

**Trade protection during the crisis:
Does it deter foreign direct investment?**

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Abstract: This paper looks empirically at the implications that protectionist measures implemented during the current crisis may have had for a country's ability to attract foreign direct investment. The research utilizes data on such measures that is available from Global Trade Alert, combined with bilateral FDI data between OECD countries and a large number of partner countries for 2006 to 2009. This allows us to examine the short run effect that protectionist measures may have had on bilateral FDI flows. The verdict from this analysis is clear: a country that implements new protectionist measures may expect that this may result in lower foreign direct investment inflows into the economy. The point estimates from our preferred specifications suggest that, depending on the empirical model, the implementation of a trade protection measure is associated with about 40 to 80 percent lower FDI inflows. Trade protection does not appear to have any implications for the country's FDI outflows, however. The negative effect on FDI inflows does not appear to be due to direct investment measures but rather to actions related to intellectual property rights protection and other more trade related measures.

Keywords: FDI, protection, financial crisis

JEL codes: F23, F13

This version: 25 August 2011

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1 Introduction

Foreign direct investment (FDI) flows were hit hard by the financial crisis. According to the *World Investment Report 2010* (UNCTAD, 2010), world-wide FDI flows increased from just under 1 trillion US \$ to an all-time high of 2.1 trillion between 2005 and 2007. They dropped to 1.8 trillion in 2008 and further to 1.1 trillion in 2009. Much of this downturn in FDI activity can arguably be explained by adverse changes in economic fundamentals that contribute to cross-border investment activity. There have been sharp falls in consumer demand in various countries and GDP growth rates have dropped. Also, economic uncertainty in the face of the crisis is likely to have dampened international FDI activity.

Many governments have also implemented trade protection measures since the start of the crisis in 2008, as documented by the *Global Trade Alert* initiative (see, for example, Evenett, 2011). Economic theory and empirical evidence suggest that trade protection measures may be expected to have an effect on foreign direct investment. One possibility is that trade protection increases FDI. Multinational firms may aim to enter markets that are protected by high trade barriers by setting up affiliates in the country, thus leading to increased foreign direct investment flows. However, there are also several arguments that would suggest a negative relationship between trade protection and FDI. For example, FDI activity may be discouraged by trade protection if affiliates of multinational firms are parts of global production networks. In this case, the import and export of intermediate and final goods would be inhibited by trade protection measures, making FDI less attractive, *ceteris paribus*.² Furthermore, the abolition of trade

² For example, the knowledge capital model (Markusen, 2002) implies both of these possibilities for positive and negative relationships between trade costs and FDI when considering horizontal or vertical FDI,

barriers may make domestic companies a more attractive target for foreign acquirers, thus suggesting that trade protection should discourage FDI (e.g., Norbäck and Persson, 2004). Moreover, trade protection implemented during the crisis may signal economic uncertainty to possible foreign investors and, hence, discourage FDI.³

This paper looks empirically at the implications that protectionist measures implemented during the crisis may have had for a country's ability to attract foreign direct investment. The research utilizes data on such measures that is available from Global Trade Alert. This is combined with bilateral FDI data between OECD countries and a large number of partner countries, including many developing countries. The analysis looks at data for the period 2006 to 2009 in order to examine the short run effect that protectionist measures may have had on bilateral FDI flows.

The empirical approach taken in this paper is to estimate a gravity model of FDI which also includes dummy variables for whether or not measures of state protection were implemented since 2008. Assuming that all countries were affected by the crisis and controlling for time invariant characteristics common to all countries that implemented such measures this is, then, akin to a difference-in-differences analysis which allows us to identify the effect of protection measures on FDI flows.

The next section describes in more detail the empirical approach and the data set. Some descriptive statistics are then presented in Section 3. Section 4 discusses the econometric results and Section 5 provides some conclusions.

respectively. See Hijzen et al. (2008) for some empirical evidence on the relationship between trade costs and foreign direct investment through mergers & acquisitions, distinguishing horizontal and vertical FDI.

³ Campa (1993), based on the theoretical framework by Dixit (1989), for example shows that uncertainty about exchange rates may discourage foreign direct investment. This uncertainty argument can be similarly applied to other economic factors, such as uncertainty about trade openness or institutional characteristics.

2 Empirical Methodology and Data

The empirical strategy is to estimate gravity type equations explaining FDI flows. These equations have the following form:

$$\begin{aligned} \ln FDI_{ijt} = & \alpha_1 \ln(GDP_{it-1} + GDP_{jt-1}) + \alpha_2 \ln(|GDP_{it-1} - GDP_{jt-1}|) + \\ & + \alpha_3 \ln(|GDPPC_{it-1} - GDPPC_{jt-1}|) + \alpha_4 \ln DIST_{ij} + \\ & + \beta_1 PROTECT_{it} + \beta_2 PROTECT_{jt} + \\ & + \gamma_1 CRISIS_t + \gamma_2 TREATED_i + \gamma_3 TREATED_j + \varepsilon_{ijt} \end{aligned} \quad (1)$$

where the dependent variable is defined as foreign direct investment flows between source country i and host country j at time t ($t = 2006, 2007, 2008, 2009$). A list of variables with definitions and data sources is provided in Table A1 in the appendix.

