UK FOREIGN DIRECT INVESTMENT IN THE OECD, CULTURE AND GEOGRAPHY

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Abstract. How does distance affect foreign direct investment? *Subject* of this research is to determine important factors for the United Kingdom, when undertaking foreign direct investment (FDI). The UK is therefore estimated as the home country of investment, investing in the form of FDI in multiple host countries. More specifically, this research measures determinants of FDI outward stock from the UK to other OECD countries. This research examines how distance affects foreign direct investment and provides twofold contribution. First: Hofstede culture distance effects on foreign direct investment is measured. Second: Geographical kilometer distance effects on foreign direct investment is measured. *Methodology* used in this research is based on the gravity model, presenting a model setup designed for international trade. Moreover, the research applies foreign direct investment OECD data, together with data on gross domestic product and population. The equation specification combines the economic variables with measures for geographical distances, and the Hofstede Culture measure. First regression equation estimates FDI as a function of GDP, population and Culture Distance. Second regression equation estimates FDI as a function of GDP, population and Geographical Distance. This regression setup provides a clear opportunity to estimate the difference between impact of cultural and geographical distance, represented in the estimation coefficients of the regressions. The British Empire has evolved and through time developed the British culture. *Purpose* of this current research is to examine how cultural distance and geographical distance impact foreign direct investment, with foreign direct investment often being an indicator of the long-term commitment of foreign investors. Furthermore, with the purpose of finding how foreign direct investment is impacted by several different cultural factors, we analyze various dimensions of the Hofstede culture. These are the power distance (PDI), individualism (IDV), the masculinity/femininity (MAS), and the uncertainty avoidance (UAI). *Conclusion* is that, all taken together, the research finds foreign direct investment from the UK going to other OECD countries to be more highly affected by geographical distance than cultural distance. Which is interesting considering Brexit. Potentially, this is because the UK is not so culturally different from its main trading partners in the OECD, which is an interesting subject for future research.

Key words: foreign direct investment, geographical distance, Hofstede national culture, international trade, gravity model, OECD, Brexit.

JEL Classifications: F14, F23, M14, M16, M2

1. Introduction

Throughout history, gains from international trade (Markusen, 2004) have stimulated long distance travelling. Moreover, culture is important in trading, since countries still carry on the echoes of different civilizations (Hofstede, 2001). The research question here is, how do these factors impact foreign direct investment (FDI) across borders? This current research seeks to answer that question. Kirkman, Lowe and Gibson (2006) provide a thorough literature review, including introduction of findings showing that FDI decreases with more differences in national culture (Li and Guisinger, 1992; Loree and Guisinger, 1995). Moreover, Slagen and Beugelsdijk (2010) findings support indications on cultural distance and geographic distance effects on FDI.

The gravity equation applied in this current research, was developed by Tinbergen (1962) and

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Pöyhönen (1963) explaining exports as function the GDP of countries, taking into account how distant they are from one another (Larue and Mutunga, 1993). Throughout history, countries have gained an advantage by wisely choosing between if to enter into conventional trade with export and import, or to undertake foreign direct investment (Markusen, 2004). If we fast-forward through history, it appears it has played out as a comparative advantage to have similar culture (Hofstede 1980, 1991, 1994, 2001, Hofstede and Bond 1998) when overcoming distance barriers (Distance Calculator, 2018). The research question seeks to answer whether the difference in countries national Hofstede culture dimensions (Hofstede 1980, 1991, 1994, 2001; Hofstede and Bond 1998) has similar effects as geographical distance (Distance Calculator, 2018) has on international trade and FDI (World Bank, 2016). We hope to illustrate some of the challenges facing countries in the past and the present. The less distance between countries, the more trade (Oguledo and Macphee, 1994). In addition, gross domestic product (GDP) and population can be applied to account for economies of scale along the lines of economic geography (Krugman, 1991; Bergstrand, 1985).

Foreign direct investment (FDI) is what we want to analyze in this current research. Foreign direct investment is investigated and connected with culture and distance, as well as economic GDP, market size, and population. The objective is to establish a relationship between some economic factors, of a country where trade has exploded in volume over the years.

