we explore whether the strength of the effect of variation in neuroticism is somehow related to the information environment of the host country. A greater degree of opacity raises the level of ambiguity, making neurotic individuals even less willing to invest in countries with a poor information environment. The plausibility of this argument is supported by evidence that suggests that countries with a lower mean score in the openness to experience trait invest less in countries where the quality of information is low (Niszczoła, 2014).

Given that uncertainty in general varies with time, we also investigate whether the effect of neuroticism varies according to the level of uncertainty on global markets, and in specific countries. Skiba (2013) shows that there is a ‘flight to familiarity’ trend in times of high uncertainty. It seems plausible that individuals that have a high neuroticism score will be more sensitive to changes in uncertainty, which should be reflected in the structure of their portfolios. At the aggregate level this should translate into a specific pattern i.e. the level of underinvestment in foreign securities from countries with a high mean neuroticism score should be more pronounced in times of high uncertainty in the financial markets.

3. Data and methodology

The standard approach used in the literature while performing analyses of foreign portfolio investments is to refer not to the absolute, but the relative level of investments, in which researchers compute benchmark levels of investments based on some model, such as the International Capital Market Pricing Model (ICAPM). In this study we follow this approach, and define the dependent variable (separately for equity and debt securities, and each year used in the study) as the log ratio of the observed weight of securities from host country j in the portfolio of investors from home country i (in year t), to the optimal weight according to

the ICAPM, that is one that corresponds to the relative size of a foreign market based solely on the market value of the securities⁶, i.e.:

$$y_{ijt} = \log \left(\frac{w_{ijt}}{w_{jt}^*} \right). \quad (1)$$

In order to compute the relative value of investment, we use the data provided by the International Monetary Fund (IMF) in the Coordinated Portfolio Investment Survey, which shows end-of-year bilateral country holdings for both equity and debt securities. The IMF has first reported such data in 1997, and has done so in a yearly fashion since 2001. To obtain a continuous study period, we discard observations from the first round of the survey, which leaves us with twelve years of holdings' data, from 2001 to 2012. The weight w_{ijt} refers to the share of securities from country j in the total value of securities held by residents of country i , whereas the baseline weight (w_{jt}^*) to the share of the value of securities from country j in the total value of securities from all 50 host countries used in this study. Similarly to Beugelsdijk and Frijns (2010), we fix the dependent variable at the log of 0.001 when a home country does not hold any securities from a specific host country.⁷

The existence of several cross-country personality assessments gives us a certain degree of freedom when choosing an appropriate form for our key independent variable: the mean neuroticism score of individuals from a specific country. In this paper we use scores that were established based on the observer-rating Revised NEO Personality Inventory (NEO-PI-R; McCrae & Terracciano, 2005) and the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975), which are used to extract scores that correspond to the 'Big Five'

⁶ It is also possible to define the dependent variable more conservatively (i.e. in a way that produces a downward bias in the estimates), by not considering the value of domestic securities in each country's portfolio. Given that the main data source used in this study does not provide such information, it necessitates the use of another dataset, which might produce inconsistencies. The alternative form of the dependent variable is very highly correlated with the standard form, with a correlation of 0.93 and 0.97 for equity and debt securities, respectively.

⁷ Although IMF provides data for a more extensive number of countries, many potential home and host countries are excluded due to the unavailability of information on the control variables. Moreover – to insure that the quality of dataset will allow us to draw reliable inferences – we exclude from our analysis home country-year pairs in which IMF lists investments in less than 44 countries, and home countries for which we do not have at least 3 years of data. As a conservative measure, we also exclude investments made to and from Ireland and Luxembourg, which often serve as intermediaries in capital flows.

and ‘Big Three’ models of personality, respectively. The use of mean scores based on these inventories has been proven to be a valid way of comparing individual differences between countries, given that prior research has demonstrated that there is a equality of the factor structure at the between-country and within-country level (McCrae & Terracciano, 2005; van Hemert, van de Vijver, Poortinga, & Georgas, 2002).

To insure that the analysis is robust, we include a wide range of control variables in all regressions.⁸ Given that in this paper we argue that the core reason for the existence of a postulated negative effect between the level of neuroticism in a home country and the value of foreign security holdings is due to the link between neuroticism and the aversion towards uncertainty, it becomes necessary to show that neuroticism has the proposed effect after considering the influence of Hofstede’s uncertainty avoidance dimension, which – as it was pointed out earlier – seems to affect investment in foreign equities. From a technical standpoint, it is important to control for the level of home bias (the degree investors overinvest in domestic securities) in each home country, as it clearly limits the amount of funds available to spend on foreign securities. It is also important to consider the role of national wealth in the country the investors originate from to rule out the possibility that differences in wealth are a better predictor of investment decisions, thus making the investigated variable redundant (Hofstede & McCrae, 2004). We also control for the potential influence of several variables that proxy for the level of similarity or familiarity between the home and host country, all of which have been used in previous studies of foreign portfolio investment. More specifically, we control for the effect of geographic distance, the level of trade between the countries, cultural distance, and dummies that separately account for instances when the home and host country share a common official language, religion, or have a legal system of the same origin (each variable takes the value of one when there is

⁸ The data sources for all of the variables used in the study are reported in the Appendix, in Table A1.

such a commonality). The final list of controls attempt to proxy for certain aspects of the host country's capital market that influence its' attractiveness. And so, all of our specifications control for the GDP per capita level and market capitalization to GDP ratio, variables which proxy for how developed the economy and capital market of the host country are, respectively. Moreover, we control for the effect of market volatility and exchange rate volatility for each host country.

4. Results

In Table 1 we present the mean level of neuroticism in each of the home countries used in the study, as measured by the NEO-PI-R and EPQ scales. Although countries that score highly on one scale usually also score highly on the other measure, there are often considerable differences between the scores. For example, France has the highest level of NEO-PI-R neuroticism, but ranks as 9th according to the EPQ scale. Conversely, Japan and Spain have the 9th and 15th rank according to the NEO-PI-R scale, respectively, while at the same time they are the 3rd (Japan) and 5th (Spain) top scoring countries according to the alternative scale used in this study. Overall, if we consider mean scores based on both inventories, it is easier to tell which countries are estimated to be the most neurotic (Russia, Italy, and Portugal score highly on both scales), than to tell which are inhabited by the most emotionally stable individuals, due to the lack of data on observer-rating NEO-PI-R scores on countries that are considered the least neurotic according to the EPQ, i.e. Norway, Sweden and the Netherlands. However, the low self-report NEO-PI-R scores for these countries that are reported in McCrae (2002) give support for the argument that these countries can indeed be considered the least neurotic nations in our sample of home countries.