The first set of explanatory variables are gravity type covariates as, for example, used in the analysis by Carr et al. (2001) or Blonigen et al. (2003). These are the sum of source and host country GDP, the absolute difference thereof, and the absolute difference in terms of per capita GDP between the two countries. These variables control for level and differences in market size, and differences in factor endowments or purchasing power. The distance between i and j is also included to control for the overall level of trade costs between the two countries. Note that these covariates are included as lagged variables in order to minimize simultaneity considerations.

The next pair of variables, PROTECT are the main variables of interest in this analysis. They are dummy variables for the source and host country respectively that are set to zero for $t = 2006, 2007$. They switch to value 1 for $t = 2008, 2009$ if a country implemented at least one measure of state protection that is deemed to discourage trade

as reported by *Global Trade Alert* during the crisis. If not, the dummy remains at 0 also for $t = 2008, 2009$.

The last set of variables are three further dummies. CRISIS is a dummy equal to 0 for $t = 2006, 2007$ and 1 thereafter for all countries. This, thus, captures any general effect of the crisis that affected all countries equally. TREATED are two dummies equal to 1 for all years if a country implemented a protection measure. This controls for any time invariant country specific effect that may be correlated with implementing a state protection measure during the crisis, for example, weak institutions.

The inclusion of these three dummies allows us to interpret β_1 and β_2 as the difference-in-differences (DiD) estimates. DiD estimation, in turn, implies that β_1 and β_2 are unbiased estimates of the effect of protection on FDI flows. The necessary assumption is that there are common trends of macro variables for the two sets of countries, i.e., those that implemented measures and those that did not. In other words, conditional on the covariates included in the gravity model in equation (1), both groups of countries are assumed to react identically to common world-wide shocks.

The time period covered is 2006 to 2009, thus including two years before the outbreak of the crisis and two years after. This allows us to investigate the short run effects of the crisis on FDI flows between countries.

We use bilateral data on annual flows of Foreign Direct Investments for the dependent variable. These data are available from the OECD. Therefore the data are restricted to investments in which at least one of the countries – that is either the source or the host country – is a member of the OECD.^{4, 5} The respective partner country can,

⁴ FDI flows are available in millions of US dollars at current exchange rates and prices. If both countries are an OECD member country the data usually contains two figures; one for outgoing amounts as reported by

however, be any country in the world. Hence, with this data we capture most of the FDI activity in the world, as very little is between two non-OECD countries. For example, in 2009 FDI outflows in our data amount to 1.06 trillion US \$. This is equivalent to 96 percent of total FDI outflows as reported in the *World Investment Report 2010* (UNCTAD, 2010).

Data on state protection measures are available from the *Global Trade Alert* project (www.globaltradealert.org). The website collects information on actions taken by countries in the course of the current economic crisis that are likely to discriminate against foreign commerce. Measures are attributed to the implementing jurisdiction and classified by several factors, in particular its severity and type. Specifically, the actions are categorized by their severity into three groups. Green measures involve trade liberalization or are at least non-discriminatory. Amber measures are likely to discriminate against foreign commerce and red ones are almost certain to do so. We use the data on red and amber measures to construct our PROTECT variables.

In order to identify the effect of trade protection we control for a number of characteristics of the source and host country, as shown in equation (1). GDP is measured in millions of US dollars at current prices and exchange rates and is available from the World Bank *World Development Indicators*.⁶ Population data for the calculation of GDP per capita is taken from the United Nations Population Division. The distance variable is defined as distance between two countries' capitals (in kilometres), data on which has

the source country and one for incoming investment amounts as reported by the host country. In this case we use the arithmetic mean of both figures.

⁵ Note that we take logs of some of the variables. To avoid the problem of zeros, 1 is added to all variables. We also set all negative FDI flows equal to zero.

⁶ Since the dependent variable is also measured in current prices we do not deflate these variables. The assumption is that both sets of variables within a country experience the same price changes.

been taken from Kristian S. Gleditsch's website at (<http://privatewww.essex.ac.uk/~ksg/>) and extended by own calculations.

In robustness checks we also include further explanatory variables, which we also discuss in Section 4. We use data on exports and imports which are available from the *World Development Indicators*. We also check for the impact of the regulatory quality in the host and source countries for which we employ data from the *Worldwide Governance Indicators* (WGI) project of the World Bank. The index is transformed to match the scale from 0 (worst) to 100 (best). Furthermore, we include a dummy that is one if both countries share a common border and a dummy that indicates whether both jurisdictions share a common official language. These data come from the *Centre d'Etudes Prospectives et d'Informations Internationales* (CEPI).

3 Descriptive Statistics

The Global Trade Alert website reports that as of 25 August 2011, 1852 trade protection measures were announced and implemented since November 2008. An illustration showing which countries have implemented measures of different severity categories is provided in Figure A1 in the appendix. As Evenett (2011) argues forcefully, the G20 are responsible for the lion's share of this activity, although a number of smaller emerging markets (such as Venezuela, Vietnam or Nigeria) are also listed as being amongst the worst offenders. Table A2 in the appendix provides a list of the countries in our sample distinguishing those that did implement some measures of severity category amber or red and those that did not. In contrast to Evenett (2011), this table does not give a ranking by number of measures implemented, however.

As shown in Table 1, the majority of actions taken by countries were trade protection measures. Less than 7 percent of all measures were more directly related to FDI by targeting investment (including local content requirements) and intellectual property rights.

