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Spanish foreign direct investment, parent financial vulnerability and destination countries financial development: A panel data analysis

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ABSTRACT

This paper evaluates the effects of destination country financial development (DCFD) on Spanish outward foreign direct investment (OFDI) stock position and gross flows to 127 countries from 75 activities considered at the division level over the period of 2008-2017. This time frame includes in Spain a period of credit restrictions to the private sector from 2008 to 2013, as banks faced liquidity stress which hurt their ability to lend. We applied a modified gravity model and a Poisson pseudo-maximum likelihood estimator to illustrate how the effects of DCFD on Spanish OFDI decreased as the financial vulnerability (FV) at the parent level increased. By using time-varying measures of financial development and FV, we also show how the evolution of the leverage ratios at the parent level could have led to different financing responses in the destination countries, to the extent of making them statistically non-significant during the period of higher leverage and financial stress in Spain. Once the deleveraging process at the parent level was carried out, our results appear to show that Spanish foreign affiliates were able to undertake more investments by obtaining bank financing in the destination countries. This would help explain the change in the pattern of gross investment flows at the end of the study period, both by activities and by destination regions.

Keywords:
Outward foreign direct investment, Destination country financial development, Financial vulnerability, Financial constraints, Spain.

JEL Classification: C12, F21; F23, F34; G15

RESUMEN

Este trabajo evalúa los efectos del desarrollo financiero en los países de destino (DFPD) sobre la posición y los flujos brutos de inversión directa española en el exterior (IDEE) hacia 127 países por parte de 75 actividades consideradas a nivel de división durante el periodo 2008-2017. Este marco temporal incluye en España un periodo de restricciones crediticias al sector privado desde 2008 hasta 2013, en el que el sector bancario se enfrentó a tensiones de liquidez que perjudicaron su capacidad para realizar préstamos. Aplicamos un modelo de gravedad modificado y un estimador de pseudo máxima verosimilitud de Poisson para ilustrar cómo los efectos de la DFPD sobre la IDEE española disminuyeron a medida que aumentaba la de vulnerabilidad financiera (VF) a nivel de la matriz. Mediante el uso de medidas de desarrollo financiero y VF que variaban en el tiempo, también mostramos cómo la

evolución de las tasas de apalancamiento a nivel de la matriz podría haber dado lugar a diferentes respuestas de la financiación en los países de destino, hasta el punto de hacerlas estadísticamente no significativas durante el período de mayor apalancamiento y estrés financiero en España. Una vez que se llevó a cabo el proceso de desapalancamiento a nivel de la matriz, nuestros resultados parecen indicar que las filiales españolas en el exterior pudieron acometer más inversiones obteniendo financiación bancaria en los países de destino. Esto ayudaría a explicar el cambio en el patrón de los flujos brutos de inversión al final del período de estudio, tanto por actividades como por regiones de destino.

Palabras clave: Salida de inversión extranjera directa, Desarrollo financiero del país de destino, Vulnerabilidad financiera, Restricciones financieras, España.

Clasificación JEL: C12, F21; F23, F34; G15

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1. INTRODUCTION

The literature agrees that the institutional environment and absorptive capacities of the destination countries are determinants that multinational enterprises (MNEs) evaluate with caution when carrying out their foreign direct investment (FDI) projects (Beazer & Blake, 2018; Choromides, 2018; Estrin et al., 2009). A common factor for MNEs in almost any foreign investment in new strategic assets is that they face high fixed and sunk costs that must be paid upfront. Normally MNEs, especially when they are small and medium enterprises, depend on the availability of external financing to cover the undertaking investment, which would make it a common determinant for all of them.

The literature suggests that financially vulnerable firms must rely on both the source country financial development (SCFD), and the destination countries financial development (DCFD), because cross-border projects are difficult to monitor, and international claims are not easily enforced. Additional reasons argue for a larger role of the DCFD over that of the SCFD in the FDI expansion in financially vulnerable sectors, as investors often do not provide all the investment capital when they take control of a foreign enterprise but rather tend to finance an important part of their investment in the local market (Lipsey, 2004).

From an aggregate point of view, Donaubauer et al. (2019) showed that financial market development in both, the source and the destination countries, plays a similarly important role. However, lower availability of credit in the source country is expected to be associated with less outward foreign direct investment (OFDI), especially by bank dependent foreign investors (Klein et al., 2002), which may cause foreign affiliates to lose the financial advantage they might have over local firms (Alfaro & Chen, 2012; Bilir et al., 2019).