We make our first attempt to assess the link between neuroticism and foreign investment by analysing the mean level of the dependent variable in high and low neuroticism subsamples, between 2001 and 2012 (the subsamples are created based on the median level of

neuroticism). The results of this comparison for foreign equity investment patterns – which are presented in Table 2 – give strong support for the main hypothesis, by demonstrating that in all cases the dependent variable takes lower values for countries with a high level of neuroticism, with all but one of the differences being statistically significant at the 0.1% level. The patterns of foreign debt investment, however, paint a less consistent picture. Although high-N countries seem to more heavily underinvest (be more biased) for every year from 2008 onwards – regardless of whether we refer to the NEO-PI-R or EPQ scores – the differences for three of the years prior to 2008 are not statistically significant or are in the other direction. However, ultimately, if we relate to the entire twelve-year period used in our analysis, the differences between the level of investment in debt from high and low-N countries are statistically significant ($p < 0.001$).

A more robust examination of the neuroticism-investment link can be performed via panel data regressions, which consider the impact of a multitude of potential predictors of international portfolio investment, and take advantage of the structure of our dataset. To make it easier to compare the efficacy of the NEO-PI-R and EPQ score, we standardize both measures. Further, in order to assess the impact of neuroticism in comparison with the effect of Hofstede's uncertainty avoidance dimension, we present two sets of specifications, one that excludes, and the other that includes the latter variable. For equity investments, the results of these regressions – that are reported in the first four columns of Table 3 – are in line with the split-sample analysis, and demonstrate that the effect of neuroticism remains statistically significant even after taking into account the influence of a wide range of controls, as well as host country and time fixed effects. In other words, in the case of equity investments, a higher level of N – in both forms put under scrutiny – lead to a relatively lower level of investment, as hypothesized. Most crucially, although the effect of N is smaller after including uncertainty avoidance in the specifications (columns 2 and 4), the effect remains statistically significant at

the same level ($p < 0.001$). Interestingly, the change in the effect of neuroticism differs depending on whether we base our analysis on the NEO-PI-R, or the EPQ score. While a one standard deviation increase in the NEO-PI-R score has a much smaller effect after including the uncertainty avoidance variable (-0.46 vs. -0.29), a one standard deviation increase in the EPQ score has a roughly similar effect on investment after the addition of the alternative uncertainty-aversion proxy (-0.77 vs. -0.64). What these results also suggest is that variation in the level of neuroticism based on the EPQ has a more sizeable effect on the propensity to invest in foreign equities than estimates based on the alternative inventory. In contrast to the results from Table 2 that have shown that there are – at least in general – significant differences in the level of investment into foreign debt securities made from high and low-N countries, columns 5-8 of Table 3 show that while the effect of neuroticism has the expected sign, in all of the cases the coefficients for the key independent variable are not statistically significant. Put differently, after accounting for several factors that affect the level of investment in debt securities, we are no longer able to demonstrate a link between the mean level of neuroticism in a home country and its investment patterns in foreign debt securities. We will return to this point, however, while applying a more robust estimation procedure.⁹

Our investigation so far has given support for the hypothesis that individuals from high-N countries generally invest less in foreign equities than the remainder of countries. However, it seems both more revelatory and intriguing to extract which between-country and host country-related features cause individuals from high-N countries to refrain from making foreign investments. Such an analysis is also warranted for one more reason: although it seems that neuroticism does not seem to systematically affect the propensity to invest in foreign debt securities, it is plausible that such an effect does indeed exist, only in specific,

⁹ Our results are qualitatively the same if we use the alternative form of the dependent variable that we have mentioned earlier. Also, the key independent variable remains statistically significant after accounting for the effect of variation in openness to experience (Niszczoła, 2014), a variable that we have omitted in the main specifications, as it would considerably reduce the sample size in specifications where we explore the role of neuroticism computed according to the EPQ.

adverse circumstances. In order to resolve these issues we analyse a multitude of regressions, in which the object of investigation is the interaction between both N-scores and various ‘uncertainty’ proxies. To conserve space and enhance readability, in Table 4 we only report parameter estimates for the interaction term. We start by analysing the interactions terms created by interacting N with three variables used in Guiso, Sapienza, and Zingales (2009), that is genetic distance, somatic distance, and the level of trust that inhabitants of the home country have towards inhabitants of the host country (the results are reported in Panel A). A general observation is that there are stark differences between the results depending on whether we relate to the NEO-PI-R or EPQ neuroticism score. While neither of the interactions with the former produce results of statistical significance, the latter – in all but one case – suggest the existence of an interaction effect between neuroticism and the variables that are investigated in this panel. More specifically, the negative and statistically significant coefficient for the interaction between N and genetic (somatic) distance demonstrate that the greater the difference between the home country and host country either from a genetic or physical-trait perspective (in which we measure (generally) covert and overt differences, respectively) the more negative the effect of N becomes. It is important to note that the very same effect is present for investments in both equity and debt, which partially contrasts with the results from Table 3, where no effect of variation in neuroticism on investment in foreign debt securities (foreign bonds, essentially) was found. Interestingly, the level of trust also seems to interact with N, but only for debt securities.

Genetic and somatic distance, as argued earlier, are variables that capture cultural differences in a very broad sense. In Panel B we analyse how N interacts with an alternative broad measure of cultural distance (which aggregates between-country differences in Hofstede’s cultural dimensions), as well as how it interacts with more specific cultural distance proxies. The results seem to suggest that the greater the difference between the home

and host country in regard to their languages, religion, or degree of democracy, the greater the effect of N becomes (although in a quarter of the cases, the results are statistically insignificant). For the remainder of cultural proxies, the results are either entirely insignificant (Hofstede-based cultural distance), inconclusive (distance in ideology interacts significantly only with the NEO-PI-R measure), or puzzling (distance in education, unexpectedly, has a positive effect in two specifications).

