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Abstract: This paper applies the panel fixed effects with vector decomposition estimator to three FDI datasets to estimate the impact of time-invariant variables on FDI while including fixed effects. We find that the omission of fixed effects significantly biases several of these variables, especially those proxying for trade costs and culture. After including fixed effects, we find that many time-invariant variables indicate the importance of vertical FDI. We also find that by eliminating these biases, the differences across datasets largely disappear. Thus, controversies in the literature that are driven by differences in data sets may be resolved by using this estimation technique.

JEL Classification: F14, F23

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1. Introduction

In the empirical literature on foreign direct investment (FDI), several variables have entered the standard canon of control variables. Some of these, such as GDP of the parent and host countries, vary over time. Others, such as distance between countries, do not. As a result, when using fixed effects to control for unobserved country heterogeneity and eliminate potential biases in the coefficients of the time varying variables, coefficients for these time-invariant variables cannot be estimated.[1] Nevertheless, doing so is important because such variables proxy for trade costs and therefore yield crucial insights into the motivation behind FDI. If FDI happens in order to gain access to consumers, higher trade costs are expected to increase FDI (horizontal FDI).[2] Alternatively, if FDI takes place to create global production networks, higher trade costs decrease FDI (vertical FDI).[3] Recently, however, Plümper and Troeger (forthcoming) have developed a three-stage estimation procedure that efficiently estimates the impact of time-invariant variables while also controlling for fixed effects.

The primary goal of this paper is to apply this panel fixed effects with vector decomposition (XTFEVD) method to three commonly used FDI data sets.[4] This allows us to deal with potential biases in the time-varying coefficients while decomposing the fixed effects into explainable components (i.e. correlated with the time-invariant

[1] For example, as demonstrated by Baltagi, Egger, and Pfeffermayr (forthcoming) and Blonigen, Davies, Waddell, and Naughton (forthcoming) including fixed effects is typically sufficient to absorb any third country effects.
[2] Models in this vein include Markusen's (1984) seminal paper and recent innovations such as the export platform literature of Ekholm, Forslid, and Markusen (forthcoming), Bergstrand and Egger (forthcoming), and Yeaple (2003).
[3] Early work in this direction includes that of Helpman (1984). More recent contributions include Baltagi, Egger, and Pfaffermayr (forthcoming). The knowledge capital model, discussed in detail by Markusen (2002), incorporates aspects of both vertical and horizontal FDI.
[4] As detailed below, we use bilateral stock and sales data involving the US, bilateral stock data involving an OECD country, and inbound and outbound flows from the World Bank.

variables) and an unexplainable component. While this does not improve the estimation of the coefficients of time-varying variables relative to fixed effects (which itself deals with the potential biases in OLS), controlling for the unobserved portion of the country-specific effects does impact the estimated coefficients for the time-invariant variables. Importantly, we find that the coefficients on several commonly-used time-invariant variables change sign when doing so. After correcting for the biases caused by the omission of this unaccounted country-specific fixed effect, our estimates largely suggest the importance of vertical FDI. In addition, we find that XTFEVD eliminates many of the differences in the coefficients found across data sets when using OLS. This suggests that prior findings that distance might have positive or negative effects on FDI, depending on the sample used (e.g. Blonigen, Davies, Waddell, Naughton (forthcoming), Grubert and Mutti (2004), Eaton and Tamura (1994)), may be due to the presence of unobserved country heterogeneity and differences in the extent of this problem across data sets. Thus, XTFEVD is a useful tool in checking the robustness of these findings.

Our second contribution is to use information on culture to ascertain the degree to which the cultures of the parent and host countries affect investment patterns. There is a growing body of theory looking at the impact of culture (which is related to networks both in production and consumption) and international trade issues (see Janeba, forthcoming, for a recent review). Using the cultural indicators developed by Hofstede (1980) and Hofstede and Bond (1988), we find that culture is a significant predictor of FDI. Since these measures do not vary over time, XTFEVD is again useful for distinguishing between their effects and those caused by unobserved heterogeneity across countries. In particular, our estimates suggest that it is more the cultural attributes of the

parent and the host separately that matter rather than the differences between them. Specifically, we find that more FDI comes from and goes to societies built around masculine values (e.g. competitiveness, assertiveness, ambition, accumulation of wealth), and that FDI flows into countries where individuals pursue long term goals and dislike waste, to cultures that handle uncertainty easily, and to countries in which inequality in power is accepted by the less powerful in society. Also, we find more FDI outflows from countries in which people like to undertake independent initiatives but less FDI inflows into these countries. Many of these results conform to anecdotal beliefs on multinationals since these firms are highly competitive, undertake risky ventures such as R&D and international dealings, and are based around creative, intangible assets. Thus, these results provide an empirical motivation for expanding the research on the relationship between trade and culture into FDI and culture.[5]

In our analysis, we use three of the most commonly-used FDI datasets, all of which run from 1980 to 2000. The first is the BEA data which covers bilateral US inbound and US outbound FDI stocks and affiliate sales. The second uses bilateral inbound FDI stocks where either the parent or host country belongs to the OECD. The third is provided by the World Bank (WB) and reports total inbound and total outbound FDI flows for a wide variety of countries. Our motivation for using these datasets is twofold. First, these are the most commonly employed datasets in the literature. Therefore this allows us to compare our results to the broadest set of existing literature.

[5] Related to our results on the level of FDI activity is the literature on cultural differences and the entry mode of multinationals. Tihanyi, Griffith and Russell (2005) provide an overview of this literature. Ionascu, Meyer and Estrin (2006) is a more recent addition that uses a composite measure of cultural differences composed from the same measures we use. Consistent with other studies, they find that multinationals tend towards greenfield investment (as opposed to acquisitions or joint ventures) when cultural differences are small.

Second, we are able to show that with respect to results found from OLS regressions the estimated impact of time-invariant variables such as distance or common language is more consistent across datasets once the unobserved country heterogeneity is taken into account by using XTFEVD. This indicates that the bias induced by unaccounted country characteristics in the OLS estimates of time-invariant variables vary across datasets.

Beyond this, our analysis reveals several things. First, the introduction of fixed effects does have a significant impact on the magnitudes of the time-varying variables. In particular, parent and host population coefficients are biased towards zero. Looking at the time-invariant variables we find a number of sign reversals after employing the XTFEVD method. For example, in the US data, we find an inverted U shape for distance between the parent and host countries when not controlling for fixed effects. When doing so, we find a U shape, a result also found in the OECD data. In addition, for all three data sets we find that OLS underestimates the impact of parent and host country area.

The remainder of the paper is laid out as follows. Section 2 presents our empirical specification, describes our data and provides a brief discussion of the XTFEVD estimation procedure. Section 3 contains our empirical results. Section 4 concludes.

2. Estimation Approach and Data

This section details our regression specification, notable features of the data, and discusses our estimation techniques (in particular, the XTFEVD method).

2.1 Regression Specification

Our baseline estimation specification is the gravity model of FDI. This specification is the workhorse of the empirical FDI literature and has been used by

numerous studies.[6] This estimating equation uses information on the parent country *i* and/or the host country *j* to predict the amount of FDI activity in year *t*. This baseline specification is:

$$FDI_{i,j,t} = \alpha_0 + \alpha_1 ParentVariables_{i,t} + \alpha_2 HostVariables_{j,t} + \alpha_3 PairVariables_{i,j,t} + \alpha_4 Trend_t + \varepsilon_{i,j,t}$$

where non-dummy variables are measured in logs.