These statements are particularly important for the Spanish case, especially from 2008 to 2013, as this period included an economic recession (Spanish National Institute of Statistics), which was accompanied by important credit restrictions to the private sector as banks faced liquidity stress which hurt their ability to lend (Central Bank of Spain 2014). The stress of the Spanish financial system reached its historical maximum at the end of 2008 but continued to be extremely high in the context of the European sovereign debt crisis, especially by mid-2011 and mid-2012, particularly affecting the financial intermediaries' segment (Cambón & Estévez 2016). In this scenario and considering the relational banking that characterizes the Spanish model (Argimón, 2017)

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and the *follow-the-customer* strategy coinciding with the overseas expansion of Spanish non-financial corporations during the pre-crisis period (Argimón, 2019), another option for Spanish MNEs to have carried out their investments would have been to demand financing from subsidiaries of Spanish global banks. The multinational strategy of the banks through branches or subsidiaries made them independent from their parent, having the largest share of local activity among the major banking systems (McCauley et al., 2010).

In this context, it is of special interest to analyze the effects that the DCFD had on Spanish OFDI during the study period. Our reasoning is that the DCFD should have played a role in determining the level of Spanish OFDI, however this role may have been conditioned by the financial vulnerability (FV) at the parent level since, in many cases, it determines the risk profile as a potential guarantor of the financing.

Overall, we show that the DCFD had positive effects on Spanish OFDI. However, these effects vary when considering different levels of FV at the parent activity level, as well as when separating the Spanish OFDI between manufacturing and non-manufacturing activities, different regions, and periods of financial stress in Spain.

The remainder of the paper is organized as follows. In Section 2 we discuss the theoretical framework and present our hypotheses. In Section 3 we explain the research method, measurement of variables, and the empirical methodology applied. In Section 4 we show and discuss the empirical results obtained. In Section 5 we present our conclusions.

2. THEORETICAL FRAMEWORK

The reasons why MNEs undertake FDI activities are explained by different theories such as the proximity-concentration hypothesis and the factor-proportions hypothesis (Brainard, 1997), which describe the roots of the distinction between horizontal and vertical FDI, respectively. This strand of literature was complemented by the knowledge-capital theoretical model (Carr et al., 2001; Markusen, 1997), which integrates both, vertical and horizontal motivations for FDI. Also, the eclectic paradigm Dunning (1980, 2000) combines previous theories and suggests that MNEs become multinational to exploit ownership, location, and internalization advantages.

Later on, the literature began to analyze the importance of financing and its effects on FDI, starting to consider it as a primary pillar for attracting

investment (Alfaro et al., 2004, 2010; Alfaro et al., 2009; Hermes & Lensink, 2003; Yao et al., 2021). From another point of view, Bilir et al. (2019, p. 193) also showed the importance of DCFD stating that among affiliates of U.S. based multinationals, nearly two-thirds of affiliate debt is raised in the host country, while U.S. headquarters hold only one-sixth. From an aggregated point of view, Donaubauer et al. (2019) using UNCTAD´s data covering manufacturing as well as service activities from 43 source countries, which reported bilateral FDI stock position to 137 destination countries during the period 2001-2012, showed that both SCFD and DCFD have positive effects on FDI. Therefore, we may argue that higher levels of the latter help in attracting FDI to these countries. Other authors, (Bilir et al., 2019; Ju & Wei, 2010) have highlighted that DCFD may also have a negative indirect competition effect by making a country a less attractive destination for MNEs. Desbordes & Wei (2017) also argued that the effect of financial market development in the host country on inward FDI is theoretically ambiguous. Therefore, based on the above considerations, we pose our first hypothesis:[1]

H1: *All else constant, higher financial development in destination countries increases the level of Spanish OFDI*.

Buch et al. (2014) stated that financial constraints matter more than economical and productivity constraints to large firms that consider investing abroad, as they are more likely to expand overseas since small firms are not productive enough to consider growing internationally. Therefore, financial constraints at the parent level have a negative impact on OFDI. Based on the previous argumentation, we pose our second hypothesis:[2]

H2. *All else constant, higher financial development in destination countries increases the level of Spanish OFDI. This increase is relatively lower when considering financial constraints at the parent activity level*.