In Panel C we explore interactions between N and variables that proxy for the level of familiarity and non-cultural similarity between the home and host countries. Evidence of an interaction effect with N is present only when we relate to the commonality of the origin of both countries' legal system – in all specifications the coefficient is positive and statistically significant, which shows that individuals from high-N countries have a preference for countries with a legal system that is similar to the legal system adopted in their own country. The level of trade between the home and host country does not seem to impact the decision-making process of investors from high-N countries. Economic distance either has a positive interaction effect (equity investments) or has no significant effect (debt investments), which in the case of the former shows that high-N countries in fact prefer to invest in the stocks from countries with a dissimilar level of economic development.

Finally, in Panel D we explore whether investing in countries on which there is less information available in either a relative or absolute sense (as proxied by geographic distance and financial transparency, respectively) lead to a different propensity to invest in foreign securities from countries with different mean levels of neuroticism. The fact that all but one of the interaction terms are statistically insignificant suggests that the availability or quality of information does not seem to play a role for neurotics while considering investments in foreign securities.

So far we have investigated how the effect of neuroticism differs depending on characteristics that are constant or roughly constant across time. To complete the picture of how the effect of N might vary we will now exploit the structure of the dataset, by exploring whether the effect of neuroticism varies across time. To illustrate how the level of uncertainty varied on global financial markets between 2001 and 2012, in Figure 1 we show changes in the standardized mean value of VIX, and consumer sentiment in the US. We use US data due to the presence of volatility spillovers from the US market onto other financial markets. Both uncertainty proxies suggest that in 2008 the average level of uncertainty was at its highest level, with the mean for 2009 being at a slightly lower level. These proxies are unequivocal, however, as to how much the level of uncertainty has fallen since then – between 2010 and 2012 the average reduction in the level of uncertainty (compared to 2008 and 2009) has been roughly -1.6 and -0.6 standard deviations, based on data on VIX and consumer sentiment, respectively. In Panel A of Table 5 we attempt to resolve whether the variation in global (general) market uncertainty translates into differences in the potency of the effect of neuroticism on foreign investment. Results show that such a link is present only while analysing the effect of variation in consumer sentiment in the US on the level of investment in foreign debt securities. However, given that the coefficient for the interaction term that contains VIX – the standard measure of global market uncertainty – is statistically insignificant, it is difficult to say that the results are conclusive for investments in debt (for equities the results are even less consistent).

In Panel B (Table 5) we turn to the analysis of measures of uncertainty that are measured for each country individually. Similarly to the results presented in Panel A in Table 4, there is a sharp contrast between the efficacy of the interaction, depending on whether we relate to the NEO-PI-R or the EPQ score. While the coefficients for the former are all insignificant, the span of the GDP forecasts and the level of consumer sentiment (in the

European countries on which we have data) have the expected sign and are all highly statistically significant ($p < 0.001$), both for investments in equity and debt. Although the last measure of uncertainty – the level of market volatility – does not seem to have a significant effect (although it carries the expected sign), these results, overall, give support for the notion that the level of uncertainty in the country that the investment is made from affects the decisions of countries inhabited – on average – by more neurotic individuals.

Finally, in Panel C we investigate whether variation in the level of uncertainty in the host country translates into differences in the effect of neuroticism. That fact that neither the GDP forecast span nor the level of market volatility in the host country have a significant interactive effect with neuroticism suggests that the level of uncertainty in the country in which the investment is made does not have a different effect in low and high-N countries.

Although the results presented in Panel A in Table 5 do not support the argument that the level of global uncertainty in financial markets affects the decisions of countries with different mean scores of neuroticism in an inconsistent manner, in Figure 2 we reinvestigate whether the effect of neuroticism is at a similar level across time. We do so by analysing the size of the coefficient separately for each of the twelve years used in the study. This allows us to adopt the more robust censored regression (Tobit) procedure, which was – conservatively – not applied in the panel regressions due to the risk of producing biased estimates. The upper part of Figure 2 – which refers to investments in foreign equities – gives some insight into why we were unable to demonstrate a significant relationship between the level of global uncertainty, as measured by VIX and consumer sentiment in the US, and the magnitude of the effect of neuroticism. Starting from 2008, the size of the effect of N seems to be at a roughly similar level, which does not correspond with the reduction in the level of global uncertainty after 2009. In fact, if we refer to the EPQ score, estimates show that N had the strongest negative effect in 2012, the year when post-2007 uncertainty was at its lowest levels (on

average). Thus, high-N countries seem to exhibit a large degree of ‘inertia’ in their international equity portfolios, and are reluctant to increase their holdings in foreign equities following a general increase in market sentiment. In other words, the severe shock induced at the beginning of the financial crisis has left a long-lasting negative effect on the propensity of individuals from high-N countries to invest in foreign equities. What is also noteworthy is that the size of the effect is larger for the EPQ score than the NEO-PI-R score, although this result is not surprising, as it corresponds to the results presented in Table 3. The analysis of the variation in the effect of N on investment in foreign debt securities between 2001 and 2012 – which are illustrated in the lower part of Figure 2 – paints a different picture in regard to the efficacy of neuroticism than the one we have obtained for equities. Coefficients for NEO-PI-R do not provide reliable support for the existence of a negative effect of N – only in two years (2010 and 2011) the coefficient is negative and statistically significant, but at the same time it becomes positive (statistically significantly) when analysing 2012 holdings. If we use the EPQ score, however, the results become much more consistent – we obtain negative and statistically significant coefficients for 8 years (a contrasting positive coefficient is obtained in 2004, however it would be unfair to argue that this undermines the general story that the data is trying to convey). These results contrast with the results that we have obtained in Table 3, in the panel regressions, and suggest that the hypothesized negative link between neuroticism and investment is indeed present. Further, in comparison with the effect of the EPQ-measured neuroticism score that was presented while considering investments in foreign equity securities two observations are warranted. Firstly, there seems to be a negative effect of N not only after the beginning of the financial crisis, but also for 4 years prior to that (also, the size of the effect in most cases thus not differ greatly in the pre and post-2008 periods. Secondly, when a negative effect of N is indeed present, it is notably stronger in the case of equity investments. Overall, when referring to the EPQ score of neuroticism, there seems to be a

roughly constant effect of N in the case of investment in foreign debt securities, whereas in the case of equities the effect is more sensitive to ‘shocks’ in uncertainty, which infuse a prolonged aversion towards foreign stocks.