The parent variables include real GDP (*Parent GDP*), population (*Parent Pop*), a measure of trade costs (*Parent TC*), and area of the country (*Parent Area*). The host variables include a comparable set of controls (*Host GDP*, *Host Pop*, *Host TC*, and *Host Area*). In addition, we include a measure of host investment costs (*Host Inv Cost*). Beyond these parent- and host-specific variables, we also include a set of variables that use information from both the host and parent countries (the pair variables). *Distance* and its squared value (*Distance Sq*) control for geographic proximity between countries.[7] Two other variables (*Island* and *Landlock*) measure the number of island nations or landlocked nations in the country pair. As these are often significant in regressions of bilateral trade, to the extent that these are positively correlated with trade costs they can provide insight into the motivations behind FDI.[8] *Common Language* is a dummy variable equal to one if there is a shared language between the countries. As with the trade and investment cost

[6] Blonigen, Davies, Waddell, and Naughton (forthcoming), Gbetnkom (2006), Tong (2005), Gao (2005), Head and Ries (2005), di Giovanni (2005), Grubert and Mutti (2004), Brainard (1997), Eaton and Tamura (1994) are but a few examples. See Blonigen (2005) for a recent overview of the empirical FDI literature. It should be noted that there is also the specification proposed by Carr, Markusen, and Maskus (2001) which uses data in levels instead of logs and explicit interaction terms to control for the joint influence of some variables. However, Blonigen and Davies (2004) finds that due to the skewed nature of FDI data, this specification tends to yield non-normal residuals. The use of logs, however, reduces this problem while simultaneously allowing for implicit interactions between the various control variables.

[7] Note that in addition to the impact of distance through trade costs, a negative effect of distance can result due to the difficulty in managing a distant subsidiary. Thus, although we tend to interpret a negative effect of distance as consistent with vertical FDI we also recognize that there exists this alternative interpretation.

[8] See Rose (2004) for an example of these in a trade regression. There, he finds that landlocked and island countries have less trade.

data, this is intended to capture some of the difficulty of doing business between the nations. *Colony* is a dummy variable equal to one when two countries share a common colonial history. This is intended to proxy for historical factors that increase the political and economic links between nations. To control for macroeconomic fluctuations, we control for the percentage change in the parent/host exchange rate from year *t-1* to *t* (*X-rate*).[9]

In addition to these, we include a set of variables that compare information between the parent and host countries. Specifically, we compare the amount of schooling and cultural aspects as defined by Hofstede (1980) and Hofstede and Bond (1988) across countries by subtracting the host value of the variable in question from the parental value. Doing so, however, creates two difficulties. First, when the parental value is less than the host value, the difference is negative and we cannot take the log of a negative value. Second, and potentially more important, there is the issue raised by Blonigen, Davies, and Head (2003) regarding deviations from zero. In that paper, they point out that when estimating the effect of skill asymmetries on FDI, it is important to control for not just skill differences, but for deviations from zero skill differences as the estimated impact of a movement away from zero can reduce FDI regardless of whether this is a movement into the positive range (where parent schooling is greater than host schooling, a positive difference) or into the negative range (where parent schooling is less than host schooling, a negative difference). One possible way to deal with this is to use absolute value of the difference. However, as both Blonigen, Davies, and Head (2003) and Carr, Markusen, and Maskus (2003) note, this unnecessarily restricts the slope of this difference variable to be the same on either side of zero. Therefore, we instead use an approach similar to

[9] Note that, since this is often negative, unlike the other variables this is not measured in logs.

that of Markusen and Maskus (2002), where we include two separate variables, one for positive differences and one for negative differences. This allows us to see whether it is a deviation from zero that matters (in which case both should have the same sign) or not. In the gravity model, where variables are measured in logs, doing so also eliminates the problem of taking the log of a negative difference. Thus, our additional pair variables include differences in schooling (*School*), and differences on five cultural aspects: power distance (*PD*), individualism (*Independence*), masculinity (*Masculinity*), uncertainty tolerance (*Uncertainty*), and long-term orientation (*Time*).[10] These are discussed in more detail below. Each of these appears once for a positive difference (*Diff Pos*) and once for a negative difference (*Diff Neg*) for a total of twelve variables. Note that, with the exception of the school differences, these do not vary over time. Finally, we include a time trend (*Trend*).[11]

In contrast to the bilateral US and OECD datasets, the WB data do not include information on the parent countries for the inbound data or the host countries for the outbound data. Therefore, in these regressions we are restricted to the host variables or the home variables respectively. We also cannot use the difference variables and therefore simply use the values of these variables for the country in question.

2.2 Data

In the Data Appendix, Table A1 contains a description of the units and sources for each of the variables. Table A2 contains summary statistics for each of the three data sets.

[10] In unreported results, we omit these cultural variables and use a more common, pared-down version of the gravity model. This did not change the qualitative nature of our results. In particular, the time invariant variables still show considerable variation across data sets when not using XTFEVD and often change sign when switching from OLS to XTFEVD. These alternative results are available upon request.

[11] In unreported results, we use a set of year dummies instead of a trend term. This did not qualitatively change our results from the reported ones. These results are available upon request.

Table A3 reports the list of parent and host countries used.[12] While we refer the interested reader to the appendix for details, there are five aspects of the data that warrant discussion here.

We use three measures of FDI activity: real affiliate sales, real FDI stocks, and real FDI flows.[13] The first is preferable for two reasons. First, it captures the value of FDI activity and therefore helps to control for differences in the technology across firms. Second, sales are the current value of the activity whereas stocks are the accumulated value of investment flows over time. As such, stock measures are dependent upon how historical values are measured. The upside of the stock and flow measures, however, is their availability. Our goal in this paper is to use commonly-employed variables – including FDI measures – in order to enhance comparability between our results and those elsewhere. However, the only commonly-available sales data are for the US. Therefore for the OECD we are forced to use FDI stocks.[14] For the World Bank data, we must use net inflows and net outflows of FDI.[15] Another item to be aware of is that even in the US data, one can obtain different results for sales and stocks (see Davies, forthcoming, for an example). One contribution of this paper is that when we use the XTFEVD, we find comparable results for the US stock and sales results, even though OLS gives us different estimated signs for some variables across these datasets.

[12] Note that in the World Bank data, the same countries appear in both the inbound and outbound samples, thus the difference in the number of observations is due to differences in missing years between the samples.
[13] Both were converted to constant 2000 US dollars using the chain-type price index for gross domestic investment obtained from the *Economic Report to the President* (US, 2007).
[14] It is worth noting that even within the US data, FDI stock information is available for a wider selection of countries.
[15] A positive net inflow of FDI for country *i* is an increase in the stock of FDI held by foreign investors in country *i*. A positive net outflow of FDI for country *i* is an increase in the stock of FDI held by *i*'s investors overseas. Thus, these are not the difference between inbound and outbound FDI.

Second, it is important to note that the US data includes both inbound and outbound data. Therefore, in these data we include a dummy variable *Inbound* which is equal to one if the observation is for US inbound FDI. An alternative to combining the inbound and outbound data is to run separate regressions for each. In unreported results we did just this. On the whole, we found insignificance for the US-only variables but roughly similar signs on the pair variables as in the reported results.[16] However, due to the drop in the number of observations, we the estimated coefficients were generally less significant than those found here. Similar to the US data, the OECD data reports FDI stocks inbound into an OECD country or outbound from and OECD country. When both countries are OECD countries, we have two observations on FDI. Due to differing definitions of FDI, the exchange rate used to convert the amount, and other reporting method differences, these two measures often differ. Therefore when two observations were available, we used the inbound data.[17] As with the US results, to allow for differences in the average level of FDI between the inbound and outbound sources, we include a dummy variable *Inbound*. Note that in both the US and OECD data, *Inbound* is time-invariant for a country pair *i,j* (since this is to *i* from *j* and not FDI in both directions between the two).