The ability of firms to finance the upfront fixed costs of OFDI varies across sectors, with some financially vulnerable activities having to rely heavily on external financing to engage in OFDI (Bilir et al., 2019; Buch et al., 2010; Rajan & Zingales, 1998). Therefore, we separate the Spanish investments between manufacturing and non-manufacturing activities to pose our third hypothesis:

[1] For our purposes, we assume that external finance is raised in the form of debt finance credits from banks in the destination countries.

[2] Financial constraints are measured at the parent activity (division) level, and guarantees may be required to obtain the loan with the possibility of collateralizing assets of the foreign affiliate but considering the parent company as well.

H3. *The effects of the financial development in destination countries on Spanish OFDI differed between manufacturing and non-manufacturing activities*.

As Spanish OFDI spatial distribution is highly concentrated in Latin American and EU (and other OECD countries) markets, we perform a similar exercise by region to pose our fourth hypothesis:

H4. *The effects of the financial development in destination countries on Spanish OFDI differed by region.*

The credit restrictions of the Spanish financial intermediary segment should be taken into account when considering the works that highlight the greater importance of financing in the destination countries. During the period of higher financial stress in Spain, this importance may have increased, as Spanish investors faced difficulties in raising external funds in the home country. In addition, the fact that Spanish banks have spread through branches or subsidiaries funded independently without support from their parent, having their capital and liquidity located and managed directly in the host countries (Argimón et al., 2018), could have emphasized the effects. Such funding could have been more important in Latin America, where Spanish banks primarily concentrate their foreign activities. Therefore, based on the previous argumentation, we pose our fifth hypothesis:

H5. *The effects of the financial development in destination countries on Spanish OFDI were greater during the period of higher financial stress in Spain to compensate for the credit restrictions in the home country.*

3. RESEARCH METHOD

3.1 Data and measurement of variables

The analysis covers information on Spanish bilateral OFDI stock position and gross flows over the period 2008-2017 in 127 destination countries and 75 activities collected at division level (two digits of the Spanish Nomenclature of Economic Activities (NACE) 2009). The list of destination countries and activities can be found in Tables A and B of the Appendix, respectively.

-Dependent variables: Spanish bilateral OFDI stock position and gross flows

The first dependent variable accounts for the OFDI activity-level stock position. This variable is considered by some authors to be more accurate and reliable than the one based on annual FDI flows, which are more volatile and sensitive to both economic conditions and financial constraints. Bilateral FDI stock position data have been used in the literature to measure the FDI of source countries (Bergstrand & Egger, 2007; Donaubauer et al., 2019; Head & Ries, 2008). We used division-level data on Spanish OFDI stock from DataInvex,[3] administered by the Directorate-General for International Trade and Investment of the Spanish Ministry of Industry, Trade and Tourism. OFDI data are taken for presentation in compliance with the Spanish legislation on foreign investments in accordance with international recommendations.[4] The participations are valued based on the book value of the equity of the direct investment enterprise.[5] The data are declared in the currency of denomination of the balance sheet of each foreign company. The conversion to euros is done by applying the exchange rate in force on 31st December of the corresponding year for each currency. In line with UNCTAD statistical procedures, all empty data is considered 0 values. FDI stocks may be negative if foreign affiliates are net lenders to the parent company in the source country, in these cases, we consider 0 values

[3] http://www.comercio.mityc.es/comercio/bienvenido/Inversiones+Exteriores/Estadisticas/DATAINVEX.htm

[4] The disclosure of information is regulated by the Resolution of 3 April 2008 and correction of errors in the Spanish B.O.E. of 26 May 2008, and the Resolution of 17 March 2009. The declaration forms were adapted to the new National Classification of Economic Activities (2009), the Resolution of 18 June 2009 extended the information to be provided, and successive modifications were made to the report forms (D-4 and D-8). The international recommendations governing the treatment of information are the Balance of Payments Manual, 5th Edition, International Monetary Fund; Benchmark Definition on Foreign Direct Investment, OECD.