5. Discussion

Although our results give support for the existence of a negative effect of neuroticism on the propensity to invest in foreign equities, and – to smaller extent – in debt, the analysis has revealed that when using the EPQ scale of neuroticism the results are generally stronger than while using the NEO-PI-R scale, and more sensitive to variation in the level of various time-invariant and temporal measures of uncertainty.¹⁰ We can think of two reasons for these differences. Firstly, it is possible that the binary response format of the EPQ (where respondents choose between ‘yes’ and ‘no’ for each item) yields better composite scores of neuroticism than the five-point Likert scale used in the NEO-PI-R. Individuals from different countries often have specific response styles, with some cultures refraining from providing more extreme answers (Hofstede & McCrae, 2004). It is possible that these inconsistent response styles translate into a significant bias in the estimates of N for certain cultures.¹¹ This argument is supported by the fact that the coefficient of variation of the N score for the NEO-PI-R and EPQ scale is equal to 2.7% and 12.3%, respectively, suggesting that the latter might be better in extracting variation in N around the world. Secondly, NEO-PI-R and EPQ neuroticism ultimately differ in what they are trying to measure. Whereas EPQ is derived from the Eysenck Personality Inventory (Eysenck & Eysenck, 1964), in which the items related to N focus heavily on anxiety (Chapman, Weiss, Barrett, & Duberstein, 2013), N in

¹⁰ The stronger results obtained via the EPQ score are not the result of non-overlapping sets of home countries for which have NEO-PI-R and EPQ scores. If we perform the analysis on a set of overlapping home countries (i.e. those for which we have mean levels of N based on both inventories) the results still suggest that a one standard deviation increase in N has a more severe influence on the level of investment when using the EPQ scale.

¹¹ Although McCrae and Terracciano (2005) try to control for this by using observer-ratings, it is the countrymen of the person that is being rated that are making the assessment, and thus some bias resulting from differences in response styles can still be present.

the NEO-PI-R scale contain certain facets that might not be negatively related to the propensity to invest in foreign securities, such as self-consciousness and anger-hostility (Gambetti and Giusberti (2012) provide evidence of a positive link between anger and the preference for risky assets, albeit they use an inventory that focuses specifically on this trait). It should be noted that these two explanations are not mutually exclusive.

The analysis suggests that being more neurotic has more severe implications for investment in foreign equities than foreign debt. It is plausible that the smaller effect of N for debt securities is caused by the existence of another effect of opposite direction. Although this might not always be the case, investments in debt securities are generally less risky than investments in equities, and thus some emotionally unstable individuals might create demand for the former. This might have the potential to weaken the effect of N, and in some way explain the divergence in the size of the effect for equities and debt.

Our study also reveals the existence of an interaction effect between N and genetic distance, somatic distance (for equity and debt investments), and trust (solely for debt investments). Although Guiso, Sapienza, and Zingales (2009) used genetic and somatic differences primarily as proxies for cultural differences between countries, one cannot deny that ultimately these measures also relate to differences in physical traits of individuals from the home and host country (more indirectly, for the former variable, and by its very definition, in the case of the latter variable). If the channel through which neuroticism impacts the propensity to invest in foreign securities is indeed related to uncertainty, as we have argued in the paper, our results suggest that emotionally unstable individuals feel unconfident when considering investments inhabited by people that look differently from their countrymen and have dissimilar cultures. Although it is very likely that cultural differences strongly dominate other somatic differences, it is difficult to rule out the role of the latter. The argument that physical traits can matter in circumstances related to investment (albeit indirectly) is

supported by the results provided by DeBruine (2002), who demonstrates that people seem to have greater trust in people that are similar to them.

A final observation worth making relates to the role that information asymmetries and uncertainty in the host market play when individuals from high-N countries make investments abroad. We find no evidence that the effect of N becomes more severe when informational asymmetries are higher, or when the prospects of the host country become more uncertain. Trade intensity – which aids information acquisition – does not seem to increase the willingness of neurotic individuals to buy foreign assets, which further supports the argument that the unavailability of information on a country does not play a crucial role for emotionally unstable individuals when considering foreign portfolio investments.

6. Conclusions

In this study we have harnessed the research opportunity provided by the existence of cross-country data on bilateral holdings in equity and debt securities, by studying whether variation in the mean neuroticism of individuals in the country from which the investment originates affects the relative level of investment from each country. Results based on panel data from 2001-2012 suggest that, in general, as the mean level of neuroticism rises, the level of investment in a host country (relative to a benchmark) falls, even after considering the role of the uncertainty avoidance cultural dimension (an alternative metric of what we are trying to capture via the neuroticism score). The magnitude and significance of this effect, however, is not uniform across specifications, and varies depending on which personality inventory we base our analysis on, being more pronounced when using the Eysenck Personality Questionnaire score rather than the Revised NEO Personality Inventory scale, and for foreign investments in equity rather than debt.

The most intriguing results of this paper are provided while investigating how neuroticism interacts with several variables with the potential of influencing how a foreign

country is perceived. Our analysis shows – indirectly – that an increase in the availability of information on the foreign country has a similar effect for neurotic and emotionally stable individuals, which in turn suggests that the formers’ lower propensity to invest is not information-related. Interestingly, it seems that the main source of uncertainty relates to the cultural differences between inhabitants of the country making the investment and the country receiving them, with some indication that trust also plays some role.

Another fairly surprising result is that we were unable to demonstrate that the global level of uncertainty in financial markets has an impact on the decision-making process of individuals from countries with a high mean neuroticism score. In some part, this is the result of differences between the level of global and local uncertainty (the latter was proven to strengthen the neuroticism-investment link), but is also fuelled by considerable post-shock ‘inertia’ in the foreign equity portfolios of individuals from relatively ‘neurotic’ countries, which largely seem resistant to the recent positive changes in market sentiment.