Third, given the importance of trade costs in differentiating between motivations for FDI, it is important to consider the construction of our trade cost measure. In our data, a country's trade cost is the log of GDP divided by the sum of exports and imports (i.e. one over openness). This proxy is admittedly rough, in particular since large countries

[16] These alternative results are available on request.
[17] When using only inbound data, the signs and significance of the coefficients from the XTFEVD regression match those for the OECD XTFEVD results with the exception that both parent and host trade costs are significantly positive.

tend to trade less than small countries. However, we use this variable because it is both available for a large number of countries and is frequently used elsewhere.[18] Likewise, distance, which is measured as the kilometers between capital cities, is at best an approximation of the distance between countries. Alternative measures use the distance between geographic centers or between economic centers. However, again, distance between capitals is the most widely measure of distance and we therefore use it here.

Fourth, our measure of investment costs comes from the Business Environment Risk Intelligence S.A. and is measured as the inverse of a composite index comprising operations risk index, political risk index and remittance and repatriation factor index.[19] This variable limits the time series in our data to, depending on the country pair, 1980 to 2000. In unreported results, we excluded this variable in order to extend the time dimension of our data to as long as 1966-2005. This did not, however, qualitatively alter our results and, given the significance of the variable, we only report those results including it.

Finally, given their relative unfamiliarity, our cultural variables deserve more detailed description. To capture the cultural characteristics of a country we use the five cultural dimensions identified by Hofstede to affect the behavior of individuals and organizations (Hofstede 1980, and Hofstede and Bond 1988). The first of these is power distance (*PD*), which indicates the degree to which the less powerful segment of a society

[18] Unreported results without trade costs gave very similar results. The primary difference is that the sales estimates result in a negative coefficient for *Parent Area* and a positive coefficient for *Landlock*. Thus, potential simultaneity of summed imports and exports (openness used in our trade measure) and FDI is not a significant factor in our results. It should be noted, however, that the same need not be true in other samples such as Lipsey's (2006) study of investment into Eastern Europe. In such a case, XTFEVD may be particularly useful since it would allow one to estimate coefficients for time-invariant proxies of trade costs (Island and Landlock) that do not suffer from this problem while still controlling for unobserved country heterogeneity.

[19] For more information see http://www.beri.com.

expects and accepts that power is distributed unequally. In countries that score high on this dimension individuals consent to a less equal society and organizations are likely to have centralized, top-down control. Second, we use the individualism measure (*Independence*). This variable reflects the extent to which people follow a group or organization. Countries with high values on individualism are those in which people act independently and pursue independent initiatives. Third, masculinity (*Masculinity*) ascertains the values around which a society is built: masculinity (e.g. competitiveness, assertiveness, ambition, accumulation of wealth) or femininity (e.g. relationships, quality of life). High scores are for societies with masculine traits. Fourth, uncertainty tolerance (*Uncertainty*) indicates the extent to which individuals value predictability. If a country scores high on uncertainty tolerance, the people in the country prefer rules and structured situations and are likely to avoid uncertain situations. Finally, long-term orientation (*Time*) measures to what extent people value thrift and perseverance. Cultures that attach a high importance to the past and present, such as those oriented on respect for tradition and fulfillment of social obligations score low on this dimension while cultures in which people are patient in waiting for results and value thrift receive high scores.

2.3 Estimating Procedures

For each dataset, we utilize three estimating procedures. First, as is common, we use OLS. Second, we include parent country-host country pair fixed effects (or simply country fixed effects in the WB data). As can be seen, many of our variables do not vary over time and we are unable to include them when using the standard fixed effects procedure. This is the purpose of utilizing the third method, the panel fixed effects with

vector decomposition (XTFEVD) method. As this method is relatively new, it is useful to provide an overview of its workings in the context of our model.

The XTFEVD estimation procedure is a three-step estimator. The first step estimates a fixed effects regression with only the time-varying variables to obtain estimated country pair fixed effects (referred to as the unit effects). It is important to note that these estimated unit effects include both the impact of time-invariant unobservables as well as time-invariant observables (such as distance or area). The second step decomposes these estimated unit effects into an explainable part (attributed to the time-invariant observables) and an unexplainable part ($Residuals_{i,j,t}$) using OLS. These residuals are the error terms from regressing the estimated unit effects on the observed time-invariant variables and are by construction uncorrelated with the time-invariant variables. The third stage then uses a pooled OLS that includes the time-varying variables, the time-invariant observables, and the time-invariant unexplainable $Residuals_{i,j,t}$. This then yields the equivalent of a fixed effects estimator, with the exception that the time-invariant effects are decomposed into its explainable and unexplainable components.

XTFEVD removes biases induced by the correlation between time-varying variables and unobserved country characteristics. When an unobserved country characteristic is correlated both with an explanatory variable and with FDI (our explained variable), its omission in an OLS regression will either overstate or understate the impact of the explanatory variable on FDI, depending on the sign of the relevant correlations. For example, if an uncontrolled country characteristic is positively correlated both with parent GDP and outward FDI, OLS will associate all the observed growth in parent GDP

with growth in outward FDI and will thus overstate the elasticity of parent GDP. Furthermore, if a time-invariant variable such as parent area is also correlated with parent GDP, this upwards bias in parent GDP can lead to a compensating downwards bias in the estimated coefficient on parent area. Such biases are removed by XTFEVD. In addition to this benefit, the particular procedure developed by Plümper and Troeger (forthcoming) is consistent and, as they demonstrate with Monte Carlo simulations, more efficient than other estimators attempting a similar decomposition.[20] Given the relatively short time frame of FDI data, this efficiency is a valuable attribute of the technique.

3. Results

In this section, we present our results. We begin with those for the bilateral US data, move to those from the bilateral OECD data, and then to those from the unilateral World Bank data. Finally, given the insights obtained from the World Bank results, we then return to the US and OECD data for a final set of results.

3.1 US Results

Table 1 presents our estimates from the US data. The first three columns report results when using FDI stocks, the last three report the results when using affiliate sales. Columns (1) and (4) contain the OLS results. Comparing these, we see that several estimates are consistent between the stock and sales results. In particular, FDI activity is largest between parent and host countries with large GDPs and small populations. In addition, higher trade costs seem to reduce FDI. This would be consistent with a vertical

[20] Plümper and Tröger's (forthcoming) Monte Carlo simulations show that XTFEVD is the most efficient and the least biased with respect to pooled OLS, random effects and the Hausman-Taylor procedure when unit effects are correlated with both time-varying and time-invariant variables. When unit effects are only correlated with the time-varying variables, XTFEVD yields unbiased and efficient estimates. When unit effects are correlated only with the time-invariant variables, all procedures yield biased estimates. In this case XTFEVD together with pooled OLS and random effects give the most efficient estimates.

motivation behind FDI with the US. Similarly, the results on the distance variables indicate an inverted U shape (where the coefficients imply a negative effect for distance for all countries in the sample) suggesting vertical FDI.[21] *Island*, however, is significantly positive in the stock results. Given that this is identified as a trade barrier by Rose (2004), this indicates the presence of horizontal FDI. No such effect is found for sales. Thus, while there are similarities between the samples there are also notable differences. Other differences include a perplexing positive effect of host investment costs in the sales data but an insignificant impact in the stock results. In addition, having a schooling deficient parent is a detriment to FDI in the sales results but not in the stock results. As for the cultural variables, with the exception of the independence variables and *PD Diff Neg* which are only significant in the stock data, the signs of the estimated coefficients are consistent between samples. Finally, the area variables indicate that more FDI activity comes from small parents and that host size has no impact on FDI.