Table 1: Share of measures by type

| Type of measure | Percentage |
|------------------------------|------------|
| investment | 5,36 |
| intellectual property rights | 1,42 |
| trade finance | 0,87 |
| trade protection | 70,00 |
| other | 22,35 |
| total | 100 |

Source: own calculations based on data from GTA website

In our data, about 40 percent of countries have implemented some sort of protectionist measure captured in the GTA database. In a first look at a possible relationship between FDI and protectionist measures, Table 2 shows summary statistics on FDI flows and GDP, distinguishing countries in our sample that implemented measures from those that did not. The table shows that, on average, larger countries tended to revert to trade protection in the face of crisis, and that these countries also attracted, on average, substantially higher FDI inflows and outflows pre-crisis. During the crisis, however, these countries experienced much smaller growth rates of FDI than countries that abstained from protection.

Hence, at a first glance, there seems to be a negative association between the implementation of trade protection measures and changes in FDI. Of course, these relationships may be confounded by the influence of other bilateral characteristics, which

we can control for in the regression analysis. We therefore now turn to the econometric analysis of the gravity model described in equation (1).

Table 2: Summary statistics for countries implementing / not implementing measure

| | Country implemented measure | Country did not implement measure |
|--|-----------------------------|-----------------------------------|
| FDI inflows 2006 | 12,494.3 | 1,149.2 |
| FDI outflows 2006 | 13,560.6 | 1,722.5 |
| GDP 2006 | 410,630.6 | 12,537.4 |
| Percentage change in FDI inflows, 2006 – 2009 | -27.1% | 7.0% |
| Percentage change in FDI outflows, 2006 – 2009 | -27.3% | 18.0% |

Note: FDI and GDP are in million US \$

Source: own calculations based on data from GTA, WDI and UNCTAD

4 Econometric Results

The baseline regression results are reported in Table 3. We estimate two variants of the empirical model. The first one, shown in columns 1 to 3 of the table, includes only the basic gravity type variables as described in equation (1). The second model includes further control variables which we turn back to below. Both models are estimated using three estimators: OLS, bilateral fixed effects and a random effects tobit technique. The OLS estimator provides some benchmark estimates for the gravity model. Since the fixed effects technique controls comprehensively for any time invariant country pair specific unobservables, this estimator is best suited to identify the coefficients in our difference-in-differences model. Hence, we see the fixed effects model as our preferred specification. The random effects tobit estimator is included as a robustness check as it takes into consideration that the dependent variable is bounded at zero.

Table 3: State protection and FDI flows: Baseline results

| VARIABLES | (1) OLS | (2) FE | (3) Tobit RE | (4) OLS | (5) FE | (6) Tobit RE |
|---------------------------|-----------------------------------|------------------------------------|------------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| GDP sum | 3.438*** (0.085) | 0.409 (0.759) | 7.867*** (0.239) | 0.958*** (0.104) | 1.272 (0.979) | 1.296*** (0.293) |
| GDP difference | -1.635*** (0.072) | 0.083 (0.176) | -3.247*** (0.190) | -0.577*** (0.076) | 0.086 (0.240) | -0.913*** (0.191) |
| GDP per capita diff. | 0.085* (0.048) | -0.243 (0.197) | 0.242* (0.138) | 0.233*** (0.051) | -0.317 (0.222) | 0.700*** (0.142) |
| distance | -2.106*** (0.055) | | -5.185*** (0.161) | -0.725*** (0.069) | | -1.509*** (0.186) |
| Protection source | 0.076 (0.170) | -0.077 (0.126) | -0.673 (0.481) | -0.171 (0.192) | -0.133 (0.160) | -0.920* (0.551) |
| Protection host | -0.380** (0.177) | -0.364*** (0.128) | -1.955*** (0.463) | -0.455** (0.202) | -0.470*** (0.169) | -1.973*** (0.519) |
| Crisis | 0.052 (0.194) | -0.092 (0.227) | 2.294*** (0.639) | 0.248 (0.238) | 0.577** (0.294) | 1.414* (0.762) |
| Treated source | 2.622*** (0.114) | | 8.886*** (0.421) | 0.370*** (0.135) | | 1.820*** (0.488) |
| Treated host | 1.790*** (0.119) | | 6.704*** (0.416) | 1.161*** (0.143) | | 3.771*** (0.467) |
| exports | | | | 0.439*** (0.018) | -0.015 (0.033) | 1.344*** (0.074) |
| imports | | | | 0.492*** (0.019) | 0.008 (0.034) | 1.224*** (0.070) |
| GDP growth source | | | | 14.643*** (1.297) | 2.247 (1.792) | 14.796*** (4.307) |
| GDP growth host | | | | 13.568*** (1.419) | 1.918 (2.132) | 23.646*** (4.005) |
| Regulatory quality source | | | | 4.435*** (0.140) | 0.336 (0.828) | 12.422*** (0.512) |
| Regulatory quality host | | | | 1.675*** (0.147) | 1.537 (0.965) | 2.943*** (0.474) |
| Common border | | | | 1.186*** (0.414) | | -1.914* (1.014) |
| Common language | | | | 1.027*** (0.163) | | 1.936*** (0.467) |
| Adj R2 | 0.249 | 0.002 | . | 0.359 | 0.002 | . |
| N | 28578 | 28578 | 28578 | 23669 | 23669 | 23669 |
| Unique country-pairs | . | 8566 | 8566 | . | 7489 | 7489 |

Notes

All regressions include year dummies; Time varying gravity style explanatory variables are lagged one period; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

The estimation results in the table show that the coefficients on the gravity type covariates are as expected from the discussion in Carr et al. (2001). A larger combined

market is positively correlated with FDI flows, while size differences discourage FDI. Differences in factor endowments are also positively correlated with FDI. This latter variable indicates that FDI activity is high between countries that have different factor endowments. This suggests that vertical FDI and global production networks are important motives for part of the FDI in our sample. Distance is also negatively associated with FDI flows, indicating that general trade, investment and communication costs, which can be assumed to increase with distance, matter for FDI activity.