The second section presents literature and model setup. In section three, the data section introduces the data applied in the research, providing variable definition and summary statistics for the sample. Estimation results are then introduced, and finally summary and conclusions.

2. Literature and Model Setup

In this current research, we estimate the UK as the home country, investing the form of FDI in multiple host countries, by measuring FDI outward stock from the UK to other OECD countries.

The British Empire evolved through time and developed the British culture. In this current research, we wish to examine how foreign direct investment (FDI) and culture (Hofstede, 1980, 1991, 1994, 2001; Hofstede and Bond. 1998) impacts exports.

We analyse the effects of the Hofstede culture dimensions, these are power distance (PDI), individualism (IDV), masculinity/femininity (MAS), and uncertainty avoidance (UAI).

We start by introducing Equation (1):

$$PX_{ij} = \beta_0 \left(Y_i\right)^{\beta_1} \left(Y_j\right)^{\beta_2} \left(D_{ij}\right)^{\beta_3} \left(A_{ij}\right)^{\beta_4} u_{ij} \qquad (1)$$

Equation (1) is based on Bergstrand (1985) model with variable PX_{ij} presenting exports flowing from country i to country j over time t. Y_i presents GDP of country i at time t, and Y_j the GDP of country j at time t. D_{ij} is the geographic distance between the country i and country j, with increased distance generally expected to reduce trade. A_{ij} presents factors affecting or restricting trade between country i and j. Finally, u_{ij} is a log-normally distributed error term, with $E(ln u_{ij})=0$.

$$EXP_{ij,t} = e^{\gamma_0} \left(Y_{i,t}\right)^{\gamma_1} \left(Y_{j,t}\right)^{\gamma_2} \left(D_{ij}\right)^{\gamma_3} \left(A_{ij}\right)^{\gamma_4} e^{\zeta_{ij,t}} \qquad (2)$$

Equation (2) offers the insertion of population for variable A into the model.

$$EXP_{ij,t} = e^{\varsigma_0} \left(GDP_{i,t}\right)^{\varsigma_1} \left(POP_{i,t}\right)^{\varsigma_2} \left(DIS_{ij}\right)^{\varsigma_3} e^{\varkappa_{ij,t}} \qquad (3)$$

Equation (3) shows the GDP, gross domestic product, and the population POP specification of the model, together with DIS for distance. We next replace exports with FDI, since FDI is one form of international economic activity (Markusen, 2004).

$$ln\ ln(FDI_{i,t}) = \omega_0 + ln\ \omega_1 ln\left(GDP_{i,t}\right) + ln\ \omega_2 ln\left(POP_{i,t}\right) +$$
$$+ ln\ \omega_3 ln\left(DIS\_Culture_i\right) + \xi_{i,t} \qquad (4)$$

We further extend the specification in Equation (6), then FDI as a function of culture, GDP and population together with the Hofstede culture dimensions. We therefore go along the lines of some previous use of the Hofstede culture index, explaining international trade (Kristjánsdóttir, 2019a; Kristjánsdóttir, Guðlaugsson, Guðmundsdóttir and Aðalsteinsson, 2017, 2020).

$$ln\ ln\left(FDI_{i,t}\right) = v_0 + ln\ v_1 ln\left(GDP_{i,t}\right) + ln\ v_2 ln\left(POP_{i,t}\right) +$$
$$+ ln\ v_3 ln\left(DIS\_Geographical\right) + \varsigma_{i,t} \qquad (5)$$

Equation (7) provides the FDI as being a function of distance, GDP and population.

Along the lines of the theory presented by Bergstrand (1985) and Keynes (1936), we expect exports to increase with the size of the economy presented with GDP as Y increases.

3. Data

This research is based on the UK FDI outward stock data from the OECD. The dataset covers FDI from the UK to other OECD countries, based on the OECD database (OECD, 2016) providing division of UK data to other OECD countries, reporting decomposition of FDI, to individual trading partner countries of the US. The division of FDI from the UK to individual OECD countries is reported on a yearly basis.

The countries included are the following OECD countries, receiving FDI form the UK: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea (the Republic of Korea), Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia

(the Slovak Republic), Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States.