[5] As noted in Baltagi et al (2007), the usage of FDI stocks have been criticized as they are measured at their book value and reflect prices of various years rather than constant or current values. However, the increasing international accounting harmonization, and especially the changes incorporated through Resolutions of 2008 and 2009, helped to expand and rationalise the information requested. With it, the data quality was reinforced to adapt it to the OECD and IMF recommendations on investment statistics. Dellis et al. (2017) using OECD database on FDI statistics (OECD BMD4), showed that their results were robust to the use of the FDI data set from UNCTAD. Therefore, we understand that the correlation of our data with other studies that have used other sources (UNCTAD), is suitable for providing adequate understanding on the long-run behaviour of Spanish OFDI. Nevertheless, due to the complexity of data processing results should be interpreted with caution.

following Donaubauer et al. (2019). As Kucera & Principi (2017) we excluded FDI in foreign securities holding entities.[6]

Spain's investment intensity abroad (in relative terms with respect to GDP) increased from 10% in 1998 to 45.5% in 2017. Its investment position represented 1.9% of the world FDI stock in 2017, higher than its production of 1.6% and similar to its share in world trade of 2% (UNCTAD).[7] From an aggregate point of view, the spatial distribution pattern of Spanish OFDI behaved differently from the norm for global transactions. During the period under study, 30% of Spain´s total OFDI stock position was in Latin American markets, with almost 30% in the EU, with a much lower presence in emerging economies of Asia. At the end of 2017, Spain was the fourteenth largest investor in the world and the third largest European economy in terms of outward investment intensity, only behind the United Kingdom and France, with a significant presence in Latin America, where it is the second largest foreign investor after the United States. When dividing the Spanish investment stock position by broad sectors throughout the study period, non-manufacturing activities presented a more stable trend, with no growth between 2010 and 2013. On the other hand, manufacturing activities presented a more irregular behavior, decreasing in several years, which may indicate certain disinvestments.

The Spanish stock position represented by the countries and sectors in our sample, was on average, 98% of the total OFDI during the study period.

The second dependent variable taken from DataInvex accounts for the annual data of Spanish OFDI gross flows at the NACE 2009 division level. Bilateral OFDI flows have been used in the literature to measure the FDI of source countries (Kucera & Principi, 2017; Sosa Andres et al., 2013). The data collected are those declared by investors in accordance with the provisions of the Spanish legislation on foreign investments.[8] The investment flows represent equity contributions and other forms of company participation in accordance with the guidelines and practices recommended at the international level by the 5th Balance of Payments

[6] This is in line with DataInvex technical specifications which literally state that: 'It is convenient to separate the ETVE type operations (Foreign Securities Holding Entities) because they can have a very high cash value and a very limited economic result. An operation of this nature can be valued at billions of euros and at the same time generate no investment in fixed assets or jobs in the country that appears as the recipient'.

[7] https://unctad.org/topic/investment/world-investment-report

[8] RD 664/1999, OM of 28 May 2001 and Ministerial Resolution of 21 February 2002.

Manual.[9] During the study period, the amount of Spanish OFDI flows slowed down from an annual average of 44 billion euros during the period 2004-2008 to an annual average below 10 billion euros in 2009-2015 (ESADE, 2017). In 2016 and 2017, investments in European markets revitalized, with the United Kingdom standing out. By broad sectors, manufacturing activities presented a significant growth since 2015, relatively late with respect to non-manufacturing activities, which started to have a less pronounced but continuous growth from 2012 to 2016. The Spanish gross foreign investment flows represented by the countries and sectors in our sample, were on average, 97% of the total OFDI flows during the study period.

-*Independent variables:*

**Destination countries financial development*

Our measure of financial development is the domestic credit allocated to the private sector by banks and other financial intermediaries, normalized by GDP. This measure reflects the use of bank financing in each destination country and has been extensively used in the literature (Beck et al., 2007; Bilir et al., 2019; Desbordes & Wei, 2017; Donaubauer et al. 2019, section 4.4). Data are taken from the World Bank Global Financial Development Database (WB-GFD). Our proxy for financial development is time-varying. It enters the model lagged by one year to reduce potential simultaneity bias and in logarithms to attenuate the influence of outlying values. The average for each country during the whole period can be seen in Table C in the Appendix. From a theoretical point of view, a higher level of DCFD, ceteris paribus, may have an ambiguous effect on OFDI due to competition effects (Bilir et al., 2019). However, as in previous studies, we expect higher DCFD levels to positively affect the financing of local affiliates and thus have a positive effect on Spanish OFDI.

**Measures of parent activities financial vulnerability in Spain*

As firms in a given sector face similar financial needs and constraints (Rajan & Zingales, 1998) we matched the Spanish OFDI split at the NACE 2009 division-level with our indicators of FV in Spain at the same level of disaggregation. Our measures of FV are time-varying due to the peculiarities of our study period and are obtained from the Bank of Spain´s Central Balance Sheet Data Office and SABI-Bureau van Dijk (BvD).[10] Our measures of FV used in the preliminary analysis are selected

[9] The data do not include intercompany financing, reinvested profits, (except when loans and/or profits are capitalized) and investment in real estate.