Columns (2) and (3) employ fixed effects instead of OLS. Now, in contrast to the OLS results, the only difference between the stock and sales data is in the host trade cost which is significantly negative in the sales data but (just) insignificantly negatively in the stock data while the reverse is true for host investment costs. This would seem to suggest that including country-pair fixed effects is capable of eliminating many of the differences between samples. This seeming similarity, however, is somewhat misleading because many of the variables that differed in the OLS sample cannot be included in this fixed effects regression. Looking at the impact of the fixed effects on the magnitude of the coefficients, we see that in the stock data, including fixed effects lowers the coefficients

[21] In every case, the squared distance term has the greater coefficient (in absolute value). This suggests that the impact of (logged) distance is highly non-linear and that the second order effect is the dominant one.

on parent GDP, parent population, parent trade costs, and host population but increases the coefficient on host trade costs. The sales data, however, sees the coefficients on parent population, parent trade costs, and host trade costs moving in the opposite direction. However, similar to the stock data, the estimate on host population falls. We are unable to comment the extent to which the time-invariant variable estimates may be impacted by the omission of unobserved factors since they cannot be included in the fixed effects estimation.

With this in mind, we now turn to the XTFEVD results from columns (3) and (6). In terms of the time-varying variables, as expected, we find similar signs and magnitudes between the fixed effects and XTFEVD results. Notably, however, the only difference between the two is that host investment costs are significantly negative in the stock results but insignificant in the sales results while the reverse is true for host trade costs. Turning to the time-invariant variables, however, we find a number of significant changes between their OLS coefficients and these which correct for unobservable time-invariant factors. Looking at the geographic variables, we now find a U shape for distance which, given the estimates, indicates that more FDI takes place between distant countries. In the US data, these coefficients mean that there are no country pairs sufficiently close for distance to have a negative effect. This is suggestive of horizontal FDI and the opposite of what is found in the OLS results. The other geographic trade cost measures –including *Island* and *Landlock* – now suggest that trade barriers reduce FDI. This is more consistent with a vertical motivation for FDI. Since the aggregate data likely includes both horizontal and vertical style FDI, it is not surprising that we find evidence of both. Turning to the other trade cost measures, *Common Language* and *Colony*, also find

significant changes. Specifically, whereas the OLS results indicate colonial ties lower FDI, the XTFEVD results reveal the reverse. In addition, unlike the OLS results we find that a common language reduces FDI stocks (although it continues to increase affiliate sales). Thus, the time-invariant trade cost variables appear to be significantly impacted by the omission of fixed effects.

Turning to the culture variables, we find two large changes. OLS indicated that FDI was greatest when the *Independence* and *Uncertainty* values for the parent were low relative to the host, the XTFEVD results indicate the reverse. In addition, the difference variables all have the same sign across the two samples. Thus, the XTFEVD results indicate that FDI activity is greatest when the parent's *PD*, *Masculinity*, or *Time* levels are low relative to the host's and when the parent's *Independence* and *Uncertainty* levels are high relative to the host's. Interestingly, it is worth noting that these patterns reject the concern that cultural differences, i.e. symmetric deviations from zero, drive FDI.

Finally, we find that more FDI takes place when the parent and/or the host are large, a marked change from the OLS results. This suggests that natural resource abundance may be important for investment decisions and matches the findings of Coughlin, Terza, and Arromdee (1991). In addition, the significant effect on *Residuals* indicates that the unexplainable component of the fixed effects is indeed important for explaining FDI patterns. Finally, in the XTFEVD results, the additional controls (*Inbound*, *X-Rate*, *Year*) are generally insignificant.

3.2 OECD Results

Table 2 presents a comparable set of regressions using the OECD data rather than the US data. First, comparing the OLS results from the OECD regression to their

counterpart in the US data (column (1) of Table 1), we see several noticeable differences, especially with regards to the time-invariant variables. In particular, rather than the inverted U for distance in the US results, the OECD estimates indicate a U shape. In addition, the OECD data find a significant impact from *Host Area* and *Colony*. Furthermore, the OECD results find significantly negative effects from both *Island* and *Landlock*. Similar differences are found for the *Uncertainty* and *Time* variables, which suggest an opposite effect from the US results. Finally, *Host Pop* is insignificant in the OECD results instead of significantly negative.

Turning to the FE results, as in the US data, we find significant declines in the coefficients for *Parent Pop* and *Host Pop* suggesting that these are biased upwards by the omitted, time-invariant unobservables. Unlike the US data, we find that the omission of fixed effects biased our *Parent TC* and *Host TC* variables downwards. We also find that including fixed effects eliminates the significance of the schooling variables.

Finally, column (3) presents the XTFEVD results from the OECD data. As in the US data, when comparing these OECD XTFEVD with the OLS results in column (1), we find several changes. Most notably, we now find both *Area* variables are significantly positive. In addition, we see a reversal in the predicted patterns of the *Independence* and *Time* difference variables and the *Common Language* dummy. This again indicates that the omitted fixed effects led to incorrect inferences. It is worth noting that the direction of these changes are shared between the US and OECD results. Thus, using XTFEVD is helpful in resolving inconsistencies across both of the US datasets and the OECD dataset. In fact, after accounting for the fixed effects through XTFEVD, with the exception of the *Parent TC* and *PD Diff Neg*, there are no differences in the signs of the significant

estimates found in the three samples. It is worth recognizing, however, that the OECD results are relatively more consistent between the OLS and XTFEVD results than the US data are. This suggests that estimates obtained from data with more variety in country pairs may be less vulnerable to unobserved heterogeneity than those from data where a single country is common to all observations.

3.3 World Bank Results

Table 3 presents the estimates from the World Bank data. Columns (1) through (3) are the estimates using inbound FDI data. Thus, in these columns variables correspond to the host values. Columns (4) through (6) are for the outbound FDI data. In these three columns, the variables are for the parent country. As before, columns (1) and (4) present OLS estimates, columns (2) and (5) report fixed effects estimates, and columns (3) and (6) present the XTFEVD estimates.

Looking first at the time-varying variables, we find many similarities between the previous results and these. As before, most FDI activity goes to or comes from large economies with small populations and that this latter effect is enhanced by the inclusion of fixed effects. This pattern, including the bias, is consistent with the bilateral FDI results above. Consistent with the US results, more FDI goes to countries with low trade costs. Similar to the OECD findings, the effect of the parent's trade cost is biased downwards by the omission of fixed effects. Also similar to the previous results, we find that more FDI comes from countries with high schooling levels (at least when fixed effects are included). Somewhat surprisingly, we find that more FDI goes to countries with low skill levels, but this result is not robust to the inclusion of fixed effects. Thus,

yet again, we find that the omission of fixed effects biases several standard time-varying control variables.

We also find that the omission of fixed effects impacts many of the time-invariant variables. When using OLS, we find insignificant effects on *Landlock* in both the inbound and outbound data. *Island*, meanwhile, is insignificant in the inbound data but significantly positive in the outbound data. When using XTFEVD, however, we find the same results from the other data sets, namely that landlocked and island nations receive less investment. This is indicative of vertical FDI. There does not appear to be a significant effect on *Area*, however, which is positive throughout. This then also matches the bilateral data XTFEVD results.