One point to note is that the estimated coefficients are much weaker when using a fixed effects estimator. This model includes bilateral fixed effects and, hence, estimates are identified over the variation over time within country pairs. Given that we only use four years of data, this time variation is relatively low.⁷ However, we prefer this estimator as it controls comprehensively for any time invariant unobservables that may otherwise bias our estimates.

Turning to the other controls, we estimate positive and statistically significant coefficients on the dummy variables indicating countries that implemented trade protection measures during the crisis (TREATED). This positive association indicates that countries that implemented such measures are also the countries that attract high levels of FDI – or, more precisely, they are countries that have FDI flows that are higher than those that would be predicted by the pure gravity relationships (size, differences, and distance).

Similarly, we estimate in some specifications positive coefficients on CRISIS, the dummy that is equal to one for all countries in the years 2008 and 2009. This does, of course, not show that FDI flows increased during the crisis. Rather, it indicates that

⁷ The coefficients on distance and on the treated dummies cannot be estimated with the fixed effects estimator, as these variables do not vary over time.

countries in general experience higher FDI flows than those expected when controlling for GDP and differences in per capita GDP. In other words, the declines in bilateral FDI activity have, on average, not been as strong as may have been expected given the negative implications of the crisis for GDP and GDP per capita.

The main variables of interest are, of course, the dummies on the implementation of state protection measures during the crisis. Here the results show that, all other things equal, a host country that implemented such a measure experienced lower FDI inflows. Taking the point estimate of the coefficient in column (2) at face value suggests that countries that implemented a measure experience roughly 43 percent lower FDI inflows than countries that did not.⁸ Implementation does not seem to affect FDI outflows of a country, however, as evidenced by the statistically insignificant coefficient on PROTECT for the source country. Before we turn to interpreting this finding, we concern ourselves with establishing how robust this result is to changes in the specification of the empirical model.

The estimations in columns 4 to 6 include further control variables. We include the level of bilateral exports and imports between source and host, GDP growth of both countries, and dummies for a common border or a common language. These are essentially further gravity type variables that proxy for the nature of the trade relationship between source and host country. The estimated coefficients are largely as expected. Trade is positively associated with FDI flows, as is GDP growth in the host (but not necessarily source) country. FDI flows are also higher between countries that share a common language, *ceteris paribus*.

⁸ Since the dependent variable is in natural logs, the effect of a dummy can be calculated as $\exp(\beta)-1$.

Furthermore, we include an index of regulatory quality in the two countries. The regulation variable attempts to proxy for aspects of the institutional environment that may be correlated with the implementation of state protection measures during the crisis. The estimations suggest that better institutional quality, as evidenced by a better regulatory quality, is positively associated with FDI flows between two countries.

As regards our results on the implementation of state protection measures, the reassuring result of the estimations in columns 4 to 6 is that our conclusions drawn thus far are robust to the inclusion of these further variables.⁹ Hence, the implementation of state protection measures that discriminate against foreign commercial interest in general have negative repercussions for FDI inflows in the implementing country. On the other hand, this does not appear to affect FDI outflows from the country, all other things equal. The outward investment activities of firms in these countries seem to be unaffected by government measures that are aimed at protecting the domestic country against foreign competition.

Types of measures

There are various forms of protectionist measures that countries have implemented during the crisis. Thus far these are lumped together in the analysis. In a further step we now distinguish two types that may be most related to investment, namely, explicit investment measures and measures related to intellectual property rights protection. We look at these in turn in Tables 4 and 5.

⁹ In a further robustness check we estimate a model that does not include the logs of FDI as dependent variable but the normal values. This produces similar results, a negative relationship between protection implemented by a host country and FDI inflows. Results are not produced here to save space.