[10] Unlike Rajan & Zingales (1998), and other subsequent works that used the same approach, our measures of FV are time-varying due to the different

considering the literature and the time frame of the study. These measures are: debt-to-equity ratio ($Debt_{it}$),[11] which we use as our preferred measure, as it is especially useful in the event of a business downturn to evaluate how much leverage is utilized; solvency ratio ($Solv_{it}$) which we use to complement the information of the debt-to-equity ratio to eliminate ambiguity; interest coverage ratio ($IntCov_{it}$) to see how the day-to-day operations yield enough profit to meet interest payments; asset tangibility ratio ($Tang_{it}$) to assess the importance of the availability of tangible assets that can be pledged as collateral to raise finance. We also introduced an efficiency measure, the asset turnover ratio ($AsTur_{it}$) to see the influence of the efficiency in the use of assets generating revenues on borrowing requirements in the destination countries.

-*Control variables*

The gravitational and first set of control variables used are taken from Kucera & Principi (2017), with the simplification of the property rights protection using the rule of law indicator as a proxy. All these variables are commonly used in the literature and helped us to maximize the sample size. We used *GDP per capita* instead of GDP because its more independent variation to population, in addition that it provides a proxy for relative endowments of capital and labor related most to the vertical MNEs aspects of the knowledge-capital model. This variable is expressed in natural logarithms (*ln*). *Population, (ln)*, which is considered a proxy for market potential, and it is more linked to the horizontal perspective of the FDI model. *Distance*, (*ln*), which from a theoretical point of view presents an ambiguous net effect (Kleinert & Toubal, 2010). According to the proximity-concentration model, distance may raise the costs of exporting and importing inputs from the source market, but it may also positively influence the decision to establish affiliates in foreign countries. *Common language (Spanish)*, also considered as a proxy to cultural similarity. It applies mainly for Latin American and Caribbean countries. *Trade openness,* considered by most of the empirical literature to present positive effects on FDI. *Capital input*, using the gross fixed capital formation normalized by GDP to measure the level of infrastructure development in the destination countries. A country's endowment with infrastructure represents an important factor to sustain economic growth,

periods of financial stress in Spain. We also use different measures of financial vulnerability because we work with a larger number of activities, not only those corresponding to the manufacturing sector.

[11] We used the debt-to-equity ratio to eliminate the ambiguity between the terms debt and liabilities. As noted by Buch et al. (2014), the impact of the parent's debt ratio might be ambiguous a priori, depending on the time at which the external financing was obtained.

attract and increase the productivity of FDI and promote trade.[12] *Property rights protection*, using the rule of law indicator as a proxy, as poor enforcement of contracts in the destination country has a negative impact on FDI decisions when assets of subsidiaries can be used as collateral. The variable's description and their sources can be found in Table D of the Appendix.

3.2 Empirical strategy

We create a modified gravity model to estimate the effects of the DCFD on Spanish bilateral OFDI considering the FV at the parent activity level to reflect financial constraints of potential guarantors. The gravitational approach to analyzing FDI patterns has gained theoretical ground in recent years (e.g., Bergstrand & Egger, 2007; Head & Ries, 2008; Kleinert & Toubal, 2010). Kleinert & Toubal (2010) showed that the gravity FDI model can be derived by considering factor-proportion models in addition to the proximity-concentration theory, and combining both frameworks, the gravitational equation may be applied for both horizontal and vertical models. Other authors have also used it to estimate financial determinants related to OFDI (Donaubauer et al., 2019; Sosa et al., 2013). We specify our baseline model specification in a panel setting as follows:

$$FDI_{cit} = exp\big[\alpha + \beta_1(lnDCFD_{ct-1}) + \beta_j(FV_{it-1}) + \beta_h(lnDCFD_{ct-1} \times FV_{it-1}) + \beta_k(X_{ct-1}) + \beta_z(X_{c-1}) + \mu_t + \gamma_i\big] + \varepsilon_{cit}$$

where subscript *c* refers to an investment destination country, *i* is the economic activity and *t* is the time in years. We refer to an investment market as a country-activity pair *(c, i)*. Thus, FDI_{cit} refers to the Spanish OFDI stock position / gross flows in the investment market (*c*, *i*) at year *t*. $DCFD_{ct-1}$ is a time-varying measure of financial development in destination countries, FV_{it-1} is a time-varying measure of FV in each specific activity. X_{c-1} and X_{ct-1} are country level and time-varying country level variables, respectively. By combining country-activity, we have the possibility to account for a total set of specific effects to obtain estimated coefficients that consider the variation within investment markets over time. The terms μ_t and γ_i denote the set of time and activity fixed effects