Looking at the cultural variables, the OLS results indicate several differences between the inbound and outbound sample. As with the US stock and sales data, this appears to be due to omitted fixed effects. When they are included in columns (3) and (6), we find the same predicted signs in each. These signs seem to indicate that more FDI comes from and goes to countries with high *PD*, *Masculinity*, and *Time* values and those with low *Independence* and *Uncertainty* values. Finally as in the US data, when using XTFEVD, neither *X-rate* nor *Trend* are significant.

3.4 To Difference or Not to Difference?

We see an important difference between the bilateral data results and those from the World Bank data when comparing the difference variables to their counterparts in Table 3. For example, the bilateral data indicate that FDI activity is greatest when the parent has a high *PD* measure compared to that of the host (i.e. when the difference between the two is large and positive). Looking at the World Bank results, this might lead

one to expect that a given country's *PD* would have a positive effect on its outbound FDI but a negative effect on its inbound FDI.[22] As Table 3 shows, this is not the case. Therefore, for our final set of results, we return to the bilateral US and OECD data but replace the difference terms with a set of parent and host variables. Table 4 shows the results when also controlling for fixed effects through XTFEVD.

As in the World Bank results, we find that many of the formerly differenced variables exhibit the same sign for the parent and host countries. In particular, FDI is greatest when both countries have high *PD* scores, high *Masculinity* scores, and low *Uncertainty* scores. These results match the World Bank results and imply that using difference terms is inappropriate for these variables. For the stock regressions (columns (1) and (3)) we find that the parent and host *Independence* coefficients have the opposite signs, implying that FDI is greatest when the parent has a high *Independence* score and the host has a low one. A similar result is found for schooling in the US data. This is consistent with the earlier results, suggesting that using differences may be appropriate for these two variables. In all three regressions *Parent Time* is positive and significant (consistent with the World Bank data). *Host Time*, however, varies across the three. This suggests that, at least for the US results, a difference term may be appropriate as this is consistent with the results found there. Finally, the remaining variables, both time-varying and time-invariant, are relatively unchanged relative to the previous results. The two exceptions are *Colony*, which is now insignificant in the sales results and *Common Language* which is now consistently negative across all three specifications (resolving the conflicting result between the US sales and stock XTFEVD regressions in Table 1).

[22] This is only approximately correct because it is primarily true for countries with either very high or very low values when compared to the sample average.

4. Conclusions

The goal of this paper has been to employ the panel fixed effects with vector decomposition method developed by Plümper and Troeger (forthcoming) to examine the extent to which the omission of fixed effects gives misleading coefficients in FDI regressions. We find that the problems created by omission of fixed effects are quite significant and that they vary across the three most commonly used FDI datasets. As a result, when including fixed effects, we find much more consistency in the estimates of time-invariant variables across data sets. In general, these new estimates find additional evidence of the importance of trade costs. In particular, geographic variables such as whether the parent or host country is landlocked or an island nation, which Rose (2004) finds are significant deterrents to trade, also seem to deter FDI. This is suggestive of vertical FDI. Nevertheless, the distance between capitals indicates horizontal FDI. That we find mixed results is not surprising, as industry-level results from papers such as Blonigen, Davies, Waddell, and Naughton (forthcoming) find that even within US data there are significant differences in the motivation behind FDI across industries. Thus, when (as in many papers) we aggregate across industries, one might expect evidence of both. What is notable, however, is that since XTFEVD yields far more comparable results across our datasets, using fixed effects may be very useful in removing the problems this variation causes when industry level data are not available.

In addition to our main results, we find that the cultural variables constructed by Hofstede (2001) are significant determinants of FDI. Thus, further research into the interaction between culture and international economic activity is important and further understanding of the ways in which these relate can have useful policy implications.

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Table 1: US Results

	Stock			Sales		
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	FE	XTFEVD	OLS	FE	XTFEVD
Parent GDP	2.444***	1.752***	1.624***	3.021***	3.106***	3.143***
	(29.07)	(6.41)	(8.01)	(33.64)	(4.89)	(10.67)
Parent Pop	-0.767***	-6.729***	-6.803***	-1.103***	-4.103***	-4.010***
	(7.84)	(6.05)	(10.86)	(10.05)	(2.65)	(3.70)
Parent TC	-8.389***	-8.506***	-11.338***	-20.350***	-12.857***	-12.861***
	(5.21)	(3.10)	(6.33)	(6.85)	(3.01)	(4.35)
Host GDP	1.536***	1.745***	1.684***	2.030***	2.139***	2.146***
	(19.37)	(9.52)	(8.35)	(19.67)	(5.52)	(7.52)
Host Pop	-0.652***	-1.870***	-1.871***	-1.007***	-2.764***	-2.785***
	(6.61)	(3.40)	(2.97)	(9.39)	(2.90)	(2.84)
Host TC	-5.309***	-1.800	-2.407	-6.719***	-8.010***	-7.963***
	(3.25)	(1.14)	(1.41)	(3.10)	(2.80)	(3.02)
Host Inv Cost	-0.007	-0.699*	-0.692**	0.766*	-0.034	-0.040
	(0.02)	(1.93)	(2.02)	(1.93)	(0.07)	(0.08)
School Diff Neg	-0.053	-0.281***	-0.279***	-0.641***	-0.304*	-0.316**
	(0.50)	(3.43)	(3.02)	(3.96)	(1.78)	(2.36)
School Diff Pos	0.699***	0.456***	0.449***	0.699***	0.411***	0.409***
	(5.21)	(5.23)	(4.55)	(5.81)	(4.95)	(3.00)
PD Diff Neg	0.122**		2.318***	0.105		0.776***
	(2.01)		(2.77e+11)	(1.56)		(6.58e+09)
PD Diff Pos	-0.234***		-0.641***	-0.164**		-0.590***
	(4.00)		(66.61)	(2.04)		(38.33)
Indep. Diff Neg	0.298***		-2.858***	-0.051		-1.755***
	(4.12)		(94.65)	(0.62)		(45.12)
Indep. Diff Pos	-0.263***		2.498***	-0.014		1.622***
	(4.24)		(82.59)	(0.20)		(41.29)
Mascu. Diff Neg	0.229***		2.543***	0.261***		1.448***
	(4.21)		(78.21)	(4.13)		(34.35)
Mascu. Diff Pos	-0.284***		-1.828***	-0.240***		-1.314***
	(5.29)		(56.78)	(3.89)		(31.67)
Uncert. Diff Neg	0.531***		-1.416***	0.346***		-0.405***
	(8.01)		(67.40)	(4.44)		(14.91)
Uncert. Diff Pos	-0.612***		0.827***	-0.505***		0.143***
	(9.27)		(39.64)	(6.14)		(5.30)
Time Diff Neg	-0.341***		-1.313***	-0.286***		-0.946***
	(10.87)		(50.87)	(6.47)		(28.62)
Time Diff Pos	0.353***		1.942***	0.504***		1.277***
	(10.28)		(74.57)	(9.33)		(38.52)
Parent Area	-0.318***		2.378***	-0.105*		1.014***
	(7.17)		(133.31)	(1.69)		(44.49)
Host Area	-0.022		0.600***	-0.049		0.729***
	(0.57)		(34.06)	(1.18)		(32.70)
Distance	10.332***		-17.739***	3.893**		-12.598***
	(6.23)		(1063.91)	(2.51)		(592.22)