Table 4: State protection and FDI flows: Investment measures

| VARIABLES | (1) OLS | (2) FE | (3) Tobit RE | (4) OLS | (5) FE | (6) Tobit RE |
|---------------------------|------------------------------------|------------------------------------|------------------------------------|-----------------------------------|------------------------------------|------------------------------------|
| GDP sum | 3.057*** (0.088) | 0.329 (0.770) | 7.301*** (0.247) | 0.724*** (0.106) | 1.159 (0.991) | 0.897*** (0.298) |
| GDP difference | -1.506*** (0.072) | 0.082 (0.176) | -3.097*** (0.189) | -0.509*** (0.076) | 0.086 (0.240) | -0.817*** (0.191) |
| GDP per capita diff. | 0.046 (0.048) | -0.249 (0.197) | 0.196 (0.138) | 0.195*** (0.051) | -0.325 (0.222) | 0.640*** (0.142) |
| Distance | -2.271*** (0.056) | | -5.423*** (0.164) | -0.897*** (0.071) | | -1.804*** (0.191) |
| Investment measure source | -0.042 (0.247) | -0.216 (0.193) | -0.592 (0.413) | -0.145 (0.236) | -0.282 (0.209) | -0.755* (0.430) |
| Investment measure host | 0.432* (0.246) | 0.013 (0.190) | 0.422 (0.413) | 0.172 (0.235) | -0.007 (0.204) | 0.101 (0.431) |
| Other measure source | 0.069 (0.178) | -0.033 (0.135) | -0.562 (0.495) | -0.144 (0.201) | -0.076 (0.169) | -0.777 (0.565) |
| Other measure host | -0.476*** (0.184) | -0.360*** (0.135) | -2.092*** (0.479) | -0.513** (0.210) | -0.473*** (0.176) | -2.078*** (0.534) |
| Investment treated source | 1.393*** (0.166) | | 2.355*** (0.414) | 1.283*** (0.158) | | 2.677*** (0.404) |
| Investment treated host | 1.268*** (0.164) | | 2.120*** (0.416) | 0.751*** (0.157) | | 1.274*** (0.409) |
| Other treated source | 2.375*** (0.119) | | 8.441*** (0.432) | 0.063 (0.140) | | 1.164** (0.501) |
| Other treated host | 1.571*** (0.123) | | 6.256*** (0.428) | 1.041*** (0.148) | | 3.551*** (0.481) |
| Crisis | 0.145 (0.192) | -0.070 (0.227) | 2.477*** (0.636) | 0.333 (0.237) | 0.626** (0.295) | 1.645** (0.758) |
| Adj R2 | 0.256 | 0.002 | . | 0.362 | 0.002 | . |
| N | 28578 | 28578 | 28578 | 23669 | 23669 | 23669 |
| Unique country-pairs | . | 8566 | 8566 | . | 7489 | 7489 |

Notes

All regressions include year dummies; Time varying gravity style explanatory variables are lagged one period; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Columns 4 to 6 include additional covariates as in Table 3, these are not reported to save space

Firstly we consider investment measures. As an example, South Korea announced a reduction of tax exemptions for foreign-owned firms in late 2010, which could be considered a protectionist measure. Furthermore, investment measures include local content requirements, an example of which is Canada's implementation of such in a provincial programme for renewable energy in 2009.

We now have two PROTECT variables per country. One is a dummy equal to one after the introduction of an investment related measure. A second dummy is equal to one if a country implemented any other type of protection measure.¹⁰ The result is quite clear: all other things equal, the implementation of an investment related measure has no significant association with FDI flows. However, other protectionist measures are, as before, negatively associated with FDI inflows in the implementing country.

Table 5 considers intellectual property rights protection. An example of such measures is the action taken by China to give accreditation to suppliers of certain high tech products. In order to be able to gain such accreditation, firms must be located in China and must be able to proof their ownership of intellectual property rights to make certain products. This measure would, thus, clearly increase protection for Chinese domestic firms.

The implementation of such IPR related measures is negatively associated with FDI inflows for host countries. This is as one may expect, since these actions in many cases discriminate against foreign firms. Note also that other measures still have a negative effect, as before. We also find that IPR measures reduce FDI outflows from countries that implement them. In other words, measures relevant to IPR protection discourage FDI outflows as firms may be less willing to operate abroad. Perhaps this form of protection, which allows domestic firms to eschew foreign competition, removes the perceived need for firms to expand operations in foreign markets.

¹⁰ Note that we also redefine the TREATED variables accordingly to preserve the difference-in-differences nature of our analysis.

Table 5: State protection and FDI flows: Intellectual property rights

| VARIABLES | (1) OLS | (2) FE | (3) Tobit RE | (4) OLS | (5) FE | (6) Tobit RE |
|----------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| GDP sum | 3.349*** (0.084) | 0.368 (0.757) | 7.760*** (0.236) | 0.911*** (0.104) | 1.151 (0.977) | 1.202*** (0.293) |
| GDP difference | -1.610*** (0.071) | 0.090 (0.177) | -3.223*** (0.187) | -0.572*** (0.076) | 0.092 (0.240) | -0.914*** (0.191) |
| GDP per capita diff. | 0.059 (0.047) | -0.239 (0.197) | 0.081 (0.136) | 0.203*** (0.051) | -0.322 (0.223) | 0.619*** (0.142) |
| Distance | -1.718*** (0.058) | 0.000 (0.000) | -4.193*** (0.171) | -0.492*** (0.073) | | -0.919*** (0.200) |
| IPR measure source | -0.574*** (0.213) | -0.630*** (0.169) | -1.966*** (0.436) | -0.706*** (0.218) | -0.754*** (0.191) | -2.044*** (0.451) |
| IPR measure host | -0.933*** (0.215) | -0.449*** (0.168) | -1.705*** (0.418) | -0.898*** (0.219) | -0.473** (0.190) | -1.592*** (0.434) |
| Other measure source | 0.223 (0.200) | 0.219 (0.149) | 0.210 (0.554) | 0.097 (0.217) | 0.219 (0.181) | 0.112 (0.620) |
| Other measure host | 0.088 (0.215) | -0.215 (0.151) | -1.398*** (0.520) | -0.066 (0.234) | -0.341* (0.189) | -1.444** (0.573) |
| IPR treated source | 3.391*** (0.141) | | 8.551*** (0.421) | 2.161*** (0.156) | | 4.424*** (0.453) |
| IPR treated host | 0.623*** (0.141) | | 2.139*** (0.409) | 0.419*** (0.151) | | 1.981*** (0.449) |
| Other treated source | 0.869*** (0.130) | | 4.287*** (0.480) | -0.375*** (0.144) | | 0.035 (0.529) |
| Other treated host | 2.203*** (0.142) | | 7.561*** (0.467) | 1.109*** (0.156) | | 3.325*** (0.500) |
| Crisis | 0.306 (0.200) | 0.107 (0.233) | 3.157*** (0.655) | 0.529** (0.245) | 0.816*** (0.303) | 2.231*** (0.774) |
| Adj R2 | 0.272 | 0.003 | . | 0.365 | 0.003 | . |
| N | 28578 | 28578 | 28578 | 23669 | 23669 | 23669 |
| Unique country-pairs | . | 8566 | 8566 | . | 7489 | 7489 |