[12] As a robustness test, we used another measure of capital input contemplating capital services (Inklaar et al., 2019), which considers the different investment patterns of countries in terms of nine different types of capital assets, since assuming that all capital input shares are identical is unlikely to hold. With this measure, the capital input of high-income countries increases relative to the capital input in low-income countries, and the capital input variable switches from having a negative to a positive sign (not reported), which is more realistic from a theoretical point of view. However, if we were to use this measure of capital input, the sample of countries would be considerably reduced.

(FE), which will help to reduce the risk of functional form misspecification, and ε_{cit} is the error term. Consequently, as for Kucera & Principi (2017), our panel's structure is based on a country-activity pair level, having country level data for the explanatory variables, and one dimension of time in years, and additionally a variable to consider the FV of the different activities at the parent level. Due to the time interval of the study, we assume that the effects are country specific. *ln* refers to natural logarithms. No structure is imposed to isolate one particular multilateral effect (i.e., horizontal, vertical, export-platform).

We used a Poisson pseudo-maximum likelihood (PPML) for our model with FE (Santos Silva & Tenreyro, 2006)[13] following Donaubauer et al. (2019), from which we also borrow the use of the bilateral FDI stock position at the end of the period and having all explanatory variables lagged one period to reduce possible endogeneity concerns. The PPML estimator has also been used in other studies (Desbordes & Wei, 2017; Head & Ries, 2008; Kleinert & Toubal, 2010; Ly et al., 2018; Sosa Andres et al., 2013) as it provides a natural way to deal with zero values in the dependent variable and a correct treatment of the error factors in the empirical analysis. The estimator is robust to different patterns of heteroscedasticity and to distributional misspecification, which makes it consistent as long as the conditional mean function is correctly specified.[14] We estimated the model in levels and used the iterated re-weighted least squares (IRLS) optimization algorithm to deal with the possibility of having regressors with high collinearity, obtaining a robust estimator for different data configurations (Santos Silva & Tenreyro, 2011). Finally, following Santos Silva & Tenreyro (2006), to account for the correct specification of the conditional mean, we performed a heteroskedasticity-robust RESET test (Ramsey, 1969) to the initial regressions to obtain a first validation of the usage of the Poisson estimator.

When it comes to introducing the FV at the parent activity level, we considered Donaubauer et al. (2019) who evaluated the existence of significant effects between SCFD and DCFD by obtaining average marginal

[13] For panel data, Wooldridge (1999, p. 94) also defended the virtues of the PPML estimator with FE for being 'fully robust in the sense that only the structural conditional mean assumption is needed for consistency and asymptotic normality, and the robust variance matrix estimate is easy to obtain, and specification testing is fairly straightforward'.

[14] As stated by Santos Silva & Tenreyro (2006), in order to obtain a consistent estimator what is needed is to have a correct specification of the conditional mean, and for obtaining a more efficient estimator, the relation between the conditional mean and the conditional variance must be analysed. Although we did not perform any specific test, we checked different relationships between the conditional mean and the conditional variance using a Poisson, a Gamma, and a Negative Binomial PML estimator. As expected, the Poisson was our preferred estimator.

effects using observed values for the variables that were not otherwise fixed, showing how changes in the financial development in the host countries impact the effects of the financial development in the source countries over its range.

However, by showing the marginal effects in the tables with a single estimate, it could be a priori difficult to infer as the value of the interaction term cannot change independently of the values of the component terms, being not possible to estimate a separate effect for the interaction (Williams, 2012).[15] In our study, we began by estimating the specification of our baseline model in which we first reported derivatives of the response with respect to DCFD, and then we introduced the interaction terms for each measure of FV at the parent activity level assessing how the effects of DCFD vary with different values of each measure of FV. For it, we calculated the average marginal effects at representative values (MERs) adjusting the predictions by changing over the range of meaningful values established by the 25th, 50th, 75th, and 95th percentiles (i.e., we estimated the interaction terms to infer how the effect of DCFD on the dependent variable depends on the magnitude of each measure of FV at the parent activity level). When introducing the sectoral, regional, and period binary variables in different sections, we created a model factorial specification with a multiple interaction term. As working with a PPML specification we report the derivatives as elasticities.