The total number of the OECD countries in the data sample is 34 countries (OECD, 2016). Data covers the years from 1989 to 2012, with the UK FDI being the limiting variable, since it only runs to 2012.

Data on geographical distance is reported in kilometers and obtained from the Distance Calculator (2018).

We choose to eliminate some OECD countries from the sample, since not all five of the Hofstede (2001) culture dimensions are reported for the. The countries eliminated in this current research, since they only report four dimensions, are the following: Chile, Greece, Slovenia and Turkey.

Taken together the five Hofstede (2001) cultural measures interpret that high Power Distance, indicating less equal society. High Individualism indicates that individualism is appreciated. High Masculinity involves that masculinity tends to be appreciated in the society. High uncertainty tolerance implies that societies tend to avoid uncertainty. And finally, high long-term orientation, indicates that there is more patience for waiting in the society. The five Hofstede dimensions do not vary over time.

Variables applied in this current research are defined in Table 1.

The UK Hofstede culture difference, referred to as the UK_Hofstede variable is in the following way:

HOFuk=HOFSTEDEi-hof_uk as the outcome when the Hofstede measure for the UK is from each country Hofstede value. Furthermore, the UK_DIS variable is the distance from the UK London capital to the capital city of each country in the sample, except for the USA where New York is instead of the capital city Washington.

Some previous research (Carr, Markusen, Maskus, 2001) has applied skilled labor differences, when estimating international activities. In this current research we apply distance differences, and culture differences when estimating international activities.

4. Estimation results and discussion

Table 3 provides estimates on how distance affects the foreign direct investment (FDI) from the UK, to individual OECD countries.

Table 4 estimates measure the effects of Culture are less negative on FDI flowing out of the UK to individual OECD countries, than on EXP from the UK, and more importantly the culture effects are found to have insignificant impact on FDI.

When the results in Table 4 are compared to the results in Table 3, they indicate that the geographical distance has more negative effects than the cultural distance, on the FDI of the UK. Actual geographical distance between countries therefore appears to matter more than cultural distance between them.

Several approaches have been applied to capture determinants of international trade and foreign

Table 1
Variable Definition

$UK\_FDI_{i,t}$	Foreign Direct Investment FDI, outward from the United Kingdom UK. Reported in United States dollars, US Dollars (USD). Millions. Obtained from the OECD (2016), on the web-page stats.oecd.org
$UK\_GDP_{i,t}$	Gross Domestic Product GDP of the United Kingdom UK. Reported in US Dollars, current prices. Millions. Obtained from the OECD (2016), on the web-page stats.oecd.org
$UK\_POP_{i,t}$	Population. All ages. All persons. Annual. Obtained from the OECD (2016), on the web-page stats.oecd.org
$OTH\_GDP_{j,t}$	Gross Domestic Product GDP of various OECD countries running over j. Reported in US Dollars, current prices. Millions. Obtained from the OECD (2016), on the web-page stats.oecd.org
$OTH\_POP_{j,t}$	Population. All ages. All persons. Annual. Obtained from the OECD (2016), on the web-page stats.oecd.org
$UK\_DIS_{i,t}$	UK distance is the distance from the UK to other countries. Measured as distance in km from the United Kingdom capital city, London, to other capital cities of countries, except for that in the case of the US New York is applied rather than Washington DC (Distance Calculator, 2016).
$UK\_Hofstede_{i,t}$	UK Hofstede is the difference between the UK Hofstede measure, and Hofstede measure of other countries. With Hofstede measure accounted as the accumulated dimensions for each country.