Notes

All regressions include year dummies; Time varying gravity style explanatory variables are lagged one period; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Columns 4 to 6 include additional covariates as in Table 3, these are not reported to save space

Neighbour effects

The analysis thus far has concentrated on actions taken by the host and source countries, respectively. However, Head and Mayer (2004) show that the decision of a firm to invest abroad does not just depend on the characteristics of the individual country. Rather, the market potential of a given host country also depends on the characteristics of

neighbouring countries. In the context of state intervention, protectionist measures taken by a given host country's neighbour may make the host country less attractive to foreign firms since, for example, exporting from host to neighbour may become more costly.

Table 6: State protection and FDI flows: Neighbouring countries

| VARIABLES | (1) OLS | (2) FE | (3) Tobit RE | (4) OLS | (5) FE | (6) Tobit RE |
|--------------------------|-----------------------------------|------------------------------------|------------------------------------|----------------------------------|------------------------------------|------------------------------------|
| GDP sum | 3.960*** (0.102) | 1.875* (1.067) | 8.516*** (0.274) | 0.912*** (0.123) | 2.598** (1.218) | 0.995*** (0.332) |
| GDP difference | -1.822*** (0.089) | 0.253 (0.273) | -3.646*** (0.212) | -0.660*** (0.089) | 0.258 (0.320) | -1.154*** (0.206) |
| GDP per capita diff. | 0.213*** (0.059) | -0.402 (0.287) | 0.482*** (0.167) | 0.415*** (0.060) | -0.497 (0.303) | 1.077*** (0.161) |
| Distance | -2.188*** (0.069) | | -4.760*** (0.196) | -0.531*** (0.082) | | -0.821*** (0.215) |
| Protection source | 0.123 (0.225) | -0.161 (0.166) | -0.710 (0.630) | -0.081 (0.234) | -0.184 (0.187) | -0.302 (0.695) |
| Protection host | -0.624** (0.249) | -0.572*** (0.180) | -2.458*** (0.578) | -0.480* (0.258) | -0.598*** (0.210) | -2.043*** (0.622) |
| Treated source | 3.299*** (0.149) | | 9.996*** (0.541) | 0.543*** (0.163) | | 2.901*** (0.588) |
| Treated host | 1.970*** (0.162) | | 5.935*** (0.522) | 1.200*** (0.177) | | 3.672*** (0.553) |
| Neighbour dummy source | 0.081 (0.458) | -0.457 (0.309) | -0.510 (0.971) | 0.010 (0.445) | -0.619* (0.346) | -0.420 (1.010) |
| Neighbour dummy host | -0.601 (0.459) | -0.581* (0.318) | -1.879* (0.967) | -0.421 (0.470) | -0.653* (0.362) | -1.547 (0.996) |
| Neighbour treated source | -0.373 (0.290) | | -1.011 (0.858) | -0.558** (0.273) | | -1.641** (0.826) |
| Neighbour treated host | -0.176 (0.284) | | -0.801 (0.880) | -0.137 (0.284) | | -1.369 (0.834) |
| Crisis | 0.534 (0.678) | 1.384*** (0.494) | 3.236** (1.567) | 0.480 (0.684) | 0.932 (0.611) | 2.721* (1.643) |
| Adj R2 | 0.247 | 0.003 | . | 0.361 | 0.003 | . |
| N | 19675 | 19675 | 19675 | 17548 | 17548 | 17548 |
| Unique country-pairs | . | 5827 | 5827 | . | 5827 | 5827 |

Notes

All regressions include year dummies; Time varying gravity style explanatory variables are lagged one period; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Columns 4 to 6 include additional covariates as in Table 3, these are not reported to save space

In a first attempt to look at this issue we simply generate a dummy variable that is equal to one if any country that shares a common border with the host (or source) implemented protectionist measures. The results of this exercise are reported in Table 6. Two points are particularly noteworthy. Firstly, the inclusion of the neighbour effects does not change the result that there is a negative effect from the implementation of a protectionist measure by a host country on its FDI inflows. The point estimate is, however, now slightly higher than in Table 3, the coefficient in column (2) suggests that the implementation of a protectionist measure is associated with about 77 percent lower FDI inflows. Secondly, there is some evidence of negative effects of neighbours' actions on FDI inflows into a host country, though the coefficients are not statistically significant in all cases.

In order to investigate this a little further we include an additional analysis. In this case we calculate for each host (and source) country the percentage of neighbouring countries that have implemented an action reported by Global Trade Alert. We include these variables in the regression equation; the results are reported in Table 7. The conclusion on the negative effect of a state measure on the host countries is again robust, and the coefficient size is roughly similar to that in Table 4. We also, as before, estimate negative coefficients on the variable capturing the percentage of neighbouring countries that implemented a measure, though these are in none of the cases statistically significant.