Paradoxically, the main strength of the paper is ultimately also its major weakness. Although using observational data has its merits in comparison to studies based on participants’ responses, and the use of mean scores seems to be a valid way of drawing inferences, the literature would benefit from an analysis that would be carried out at the individual and not ecological level. To enhance the robustness of this papers’ findings, one would ideally have to track changes in the structure of portfolios of specific investors, whose personalities have been previously evaluated. Extant knowledge would also surely be enriched if one would pursue an alternative path, by exploring whether neurotics’ more pronounced preference for interacting with culturally and somatically similar individuals is indeed present while studying this link in a different, not necessarily economic context.

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Table 1. Neuroticism around the world

Country	NEO-PI-R	EPQ
Argentina	51.3	
Australia	48.6	15.5
Austria	48.3	
Belgium	49.6	
Bulgaria		14.9
Canada	49.6	12.7
Chile	50.0	
Denmark	50.3	
Egypt		17.3
Finland		14.6
France	52.7	15.1
Germany	48.1	13.6
Hong Kong	50.5	14.6
Hungary		14.6
Italy	52.6	16.6
Japan	50.7	16.7
Lithuania		15.1
Netherlands		11.5
Norway		10.3
Poland	50.7	
Portugal	51.6	15.7
Russia	51.4	18.0
Slovenia	50.7	
South Korea	48.4	15.3
Spain	49.7	16.2
Switzerland	50.6	
Thailand	48.9	
Turkey	51.4	
United Kingdom	50.1	14.9
United States	48.1	15.0
<i>Mean (M)</i>	50.2	14.9
<i>Standard deviation (SD)</i>	1.3	1.8
<i>Coefficient of variation (SD/M)</i>	2.7%	12.3%

Notes: This table reports the mean neuroticism score in select countries, based on the observer-rating Revised NEO Personality Inventory (NEO-PI-R) and the Eysenck Personality Questionnaire (EPQ).

Table 2. Foreign portfolio investment made from high and low-neuroticism countries

	Equity						Debt					
	NEO-PI-R			EPQ			NEO-PI-R			EPQ		
	High	Low	<i>diff</i>									
2001	-4.55 (2.83)	-3.66 (2.77)	***	-4.84 (2.92)	-4.65 (3.06)	*	-4.84 (2.92)	-4.65 (3.06)	*	-4.63 (2.91)	-4.50 (3.15)	
2002	-4.16 (2.72)	-3.48 (2.77)	***	-4.01 (2.64)	-3.07 (2.59)	***	-4.96 (2.91)	-4.74 (3.01)	*	-4.35 (3.12)	-4.85 (2.89)	*
2003	-4.46 (2.69)	-3.50 (2.81)	***	-4.09 (2.68)	-2.44 (2.32)	***	-5.21 (2.65)	-4.73 (2.89)	*	-4.40 (2.97)	-4.57 (2.86)	
2004	-4.45 (2.72)	-3.47 (2.78)	***	-4.16 (2.80)	-3.29 (2.85)	***	-5.02 (2.79)	-4.60 (2.94)	*	-4.62 (2.94)	-4.30 (2.97)	*
2005	-4.33 (2.82)	-3.62 (2.79)	***	-4.47 (2.82)	-2.67 (2.50)	***	-4.73 (2.99)	-4.68 (2.91)		-4.51 (2.97)	-4.26 (3.02)	*
2006	-4.20 (2.73)	-3.43 (2.68)	***	-4.01 (2.62)	-3.03 (2.72)	***	-4.47 (3.00)	-4.39 (2.90)		-4.32 (2.92)	-4.04 (3.06)	*
2007	-4.04 (2.77)	-3.19 (2.59)	***	-3.72 (2.65)	-2.40 (2.30)	***	-4.48 (2.98)	-4.35 (2.87)		-4.34 (2.87)	-4.00 (2.96)	*
2008	-4.28 (2.69)	-3.09 (2.62)	***	-4.27 (2.58)	-2.95 (2.60)	***	-4.73 (2.85)	-4.53 (2.82)	*	-4.61 (2.84)	-4.07 (2.92)	*
2009	-4.26 (3.03)	-3.05 (2.65)	***	-4.08 (2.81)	-2.75 (2.59)	***	-4.99 (2.89)	-4.34 (2.86)	***	-4.58 (2.83)	-4.18 (3.03)	*
2010	-4.42 (2.98)	-3.16 (2.69)	***	-4.16 (2.74)	-2.78 (2.70)	***	-5.01 (2.81)	-4.32 (2.89)	***	-4.64 (2.75)	-4.17 (3.06)	*
2011	-4.42 (3.08)	-3.27 (2.71)	***	-4.27 (2.95)	-2.71 (2.88)	***	-4.97 (2.83)	-4.31 (2.85)	***	-4.62 (2.74)	-3.75 (3.09)	***
2012	-4.52 (3.09)	-2.71 (2.36)	***	-3.92 (2.85)	-2.61 (2.75)	***	-4.91 (2.86)	-4.17 (2.90)	***	-4.63 (2.80)	-4.06 (3.00)	*
2001-2011	-4.34 (2.86)	-3.30 (2.70)	***	-4.13 (2.74)	-2.82 (2.64)	***	-4.87 (2.87)	-4.49 (2.91)	***	-4.53 (2.87)	-4.22 (3.01)	***

Notes: This table reports mean levels of investment relative to a benchmark (see equation 1), made from countries with an above- or below-median neuroticism score (means for these countries are denoted as High and Low, respectively). *diff* denotes the significance of a Mann-Whitney U-test for the equality of means in the High and Low neuroticism countries. Standard deviations are shown in parentheses.