Distance Sq.	-0.710***		1.268***	-0.241**		0.927***
	(6.39)		(84.32)	(2.36)		(48.32)
Colony	-1.070***		10.599***	-1.063***		5.230***
	(5.54)		(14.42)	(4.40)		(5.78)
Common Lang	0.824***		-0.878***	1.236***		0.391***
	(5.43)		(18.17)	(5.87)		(6.61)
Island	0.653***		-1.952***	-0.062		-1.885***
	(3.61)		(19.83)	(0.34)		(14.83)
Landlock	0.099		-2.282***	0.178		-1.101***
	(0.89)		(31.27)	(1.55)		(11.67)
Inbound	1.389***		-7.996***	1.915***		0.075
	(7.19)		(108.40)	(6.97)		(0.80)
X-rate	4.50e-11***	-2.81e-12	-4.36e-12	3.86e-10***	-1.41e-11	-1.46e-11
	(3.39)	(0.81)	(0.00)	(4.42)	(0.28)	(0.00)
Year	-0.028***	0.051***	0.052	-0.103***	-0.059**	-0.061
	(4.13)	(3.75)	(0.48)	(8.42)	(2.33)	(0.44)
Residuals			1.000***			1.000***
			(251.87)			(93.76)
Constant	-57.110***	-94.889***	-72.733***	95.511***	62.969*	77.611***
	(4.24)	(7.00)	(24.20)	(4.09)	(1.88)	(20.90)
Observations	997	997	997	792	792	792
R-squared	0.88	0.96	0.96	0.88	0.96	0.96

Robust t-statistics reported in parentheses. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

Table 2: OECD Results

	(1)	(2)	(3)
	OLS	FE	XTFEVD
Parent GDP	2.432***	2.207***	2.242***
	(57.68)	(9.43)	(12.29)
Parent Pop	-1.083***	-3.441***	-3.567***
	(24.70)	(4.46)	(5.27)
Parent TC	-6.862***	8.664***	8.909***
	(5.34)	(5.19)	(5.41)
Host GDP	0.709***	1.628***	1.674***
	(14.99)	(7.20)	(8.60)
Host Pop	0.010	-3.387***	-3.575***
	(0.22)	(4.54)	(5.37)
Host TC	-14.489***	2.429	2.182
	(11.48)	(1.36)	(1.34)
Host Inv Cost	-1.688***	-1.127***	-1.109***
	(7.63)	(3.50)	(3.62)
School Diff Neg	-0.122***	0.012	0.008
	(3.22)	(0.31)	(0.23)
School Diff Pos	-0.013	-0.023	-0.027
	(0.39)	(0.74)	(0.81)
PD Diff Neg	0.134***		-0.499***
	(4.06)		(3375.86)
PD Diff Pos	-0.322***		-0.024***
	(10.39)		(2.99)
Independence Diff Neg	0.073**		-0.436***
	(2.55)		(32.87)
Independence Diff Pos	-0.148***		0.593***
	(5.25)		(45.47)
Masculinity Diff Neg	0.028		0.880***
	(1.11)		(68.50)
Masculinity Diff Pos	-0.201***		-1.066***
	(7.81)		(82.60)
Uncertainty Diff Neg	-0.098***		-0.266***
	(3.14)		(22.26)
Uncertainty Diff Pos	-0.007		0.495***
	(0.22)		(41.43)
Time Diff Neg	0.189***		-1.177***
	(7.35)		(83.27)
Time Diff Pos	0.000		1.344***
	(0.02)		(95.71)
Parent Area	-0.039*		1.114***
	(1.81)		(99.53)
Host Area	0.331***		1.437***

	(15.31)		(131.22)
Distance	-2.573***		-5.229***
	(6.32)		(624.02)
Distance Sq.	0.115***		0.258***
	(4.09)		(31.00)
Colony	0.640***		3.870***
	(5.84)		(21.94)
Common Lang	1.273***		-0.750***
	(16.15)		(62.47)
Island	-0.250**		-1.307***
	(2.55)		(21.22)
Landlock	-0.334***		-1.420***
	(5.45)		(33.11)
X-Rate	-2.5e-4***	2.7e-4***	2.7e-4
	(3.27)	(2.76)	(0.01)
Year	0.005	0.073***	0.073***
	(0.88)	(7.19)	(2.95)
Inward	0.286***	0.023	-0.068**
	(4.37)	(0.36)	(2.45)
Residuals			1.000***
			(356.72)
Constant	-68.404***	-179.527***	-189.733***
	(6.24)	(14.57)	(300.15)
Observations	5450	5450	5450
R-squared	0.71	0.94	0.94

Robust t-statistics reported in parentheses. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

Table 3: World Bank Results

	Inbound			Outbound		
	OLS	FE	XTFEVD	OLS	FE	XTFEVD
GDP	0.977***	1.371***	1.357***	2.254***	2.448***	2.467***
	(11.30)	(4.17)	(4.19)	(17.52)	(5.82)	(7.25)
Pop	-0.193*	-3.698***	-3.703***	-0.933***	-5.419***	-5.412***
	(1.92)	(4.46)	(4.99)	(6.75)	(6.07)	(5.73)
TC	-22.765***	-11.015***	-11.621***	-20.488***	-2.508	-1.909
	(10.03)	(3.47)	(3.84)	(8.25)	(0.68)	(0.59)
School	-0.768***	-0.478	-0.495	-0.215	1.614***	1.613**
	(3.73)	(0.79)	(0.76)	(0.88)	(2.62)	(2.49)
PD	0.240*		3.723***	0.405***		4.449***
	(1.91)		(129.97)	(3.00)		(174.57)
Independence	0.819***		-0.733***	0.251		-1.870***
	(4.66)		(77.65)	(1.23)		(199.42)
Masculinity	0.042		3.334***	-0.174*		4.304***
	(0.37)		(33.77)	(1.78)		(46.23)
Uncertainty	-0.109		-3.875***	-0.759***		-5.012***
	(0.57)		(41.70)	(3.68)		(54.65)
Time	-0.058		1.155***	0.341**		2.189***
	(0.40)		(15.93)	(2.31)		(35.18)
Area	0.431***		1.161***	0.143***		0.952***
	(9.87)		(10.01)	(3.48)		(8.83)
Island	0.002		-3.777***	0.408***		-4.234***
	(0.01)		(39.13)	(2.94)		(44.73)
Landlock	-0.046		-3.092***	0.059		-4.633***
	(0.19)		(132.06)	(0.27)		(220.83)
X-Rate	-0.019	-0.097***	-0.097	0.026	-0.016	-0.017
	(1.04)	(4.36)	(0.86)	(1.17)	(0.80)	(0.17)
Year	0.065***	0.096***	0.096	0.049***	0.077***	0.078
	(10.45)	(8.58)	(0.61)	(8.20)	(7.61)	(0.54)
Residuals			1.000***			1.000***
			(69.53)			(102.16)
Constant	-133.8***	-163.3***	-188.1***	-122.5***	-144.6***	-169.3***
	(11.05)	(9.71)	(205.70)	(10.84)	(10.32)	(189.38)
Observations	769	769	769	665	665	665
R-squared	0.64	0.79	0.79	0.82	0.89	0.89

Robust t-statistics reported in parentheses. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

Table 4: Bilateral Data without Differences (XTFEVD Estimates)