Hence, while the results provide some weak indication that neighbours' activities matter for host countries, this result is not very robust.

Table 7: State protection and FDI flows: Percentage of neighbours that implemented measures

| VARIABLES | (1) OLS | (2) FE | (3) Tobit RE | (4) OLS | (5) FE | (6) Tobit RE |
|-----------------------------|-----------------------------------|------------------------------------|------------------------------------|----------------------------------|------------------------------------|------------------------------------|
| GDP sum | 3.933*** (0.101) | 1.856* (1.066) | 8.455*** (0.273) | 0.888*** (0.123) | 2.466** (1.212) | 0.954*** (0.332) |
| GDP difference | -1.794*** (0.088) | 0.251 (0.273) | -3.589*** (0.212) | -0.643*** (0.088) | 0.258 (0.319) | -1.113*** (0.206) |
| GDP per capita diff. | 0.200*** (0.059) | -0.411 (0.286) | 0.412** (0.166) | 0.408*** (0.060) | -0.512* (0.302) | 1.047*** (0.161) |
| distance | -2.090*** (0.069) | | -4.555*** (0.194) | -0.477*** (0.081) | | -0.708*** (0.215) |
| Protection source | 0.059 (0.229) | -0.051 (0.171) | -0.649 (0.634) | -0.069 (0.237) | -0.025 (0.192) | -0.103 (0.700) |
| Protection host | -0.567** (0.252) | -0.612*** (0.181) | -2.408*** (0.580) | -0.448* (0.262) | -0.642*** (0.211) | -2.040*** (0.625) |
| Treated source | 3.110*** (0.150) | | 9.672*** (0.543) | 0.522*** (0.163) | | 2.862*** (0.589) |
| Treated host | 2.119*** (0.164) | | 6.133*** (0.521) | 1.183*** (0.179) | | 3.659*** (0.552) |
| Neighbour percentage source | -0.395 (0.364) | -1.167*** (0.266) | -2.209*** (0.735) | -0.539 (0.358) | -1.448*** (0.298) | -2.473*** (0.763) |
| Neighbour percentage host | -0.557 (0.355) | -0.347 (0.263) | -0.867 (0.705) | -0.295 (0.358) | -0.300 (0.297) | -0.417 (0.735) |
| Neighbour treated source | 2.376*** (0.234) | | 4.775*** (0.659) | 1.207*** (0.227) | | 1.166* (0.674) |
| Neighbour treated host | -0.231 (0.226) | | -1.048 (0.654) | -0.363 (0.226) | | -0.863 (0.651) |
| Crisis | 0.766 (0.470) | 1.513*** (0.370) | 3.282*** (1.166) | 0.687 (0.473) | 1.042** (0.487) | 2.972** (1.236) |
| Adj R2 | 0.252 | 0.004 | . | 0.362 | 0.005 | . |
| N | 19675 | 19675 | 19675 | 17548 | 17548 | 17548 |
| Unique country-pairs | . | 5827 | 5827 | . | 5827 | 5827 |

Notes

All regressions include year dummies; Time varying gravity style explanatory variables are lagged one period; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1; Columns 4 to 6 include additional covariates as in Table 3, these are not reported to save space

5 Conclusions

The verdict from this analysis is clear: a country that implements new protectionist measures may expect that this may result in lower foreign direct investment inflows into

the economy. The point estimates from our preferred specifications suggest that the implementation of a trade protection measure is associated with about 40 to 80 percent lower FDI inflows than would have occurred in the absence of such measures. Trade protection does not appear to have any implications for the country's FDI outflows, however. The negative effect on FDI inflows does not appear to be due to direct investment measures but rather to actions related to intellectual property rights protection and other more trade related measures. One possible interpretation of this is that FDI is deterred since the protectionist measure discourages trade and activities of global production networks, where the free flow of goods and services between firms in different countries is of high importance. Another possibility is that the implementation of protectionist measures signals uncertainty about trade openness or the general institutional environment to potential investors. These two interpretations are, of course, not mutually exclusive.

These research findings have important implications for the commercial interests of less and least developed countries. Many of the "offending" countries are emerging or developing economies. For them, the harm done to their own economy may be particularly severe. It is well accepted that foreign direct investments into such economies may have strong beneficial effects on economic growth, firm productivity, wages and employment (e.g., Barba Navaretti and Venables, 2004, Görg and Greenaway, 2004). Given that protectionist measures can deter inflows of FDI these beneficial effects may be impeded, possibly leading to adverse implications for the economic performance and growth perspectives of these countries.