* Significance of U-test for the equality of means at the 5% level; ** Significance of U-test for the equality of means at the 1% level;

*** Significance of U-test for the equality of means at the 0.1% level.

Table 3. The effect of neuroticism on foreign portfolio investment

	Equity				Debt			
	NEO-PI-R		EPQ		NEO-PI-R		EPQ	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Home country characteristics</i>								
Neuroticism	-0.463*** (0.071)	-0.289*** (0.071)	-0.774*** (0.101)	-0.638*** (0.108)	-0.093 (0.057)	-0.056 (0.062)	-0.102 (0.073)	-0.103 (0.081)
Uncertainty avoidance		-0.478*** (0.065)		-0.225* (0.088)		-0.079 (0.059)		0.001 (0.066)
Home bias	-0.125*** (0.038)	-0.097** (0.038)	-0.318*** (0.042)	-0.299*** (0.044)	-0.208*** (0.044)	-0.210*** (0.044)	-0.222*** (0.047)	-0.222*** (0.047)
GDP per capita	0.739*** (0.087)	0.634*** (0.088)	0.098 (0.142)	0.103 (0.142)	0.483*** (0.091)	0.462*** (0.093)	0.323* (0.155)	0.325* (0.156)
<i>The relationship between the home and host country</i>								
Geographic distance	-0.981*** (0.073)	-0.987*** (0.073)	-0.763*** (0.093)	-0.808*** (0.094)	-0.819*** (0.076)	-0.826*** (0.075)	-0.606*** (0.072)	-0.605*** (0.075)
Trade	-0.021 (0.074)	-0.026 (0.074)	0.214* (0.100)	0.202* (0.101)	0.054 (0.063)	0.050 (0.063)	0.212** (0.077)	0.214** (0.078)
Cultural distance	0.156*** (0.046)	0.079 (0.048)	-0.035 (0.054)	-0.045 (0.054)	0.044 (0.038)	0.031 (0.040)	0.009 (0.046)	0.009 (0.046)
Common language	0.960*** (0.184)	0.771*** (0.182)	0.498* (0.216)	0.343 (0.224)	0.222 (0.179)	0.193 (0.174)	0.150 (0.168)	0.150 (0.167)
Common religion	0.959*** (0.180)	1.024*** (0.185)	0.270 (0.158)	0.255 (0.165)	-0.112 (0.191)	-0.089 (0.189)	-0.649*** (0.143)	-0.649*** (0.143)
Common legal origin	0.422*** (0.124)	0.187 (0.127)	0.904*** (0.155)	0.850*** (0.156)	-0.025 (0.131)	-0.075 (0.142)	0.457*** (0.132)	0.456*** (0.133)
<i>The attractiveness of the host country</i>								
GDP per capita	0.285* (0.141)	0.281* (0.140)	0.084 (0.170)	0.086 (0.170)	0.870*** (0.156)	0.871*** (0.156)	0.911*** (0.171)	0.911*** (0.171)
Market capitalization to GDP	-0.044 (0.072)	-0.045 (0.071)	-0.025 (0.079)	-0.025 (0.079)	-0.031 (0.041)	-0.031 (0.041)	-0.030 (0.050)	-0.029 (0.050)
Market volatility	0.089 (0.072)	0.088 (0.071)	0.088 (0.092)	0.087 (0.092)	0.010 (0.088)	0.010 (0.088)	0.076 (0.102)	0.076 (0.102)
Exchange rate volatility	0.020 (0.033)	0.020 (0.032)	-0.015 (0.041)	-0.015 (0.041)	0.241*** (0.063)	0.241*** (0.063)	0.236** (0.074)	0.236** (0.074)
<i>Number of observations</i>	9 541	9 541	6 734	6 734	7 821	7 821	5 909	5 909
<i>Adjusted R²</i>	0.193	0.200	0.241	0.243	0.316	0.316	0.426	0.429
<i>F-statistic</i>	34.7	35.6	32.5	32.3	55.1	54.2	67.0	66.9

Notes: This table reports random effects (GLS) panel regression results. Neuroticism levels are based on the Revised NEO Personality Inventory (NEO-PI-R) or the Eysenck Personality Questionnaire (EPQ), and are standardized. Cluster-robust standard errors are shown in parentheses. All specifications control for host country and time fixed effects.

* Significant coefficient at the 5% level; ** Significant coefficient at the 1% level; *** Significant coefficient at the 0.1% level.

Table 4. The interaction between neuroticism and time-invariant uncertainty proxies

	Equity		Debt	
	NEO-PI-R	EPQ	NEO-PI-R	EPQ
<i>Panel A. Cultural differences and trust between countries (European subsample)</i>				
Genetic distance	0.053 (0.180)	-0.473** (0.168)	-0.029 (0.128)	-0.323*** (0.090)
Somatic distance	0.057 (0.073)	-0.186* (0.073)	0.071 (0.059)	-0.166* (0.066)
Trust	-0.271 (0.426)	0.449 (0.404)	-0.241 (0.284)	0.931*** (0.257)
<i>Panel B. Alternative cultural distance proxies</i>				
Cultural distance	-0.033 (0.055)	-0.088 (0.055)	0.046 (0.046)	-0.031 (0.045)
Distance in language	-0.166* (0.073)	-0.277** (0.094)	-0.090 (0.067)	-0.155* (0.064)
Distance in religion	-0.181** (0.065)	0.079 (0.079)	-0.154** (0.057)	-0.121* (0.061)
Distance in degree of democracy	-0.500*** (0.147)	-0.492** (0.153)	0.051 (0.078)	-0.207* (0.096)
Distance in ideology	-0.922*** (0.255)	-0.473 (0.281)	-0.629** (0.214)	0.072 (0.232)
Distance in education	0.347** (0.125)	0.142 (0.125)	-0.074 (0.074)	0.190* (0.074)
<i>Panel C. Familiarity and economic distance between countries</i>				
Trade	-0.004 (0.042)	-0.057 (0.050)	0.014 (0.034)	-0.068 (0.035)
Common legal origin	0.626*** (0.135)	0.576*** (0.164)	0.329** (0.116)	0.255* (0.120)
Economic distance	0.155** (0.058)	0.149* (0.061)	0.040 (0.055)	0.065 (0.049)
<i>Panel D. Uncertainty about quality of information in host country</i>				
Geographic distance	-0.013 (0.056)	-0.022 (0.078)	0.085 (0.051)	0.083 (0.054)
Financial transparency	-0.084 (0.100)	0.049 (0.117)	-0.215* (0.102)	-0.026 (0.101)

Notes: This table reports the interaction term obtained via random effects (GLS) panel regressions. Due to a high degree of correlation between the uncertainty proxies, each pair of estimates relates to a distinct specification that assesses the interaction of N with just one uncertainty proxy. Neuroticism levels are standardized. Cluster-robust standard errors are shown in parentheses. All specifications control for host country and time fixed effects.