	(1)	(2)	(3)
	US Stock	US Sales	OECD
Parent GDP	1.473***	2.639***	2.197***
	(7.18)	(8.93)	(12.10)
Parent Pop	-6.443***	-2.981***	-3.545***
	(10.29)	(2.82)	(5.30)
Parent TC	-11.383***	-13.519***	8.693***
	(6.37)	(4.70)	(5.35)
Host GDP	1.822***	2.309***	1.667***
	(8.89)	(8.13)	(8.67)
Host Pop	-2.026***	-3.188***	-3.617***
	(3.24)	(3.34)	(5.50)
Host TC	-2.539	-6.911***	2.056
	(1.51)	(2.69)	(1.28)
Host Inv Cost	-1.081***	-0.587	-1.091***
	(3.13)	(1.19)	(3.62)
Parent School	0.231***	0.626***	0.073
	(4.03)	(7.13)	(1.34)
Host School	-0.269***	-0.195**	0.065
	(4.88)	(2.37)	(1.25)
Parent PD	2.508***	3.677***	4.345***
	(2.99e+11)	(3.21e+10)	(481.63)
Host PD	8.873***	3.668***	2.195***
	(902.12)	(230.69)	(14854.13)
Parent Independence	-1.046***	-0.472***	0.991***
	(18.10)	(6.40)	(31.89)
Host Independence	0.455***	-0.457***	-1.377***
	(8.08)	(6.42)	(42.74)
Parent Masculinity	4.146***	1.687***	1.763***
	(61.50)	(21.35)	(46.37)
Host Masculinity	1.842***	1.787***	2.856***
	(29.99)	(23.09)	(73.31)
Parent Uncertainty	-5.071***	-2.808***	-0.907***
	(135.56)	(59.05)	(52.56)
Host Uncertainty	-3.100***	-2.362***	-2.943***
	(84.97)	(51.20)	(167.23)
Parent Time	2.866***	1.145***	3.324***
	(39.22)	(12.69)	(86.34)
Host Time	-1.004***	0.024	1.640***
	(14.47)	(0.27)	(39.15)
Parent Area	1.853***	0.665***	0.949***
	(30.68)	(8.58)	(26.20)
Host Area	0.457***	0.720***	1.128***

	(8.17)	(10.17)	(33.63)
Distance	-17.676***	-8.415***	-9.851***
	(1072.28)	(408.88)	(1117.40)
Distance Sq.	1.206***	0.633***	0.581***
	(80.61)	(33.77)	(64.75)
Colony	6.012***	1.537	3.906***
	(7.79)	(1.63)	(23.23)
Common Lang	-3.564***	-0.368***	-1.524***
	(69.40)	(5.86)	(132.90)
Island	-2.863***	-2.548***	-3.472***
	(31.94)	(22.52)	(55.13)
Landlock	-1.471***	-0.479***	-1.651***
	(21.50)	(5.53)	(39.95)
Inbound	-7.569***	2.141***	0.699***
	(93.27)	(21.24)	(23.59)
X-rate	-1.11e-11	-5.70e-11	3.03e-4
	(0.00)	(0.00)	(0.01)
Year	0.051	-0.081	0.064**
	(0.65)	(0.84)	(2.15)
Residuals	1.000***	1.000***	1.000***
	(241.70)	(91.79)	(269.21)
Constant	-91.871***	84.877***	-187.852***
	(29.61)	(22.34)	(236.82)
Observations	997	792	5450
R-squared	0.96	0.96	0.94

Robust t-statistics reported in parentheses. *** significant at 1% level. ** significant at 5% level. * significant at 10% level.

Data Appendix

Table A1: Variable Definitions and Sources

Variable Name	Description	Source
Real FDI stock	ln(parent's FDI stock in millions of constant 2000 USD)	BEA
Real FDI sales	ln(Total sales of foreign affiliates in millions of constant USD)	BEA
Parent GDP	ln(parent county real GDP in millions of constant 2000 USD)	WDI
Parent Pop	ln(parent country population in thousands)	WDI
Parent TC	ln(GDP of parent/(Exports+Imports of parent))	WDI
Host GDP	ln(host county real GDP in millions of constant 2000 USD)	WDI
Host Pop	ln(host country population in thousands)	WDI
Host TC	ln(GDP of host/(Exports+Imports of host))	WDI
Host Inv Cost	ln(1/host's BERI measure of business environment risk)	BERI
Colony	=1 if used to be in same colony group together	Rose (2004)
Common Lang	=1 if common language	Rose (2004)
Island	# of island nations in pair	Rose (2004)
Landlock	# of landlocked nations in pair	Rose (2004)
Distance	Ln of miles between capital cities	http://www.indo.com
Distance Sq.	$(\text{Distance})^2$	Our construction
Parent Area	Ln of square kilometers of area of Parent	WDI
Host Area	Ln of square kilometers of area of Host	WDI
Inbound	=1 if inbound	Our construction
X-rate	% change in the exchange rate between parent and host (or country and US in WB data) from *t-1* to *t*.	WDI
Parent School	Parent country average years of schooling for those over age 25	Barro & Lee (2000)
Host School	Host country average years of schooling for those over age 25	Barro & Lee (2000)
School Diff Neg	- Ln of (Parent School - Host School) where parent has less schooling	Our construction
School Diff Pos	Ln of (Parent School - Host School) where parent has more schooling	Our construction
Cultural differences	Scores from 1 to 100	
Parent PD	Parent country score on power distance High values indicate acceptance of a less equal society	Hofstede (2001)
Host PD	Host country score on power distance	Hofstede (2001)
PD Diff Neg	Ln of abs value of (Parent PD - Host PD) where parent has lower PD	Our construction
PD Diff Pos	Ln of abs value of (Parent PD - Host PD) where parent has higher PD	Our construction
Parent Individualism	Parent country score on individualism High values for more individualistic societies	Hofstede (2001)
Host Individualism	Host country score on individualism	Hofstede (2001)
Individualism Diff Neg	Ln of abs value of (Parent Individualism - Host Individualism) where parent has lower Individualism	Our construction
Individualism Diff Pos	Ln of abs value of (Parent Individualism - Host Individualism) where parent has higher Individualism	Our construction
Parent Masculinity	Parent country score on masculinity High values for countries with "masculine" values.	Hofstede (2001)
Host Masculinity	Host country score on masculinity	Hofstede (2001)
Masculinity Diff Neg	Ln of abs value of (Parent Masculinity - Host Masculinity) where parent has lower scores	Our construction
Masculinity Diff Pos	Ln of abs value of (Parent Masculinity - Host Masculinity) where parent has higher scores	Our construction
Parent Uncertainty	Parent country score on uncertainty tolerance High values for countries where individuals value predictability and	Hofstede (2001)

	avoid uncertain situations	
Host Uncertainty	Host country score on uncertainty tolerance	Hofstede (2001)
Uncertainty Diff Neg	Ln of abs value of (Parent Uncertainty - Host Uncertainty) where parent has lower scores	Our construction
Uncertainty Diff Pos	Ln of abs value of (Parent Uncertainty - Host Uncertainty) where parent has higher scores	Our construction
Parent Time	Parent country score on long-term orientation High values in countries where people are oriented toward future and value thrift and perseverance	Hofstede (2001)
Host Time	Host country score on long-term orientation	Hofstede (2001)
Time Diff Neg	Ln of abs value of (Parent Time - Host Time) where parent has lower scores	Our construction
Time Diff Pos	Ln of abs value of (Parent Time - Host Time) where parent has higher scores	Our construction

BEA= Bureau of Economic Analysis; www.bea.doc.gov/bea/di/di1fdibal.htm
WDI = World Development Indicators; http://publications.worldbank.org/WDI/
BERI = Business Environment Risk Intelligence; www.beri.com