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Appendix

Table A1: List of variables included in the empirical model

| Variable | Description | Source |
|---------------------------|--|--|
| bilateral FDI flows | Bilateral FDI flows from source to host in Million US-\$ | OECD.Stat Extracts |
| GDP sum | Sum of both countries' GDP in Million US-\$ | World Bank: World Development Indicators |
| GDP difference | Absolute difference in both countries' GDP in Million US-\$ | World Bank: World Development Indicators |
| GDP per capita difference | Absolute difference in both countries' GDP per capita | GDP: World Bank, Population: United Nations Population Division (via WDI) |
| distance | Distance between capitals in km | Kristian S. Gleditsch (http://privatewww.essex.ac.uk/~ksg/) and own calculations |
| exports | Bilateral exports from source to host in Million US-\$ | OECD.Stat Extracts |
| imports | Bilateral imports from host to source in Million US-\$ | OECD.Stat Extracts |
| GDP growth | Annual growth of GDP at market prices (1 equals an 100% increase) | World Bank: World Development Indicators |
| regulatory quality | Index of regulatory quality (0 - 100) | World Bank: Worldwide Governance Indicators (WGI) project |
| common border | Dummy: 1 if countries share a common border | Centre d'Etudes Prospectives et d'Informations Internationales (CEPI) |
| common language | Dummy: 1 for common official primary language | Centre d'Etudes Prospectives et d'Informations Internationales (CEPI) |
| protection | Dummy: 1 for 2008 and 2009 if a country has implemented at least one measure | Global Trade Alert |
| treated | Dummy: 1 for treated countries (countries with at least one measure implemented) | Global Trade Alert |
| crisis | Dummy: 1 for the years 2008 and 2009 | |
| investment measure | Dummy: 1 if a country has implemented an amber or red measure in the category "Investment measure" or "Local content requirement" | Global Trade Alert |
| IPR measure | Dummy: 1 if a country has implemented an amber or red measure in the category "Intellectual property protection" | Global Trade Alert |
| other measure | Dummy: 1 if a country has implemented an amber or red measure in a category other than the ones captured by the investment/IPR dummy | Global Trade Alert |
| neighbour dummy | Dummy: 1 if any of the neighbouring countries has implemented an amber or red measure | Global Trade Alert, CEPI |
| neighbour percentage | Percentage of neighbouring countries (0 - 1) that have implemented an amber or red measure | Global Trade Alert, CEPI |

Table A2: List of countries with trade protection measure implemented

| Countries without measure implemented (84) | Countries with measure implemented (107) |
|---|---|
| Albania | Afghanistan |
| Andorra | Algeria |
| Antigua And Barbuda | Angola |
| Azerbaijan | Argentina |
| Bahamas | Australia |
| Bahrain | Austria |
| Barbados | Bangladesh |
| Bermuda | Armenia |
| Bhutan | Belgium |
| Belize | Bolivia, Plurinational State Of |
| Solomon Islands | Bosnia And Herzegovina |
| Brunei Darussalam | Botswana |
| Burundi | Brazil |
| Cambodia | Bulgaria |
| Cape Verde | Belarus |
| Central African Republic | Cameroon |
| Chad | Canada |
| Comoros | Sri Lanka |
| Congo | Chile |
| Dominica | China |
| El Salvador | Colombia |
| Equatorial Guinea | Congo, The Democratic Republic Of The |
| Eritrea | Costa Rica |
| Faroe Islands | Croatia |
| Fiji | Cyprus |
| Djibouti | Czech Republic |
| Georgia | Benin |
| Palestinian Territory, Occupied | Denmark |
| Kiribati | Dominican Republic |
| Greenland | Ecuador |
| Grenada | Ethiopia |
| Guatemala | Estonia |
| Guinea | Finland |
| Guyana | France |
| Haiti | Gabon |
| Honduras | Gambia |
| Hong Kong | Germany |
| Iceland | Ghana |
| Côte D'ivoire | Greece |
| Lao People's Democratic Republic | Hungary |
| Lesotho | India |
| Liberia | Indonesia |
| Libyan Arab Jamahiriya | Iran, Islamic Republic Of |
| Liechtenstein | Iraq |
| Macao | Ireland |
| Madagascar | Israel |
| Maldives | Italy |

Mali
Mauritius
Moldova, Republic Of
Montenegro
Oman
Nepal
Vanuatu
Nicaragua
Niger
Norway
Micronesia, Federated States Of
Marshall Islands
Palau
Panama
Papua New Guinea
Guinea-Bissau
Timor-Leste
Qatar
Saint Kitts And Nevis
Saint Lucia
Saint Vincent And The Grenadines
San Marino
Sao Tome And Principe
Senegal
Serbia
Seychelles
Suriname
Swaziland
Tajikistan
Tonga
Tunisia
Turkmenistan
Macedonia, The Former Yugoslav Republic Of
Burkina Faso
Uruguay
Samoa
Yemen

Jamaica
Japan
Kazakhstan
Jordan
Kenya
Korea, Republic Of
Kuwait
Kyrgyzstan
Lebanon
Latvia
Lithuania
Luxembourg
Malawi
Malaysia
Malta
Mauritania
Mexico
Mongolia
Morocco
Mozambique
Namibia
Netherlands
New Zealand
Nigeria
Pakistan
Paraguay
Peru
Philippines
Poland
Portugal
Romania
Russian Federation
Rwanda
Saudi Arabia
Sierra Leone
Singapore
Slovakia
Viet Nam
Slovenia
South Africa
Zimbabwe
Spain
Sudan
Sweden
Switzerland
Syrian Arab Republic
Thailand
Togo
Trinidad And Tobago
United Arab Emirates

| |
|-----------------------------------|
| Turkey |
| Uganda |
| Ukraine |
| Egypt |
| United Kingdom |
| Tanzania, United Republic Of |
| United States |
| Uzbekistan |
| Venezuela, Bolivarian Republic Of |
| Zambia |

Figure A1: Implementation of measures by country and severity categories