Table 2
Summary Statistics for the Basic Sample

Variable	Obs	Mean	Std. Dev.	Min	Max
$ln(UK\_FDI_{i,t})$	724	5.944604	2.119853	.4259211	12.05647
$ln(UK\_GDP_{i,t})$	1176	14.28597	.3124355	13.77242	14.68813
$ln(OTH\_GDP_{i,t})$	804	12.59501	1.539574	8.574854	16.59776
$ln(UK\_POP_{i,t})$	1176	17.89607	.0274194	17.85989	17.9564
$ln(OTH\_POP_{i,t})$	814	16.37921	1.524325	12.44014	19.56526
$ln(UK\_Distance_{i,t})$	1152	7.777442	1.059243	5.771441	9.841612
$ln(UK\_Hofstede_{i,t})$	696	4.457049	.8364267	.7442554	5.237164

Table 3

Geographical distance effects on foreign direct investment, based on Equation (4)

Linear regression					Number of obs	= 539
					F(5, 533)	= 109.34
					Prob > F	= 0.0000
					R-squared	= 0.5359
					Root MSE	= 1.4343
		Robust				
lnUKfdi	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
lnUKgdp	1.249777	.4802344	2.60	0.010	.3063925	2.193161
lnOTHgdp	2.552213	.1647092	15.50	0.000	2.228654	2.875772
lnUKpop	-20.29229	5.26387	-3.86	0.000	-30.63277	-9.951815
lnOTHpop	-1.83521	.1672735	-10.97	0.000	-2.163806	-1.506614
lnDISuk	-.2087674	.0592539	-3.52	0.000	-.3251672	-.0923676
_cons	350.9077	88.48003	3.97	0.000	177.0954	524.7201

Robust t-statistics are reported in parentheses.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

Table 4

Cultural distance effects on foreign direct investment, based on Equation (5)

Linear regression					Number of obs	= 428
					F(5, 422)	= 82.97
					Prob > F	= 0.0000
					R-squared	= 0.5154
					Root MSE	= 1.4151
		Robust				
lnUKfdi	Coef.	364.4958Std. Err.	t	P>t	[95% Conf.	Interval]
lnUKgdp	1.113228**	.5314235	2.09	0.037	.0686612	2.157795
lnOTHgdp	2.910743***	.2458645	11.84	0.000	2.427472	3.394015
lnUKpop	-20.81707***	5.631686	-3.70	0.000	-31.88672	-9.747416
lnOTHpop	-2.31361***	.2784291	-8.31	0.000	-2.86089	-1.766329
lnHOFuk	-.1064563	.0755596	-1.41	0.160	-.2549763	.0420638
_cons	364.4958	95.19117	3.83	0.000	177.3879	551.6037

Robust t-statistics are reported in parentheses.
*** Significant at the 1 percent level.
** Significant at the 5 percent level.
* Significant at the 10 percent level.

direct investment (Davies and Kristjánsdóttir, 2010; Kristjánsdóttir, 2010, 2013, 2016a, 2017, 2019b, 2020; Kristjánsdóttir and Óskarsdóttir, 2020).

Possible adaptations could be to include fixed effects XTFEVD method, accounting for fixed effects, along the lines of Davies, Ionascu and Kristjánsdóttir (2008) who covered inward and outward FDI stock and flows, as well as affiliate sales to capture operational activities of multinational corporations (Beugelsdijk, Hennart, Slangen and Smeets, 2010). The XTFEVD method is applied on FDI in a research by Davies, Ionascu and Kristjánsdóttir (2008), when estimating the impact of time-invariant variables on FDI with fixed. The XTFEVD procedure allows

for incorporation for fixed effects in data samples, correcting for the conflation of samples with one home country and multiple host countries of FDI discussed in Van Hoorn (2016) and Brouthers, Marshall and Keig (2016).

5. Conclusions

We seek to analyze how foreign direct investment, FDI, flowing out of the United Kingdom to other OECD countries is impacted by geographical distance and culture distance.

The results obtained are novel in the sense that outgoing FDI from the UK is estimated to be less

impacted by Hofstede culture distance than by geographical distance. In fact, the culture distance effects are estimated to have insignificant effects on the outflow of FDI from the UK.

This indicates that the geographical distance has more significant effects on FDI, that is the further away countries are from the UK, the less FDI they receive.

Within the gravity model setting we also analyze other variables, accounting for the economic size and market size of the UK and the hosting countries of investment.

Our findings indicate that, when considering other variables than geographical or culture distance, the outflowing FDI from the UK is mostly drawn by the economic size of the country receiving the investment, the host country of investment flowing out of the UK, with the economic size being measured with the GDP of the hosting country.

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