4. EMPIRICAL RESULTS AND DISCUSSION

Before starting the econometric analysis to test our hypotheses we performed two tasks. First, we verified that the model using the Poisson estimator provided no evidence of misspecification of the functional form when either of the dependent variables is used (coefficients not reported).[16] Second, we created different binary variables in the dataset to perform the sectoral and regional analyses. In subsection 4.2, we introduced a binary variable that assigned a value of 1 if it

[15] It is important to notice that the marginal effect of a single variable in a nonlinear model is conditional on the rest of the independent variables, as well as an interaction effect is conditional on the covariates in the model. Therefore, based on Ai & Norton (2003) we made Spanish OFDI depend on our independent variables $DCFD_{ct}$ and FV_{it}, their interaction term, a vector of additional control variables X, and a constant term independent of $DCFD_{ct}$ and FV_{it}. In our work, we report marginal effects for interaction terms exploring the nature of the response surface of the measures of FV_{it}.

[16] To reach this conclusion, we carried out different heteroskedasticity-robust RESET tests using our baseline model incorporating only the direct effects (i.e., without the interaction terms) and one FV measure at a time.

corresponded to a manufacturing activity and 0 otherwise, whereas in subsection 4.3 we introduced a binary variable that assigned a value of 1 if the country belonged to a specific region and 0 otherwise. The selected regions were based on the spatial distribution of Spanish OFDI: a) countries in Latin America and the Caribbean (hereinafter, Latamca); b) countries Participants to the OECD Arrangement (hereinafter, OECD-A).[17] In addition, in each subsection we created a binary variable to differentiate the periods of financial stress in Spain by assigning a value of 1 to the period with higher stress.

4.1. Baseline Equation. Effects of DCFD on Spanish OFDI by representative values of FV at the parent activity level

The control variables used in the model are taken from Kucera & Principi (2017) with the simplification of rights protection using the rule of law indicator as a proxy. The effects of each control variable on Spanish OFDI in the initial regressions using the baseline model showed the expected signs, GDPpc (+), population (+), distance (-), common language (+), trade openness (+), capital input (-),[18] property rights protection (+), all of them being statistically significant. The initial direct effects of our main independent variable, DCFD, are presented in Table 1 considering the whole sample and study period.

The average marginal effects of DCFD are positive and statistically significant at 5% level in all regressions whatever the measure of FV and dependent variable is considered, stock position in columns (1-5) and gross investment flows in columns (6-10). These results are in line with previous studies (Bilir et al., 2019; Desbordes & Wei, 2017) and leads us to support Hypothesis 1, concluding that the financial development in destination countries had significant effects on Spanish OFDI during our study period. This would indicate that foreign affiliates of Spanish MNEs tend to be located in countries with better bank credit allocation. Therefore, they could have borrowed from local banks by providing their own collateral or might benefit from guarantees provided by their parents, which would be scrutinized by the local financiers especially if they do not have pre-existing business relationships.

[17] This region includes not only EU countries but also a number of OECD countries. As of January 2021, the Participants to the Arrangement were: Australia, Canada, the European Union, Japan, Korea, New Zealand, Norway, Switzerland, Turkey, and the United States.

[18] When capital services is used as measure of capital input, the sign turns out to be positive.

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Table 1: **Baseline Equation. Effects of DCFD on Spanish OFDI by representative values of FV at the parent activity level**