- * Significant coefficient at the 5% level.
- ** Significant coefficient at the 1% level.
- *** Significant coefficient at the 0.1% level.

Table 5. The interaction between neuroticism and time-variant uncertainty proxies

	Equity		Debt	
	NEO-PI-R	EPQ	NEO-PI-R	EPQ
<i>Panel A. General level of uncertainty</i>				
VIX	-0.003 (0.002)	0.005* (0.003)	-0.001 (0.002)	-0.004 (0.003)
Consumer sentiment (United States)	0.001 (0.002)	0.003 (0.002)	0.004* (0.002)	0.009** (0.003)
<i>Panel B. Uncertainty in home country</i>				
GDP forecast span	0.091 (0.067)	-0.355*** (0.096)	-0.029 (0.054)	-0.407*** (0.110)
Consumer sentiment (European countries)	-0.003 (0.003)	0.012*** (0.004)	0.001 (0.003)	0.015*** (0.003)
Market volatility	0.013 (0.040)	-0.053 (0.051)	-0.047 (0.045)	-0.073 (0.057)
<i>Panel C. Uncertainty in host country</i>				
GDP forecast span	-0.097 (0.069)	0.030 (0.087)	-0.115 (0.064)	-0.109 (0.104)
Market volatility	-0.065 (0.052)	0.046 (0.054)	-0.073 (0.052)	-0.080 (0.075)

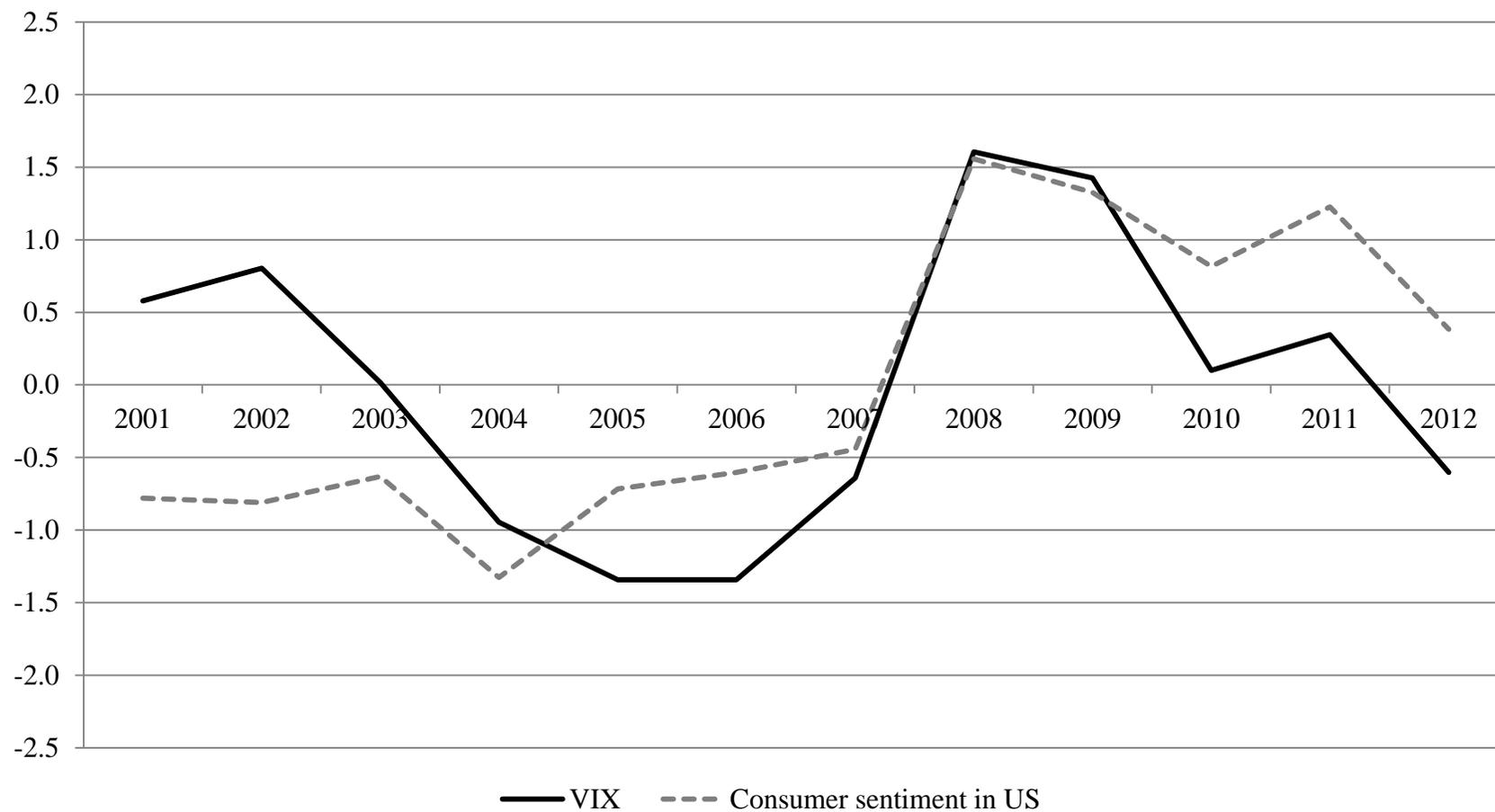
Notes: This table reports fixed effects (OLS) panel regression results. Neuroticism levels are standardized. Cluster-robust standard errors are shown in parentheses. All specifications control for time effects.

* Significant coefficient at the 5% level.