Tables A2: Summary Statistics

A2.1 US data

	FDI stock (1038 observations)				FDI sales (816 observations)			
Variable	Mean	Std. Dev.	Min	Max	Mean	Std.Dev.	Min	Max
FDI stock/sales	8.05	2.38	1.31	12.53	9.33	2.51	0.02	13.17
Parent GDP	27.92	1.90	24.02	29.91	27.97	1.88	23.71	29.91
Parent Pop	11.31	1.57	8.04	14.05	11.34	1.56	8.09	14.04
Parent TC	0.29	0.05	0.19	0.40	0.29	0.05	0.20	0.40
Host GDP	27.89	1.86	24.02	29.91	27.92	1.86	24.23	29.91
Host Pop	11.34	1.52	8.13	14.05	11.34	1.53	8.16	14.05
Host TC	0.29	0.05	0.19	0.40	0.29	0.05	0.19	0.40
Host Inv Cost	-4.15	0.19	-4.42	-3.51	-4.14	0.18	-4.42	-3.56
School Diff Neg	0.56	0.75	-1.27	2.32	0.55	0.74	-1.27	2.29
School Diff Pos	0.64	0.77	-1.02	2.32	0.63	0.76	-1.02	2.30
PD Diff Neg	-1.34	1.43	-3.99	0.00	-1.32	1.44	-3.99	0.00
PD Diff Pos	1.15	1.39	0.00	3.99	1.18	1.40	0.00	4.16
Independence Diff Neg	-1.49	1.67	-4.34	0.00	-1.49	1.68	-4.34	0.00
Independence Diff Pos	1.59	1.73	0.00	4.34	1.61	1.73	0.00	4.34
Masculinity Diff Neg	-1.18	1.43	-4.04	0.00	-1.18	1.43	-4.04	0.00
Masculinity Diff Pos	1.27	1.46	0.00	4.04	1.26	1.46	0.00	4.04
Uncertainity Diff Neg	-1.41	1.55	-4.06	0.00	-1.41	1.55	-4.06	0.00
Uncertainity Diff Pos	1.30	1.50	0.00	4.06	1.33	1.52	0.00	4.06
Time Diff Neg	-1.15	1.39	-4.49	0.00	-1.15	1.40	-4.49	0.00
Time Diff Pos	1.10	1.35	0.00	4.49	1.10	1.37	0.00	4.49
Parent Area	14.40	2.03	10.40	16.05	14.39	2.04	10.40	16.05
Host Area	14.36	2.06	10.40	16.05	14.36	2.06	10.40	16.05
Distance	8.40	0.56	6.12	9.20	8.39	0.56	6.12	9.20

Distance Sq.	70.79	8.68	37.46	84.66	70.78	8.68	37.46	84.66
Colony	0.04	0.20	0	1	0.04	0.20	0	1
Common Lang	0.26	0.44	0	1	0.26	0.44	0	1
Island	0.14	0.35	0	1	0.14	0.35	0	1
Landlock	0.11	0.32	0	1	0.11	0.32	0	1
Inbound	0.49	0.50	0	1	0.49	0.50	0	1
X-rate	1.00E+08	1.92E+09	-0.99952	5.21E+10	8550915	1.75E+08	-0.99952	4.80E+09
Year	1990	6.06	1980	2000	1991	4.83	1983	2000

A2.2 OECD data (5450 Observations)

Variable	Mean	Std.Dev.	Min	Max
FDI stock	5.80	3.00	-2.30	11.96
Parent GDP	26.75	1.37	23.49	29.87
Parent Pop	10.18	1.41	8.08	14.05
Parent TC	0.25	0.04	0.19	0.40
Host GDP	26.73	1.33	24.28	29.87
Host Pop	10.25	1.42	8.16	14.05
Host TC	0.25	0.04	0.19	0.40
Host Inv Cost	-4.11	0.17	-4.42	-3.60
School Diff Neg	0.13	0.76	-6.21	2.16
School Diff Pos	0.19	0.82	-6.21	2.16
PD Diff Neg	-1.31	1.46	-4.23	0.00
PD Diff Pos	1.21	1.46	0.00	4.53
Independence Diff Neg	-1.33	1.50	-4.29	0.00
Independence Diff Pos	1.26	1.49	0.00	4.29
Masculinity Diff Neg	-1.51	1.65	-4.50	0.00
Masculinity Diff Pos	1.43	1.64	0.00	4.62
Uncertainity Diff Pos	-1.49	1.61	-4.39	0.00
Uncertainity Diff Pos	1.41	1.58	0.00	4.39
Time Diff Neg	-1.13	1.42	-4.65	0.00
Time Diff Pos	1.23	1.46	0.00	4.65
Parent Area	12.73	1.71	10.40	16.05
Host Area	12.81	1.75	10.40	16.05
Distance	7.50	1.13	4.76	9.42
Distance Sq.	57.47	16.71	22.70	88.64
Colony	0.04	0.20	0	1
Common Lang	0.12	0.32	0	1
Island	0.20	0.42	0	2
Landlock	0.29	0.50	0	2
X-rate	3.29	85.65	-1.00	3985.28
Year	1994	4.58	1983	2000
Inward	0.72	0.45	0	1

A2.3 World Bank data

	Inbound (769 observations)				Outbound (665 observations)			
Variable	Mean	Std.Dev.	Min	Max	Mean	Std.Dev.	Min	Max
FDI inflow/outflow	21.27	2.03	12.45	26.50	21.30	2.34	11.02	26.23
GDP host/parent	26.15	1.37	23.49	29.91	26.39	1.31	23.49	29.91
POP host/parent	10.28	1.50	7.97	14.05	10.17	1.43	7.97	14.05
TC host/parent	0.26	0.05	0.19	0.48	0.26	0.04	0.19	0.42

School host/parent	1.97	0.43	0.25	2.51	2.06	0.33	0.86	2.51
PD host/parent	3.78	0.49	2.40	4.64	3.72	0.48	2.40	4.64
Independ.host/parent	4.00	0.49	2.89	4.51	4.06	0.46	2.89	4.51
Mascul. host/parent	3.78	0.69	1.61	4.70	3.72	0.74	1.61	4.70
Uncert. host/parent	4.03	0.38	3.14	4.64	4.05	0.39	3.14	4.64
Time host/parent	3.64	0.41	2.56	4.77	3.63	0.41	2.56	4.77
Area host/parent	12.88	1.79	10.40	16.05	12.87	1.81	10.40	16.05
Island host/parent	0.21	0.41	0	1	0.19	0.39	0	1
Landl. host/parent	0.10	0.31	0	1	0.11	0.31	0	1
X-rate host/parent	0.17	1.42	-1.00	23.10	0.17	1.51	-1.00	23.10
Year	1987	8.45	1970	2000	1987.423	8.363	1970	2000

Table A3: Countries in Sample

US data	**OECD data**	**World Bank Data**
Australia	Australia	Australia
Austria	Austria	Austria
		Bangladesh
Belgium	Belgium	Belgium
Brazil		Brazil
Canada	Canada	Canada
China	China	China
Czech Republic	Czech Republic	Czech Republic
Denmark	Denmark	Denmark
Finland	Finland	Finland
France	France	France
Germany	Germany	Germany
Hungary	Hungary	Hungary
India	India	India
Ireland	Ireland	Ireland
Italy	Italy	Italy
Japan	Japan	Japan
Korea (South)	Korea (South)	Korea (South)
Netherlands	Netherlands	Netherlands
New Zealand	New Zealand[b]	New Zealand
Norway	Norway	Norway
Philippines		Philippines
Poland	Poland	Poland
Portugal	Portugal	Portugal
Slovak Republic[a]	Slovak Republic[b]	Slovak Republic
Spain	Spain	Spain
Sweden	Sweden	Sweden
Switzerland	Switzerland	Switzerland
		Thailand
United Kingdom	United Kingdom	United Kingdom
United States	United States	United States
[a] *only in sales data*	[b] *parent country only*	

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