** Significant coefficient at the 1% level.

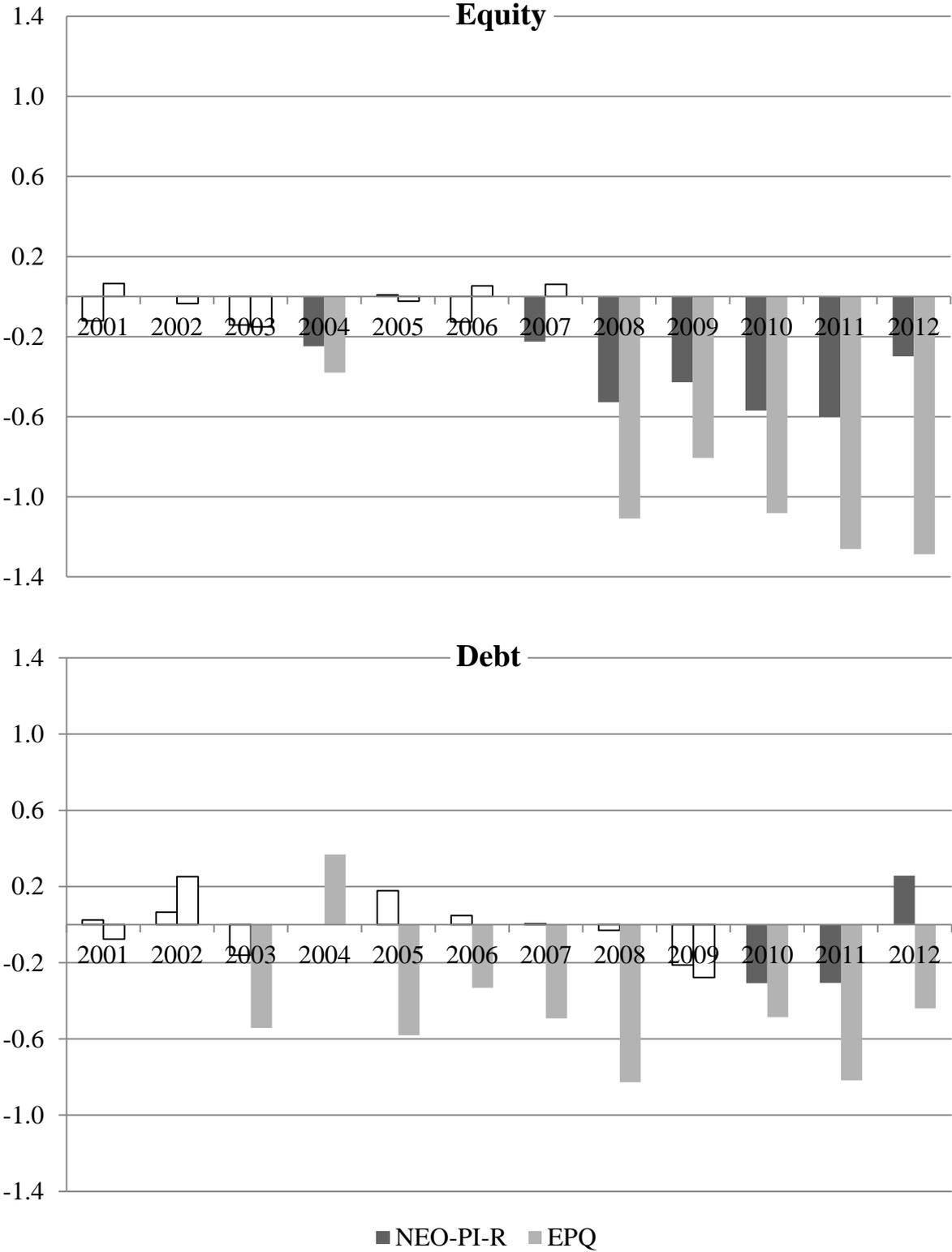
*** Significant coefficient at the 0.1% level.

Figure 1. Changes in global market uncertainty



Notes: This figure illustrates the mean standardised level of uncertainty in a given year, which is computed on the basis of daily data. To facilitate the comparison, the figure shows the negative value of (standardized) consumer sentiment in the US (which tends to fall when uncertainty rises).

Figure 2. Variation in the effect of neuroticism on foreign portfolio investment



Notes: This figure illustrates the size of the effect of neuroticism on the level of foreign portfolio investment (after controlling for the effect of all the control variables specified in Table 3, and the host country fixed effects). Estimates are obtained via the Tobit procedure. Coefficients that are not significantly different from zero ($p \geq 0.05$) are shown in white.

Appendix

Table A1. The variables and datasets used in the study

Variable	Dataset	Provider (based on data from)	Notes
Equity and debt securities holdings	Coordinated Portfolio Investment Survey	International Monetary Fund	
Neuroticism	McCrae & Terracciano, 2005 (NEO-PI-R); Lynn & Martin, 1995 (EPQ)		
Uncertainty avoidance			
Cultural distance	The Hofstede Center	http://geert-hofstede.com	Computed as in Kogut and Singh (1988)
Home bias	Coordinated Portfolio Investment Survey; Debt securities statistics	International Monetary Fund; Bank for International Settlements	Computed as in Fidora, Fratzscher, and Thimann (2007)
GDP per capita			
Market capitalization to GDP	World Development Indicators	The World Bank	
Economic distance			
Geographic distance			
Common language	GeoDist dataset	Mayer & Zignano, 2011	
Common religion			
Trade	Direction of Trade Statistics	International Monetary Fund	Computed as share of trade with a given partner to the total value of trade (with all partners), where trade is defined as the geometric average of exports and imports reported by both trading partners
Common legal origin	La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999		
Market volatility			
Exchange rate volatility	Baker & Bloom, 2013		
GDP forecast span			
Genetic distance		Cavalli-Sforza, Menozzi, & Piazza, 1994	
Somatic distance	Guiso, Sapienza, & Zingales, 2009	Biasutti, 1954	
Trust		The Eurobarometer Survey	
Distance in language			
Distance in religion			
Distance in degree of democracy	Dow & Karunaratna, 2006		
Distance in ideology			
Distance in education			
Financial transparency	Bushman, Piotroski, & Smith, 2004		
VIX		https://www.cboe.com/micro/vix/historical.aspx	
Consumer sentiment (United States)	University of Michigan Survey of Consumer Sentiment	http://research.stlouisfed.org/fred2/series/UMCSENT/	
Consumer sentiment (European countries)	European Commission consumer confidence data	http://ec.europa.eu/economy_finance/db_indicators/surveys/time_series/index_en.htm	