	Dependent Variable K $OFDI$ stock position					*Dependent Variable K $OFDI$ gross flows*				
	ln(DCFD) × Debt	ln(DCFD) × Solv	ln(DCFD) × IntCov	ln(DCFD) × Tang	ln(DCFD) × AsTur	ln(DCFD) × Debt	ln(DCFD) × Solv	ln(DCFD) × IntCov	ln(DCFD) × Tang	ln(DCFD) × AsTur
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
ln(DCFD)	0.434**	0.433**	0.444**	0.431**	0.409**	0.393**	0.392**	0.391**	0.391**	0.372**
	(0.202)	(0.204)	(0.206)	(0.195)	(0.203)	(0.182)	(0.183)	(0.187)	(0.188)	(0.179)
Percentile FV_i										
p25	1.07	1.55	1.11	0.16	0.82	1.07	1.55	1.11	0.16	0.82
p50	1.46	1.74	1.51	0.25	1.36	1.46	1.74	1.51	0.25	1.36
p75	1.99	1.96	2.20	0.36	1.70	1.99	1.96	2.20	0.36	1.70
p95	3.43	2.28	4.32	0.54	2.35	3.43	2.28	4.32	0.54	2.35
DCFD x Perce. FV_i										
p25	0.457**	0.389**	0.400**	0.427**	0.517**	0.489**	0.292	0.337*	0.440**	0.479**
	(0.205)	(0.198)	(0.202)	(0.187)	(0.212)	(0.212)	(0.191)	(0.194)	(0.218)	(0.206)
p50	0.443**	0.427**	0.426**	0.430**	0.400**	0.430**	0.377**	0.369**	0.399**	0.362**
	(0.203)	(0.202)	(0.203)	(0.192)	(0.203)	(0.190)	(0.181)	(0.188)	(0.191)	(0.178)
p75	0.423**	0.471**	0.472**	0.435*	0.327	0.351*	0.477**	0.425**	0.347*	0.289*
	(0.204)	(0.216)	(0.213)	(0.224)	(0.215)	(0.180)	(0.217)	(0.188)	(0.185)	(0.175)
p95	0.370	0.535**	0.613**	0.443	0.187	0.135	0.621*	0.597**	0.263	0.148
	(0.232)	(0.247)	(0.292)	(0.311)	(0.267)	(0.264)	(0.321)	(0.261)	(0.242)	(0.202)
Control variables	GDPpc, population, distance, common language, trade openness, capital input, property rights protection.									
Observations	85,125	85,125	85,125	85,125	85,125	85,125	85,125	85,125	85,125	85,125
Invest. Markets	9,525	9,525	9,525	9,525	9,525	9,525	9,525	9,525	9,525	9,525

Notes: (i) *p<0.1, **p<0.05, ***p<0.01. (ii) Constant term, time and activity fixed effects included in all regressions. (iii) Standard errors using the delta method in parentheses. (iv) All right-hand variables lagged one period. (v) IRLS optimization algorithm used in all regressions. (vi) Investment market is a country-activity pair (c, i). (vii) DCFD. Time-varying measure of destination countries financial development. (viii) Time-varying measures of parent activities financial vulnerability: a) Debt. debt-to-equity ratio; b) Solv. solvency ratio; c) IntCov. interest coverage ratio; d) Tang. asset tangibility ratio; e) AsTur. asset turnover ratio. (ix) The measure of financial vulnerability in each regression is shown in the top row.

To obtain the necessary financing, or better borrowing conditions, parent companies may try to benefit from existing banking relationships in the home country (Boot, 2000), which could be extended to local banks that were part of the international network of Spanish financial institutions. These potential benefits would also involve closer scrutiny and monitoring of the parent activities. Therefore, we re-evaluate the effects of DCFD on Spanish OFDI by examining the coefficients of the interaction terms when fixing the parent activity measures of FV at the 25th, 50th, 75th and 95th percentile levels.

We start with our preferred measure, the debt-to-equity ratio, showing how as the level of indebtedness increases the coefficients of the effects of DCFD on Spanish investments decrease progressively, losing their statistical significance at the 95th percentile, especially when analyzing investment flows, columns (1) and (6). In line with Buch et al. (2014), this could be explained by the fact that a higher leverage,ceteris paribus, would leave fewer assets available to serve as collateral for new loans, rather than considering that the increased borrowing occurs to make new investments.

This reasoning would be corroborated by the results of the measures used to reduce the possible ambiguity of the debt-to-equity ratio, solvency and interest coverage, as higher ratios of both increase the effect of DCFD, columns (2) and (7), (3) and (8), respectively. This would allow us to support Hypothesis 2, since higher financial constraints at the parent level led to lower financing effects in the destination countries on Spanish OFDI.

The relatively high level of indebtedness during the period also affects the interpretation of the asset tangibility measure. Although the activities with a higher ratio might pledge more collateral to raise external financing, we may see that as the ratio increases the predicted mean effect of DCFD on Spanish investments decreases, especially when analyzing investment flows, columns (4) and (9). [19] As in Buch et al. (2014) and Desbordes & Wei (2017), our results suggest that we should interpret the measure in terms of higher fixed costs of entry into new markets since foreign affiliates would also have a high proportion of property, plant and equipment, meaning they would have to make higher investments. Finally, from an operational point of view, having a greater operating efficiency decreases the effect of DCFD on Spanish OFDI, columns (5) and (10), as it reduces the need for external financing. This would be in line with Sasidharan & Padmaja (2018) who state that highly productive firms

[19] It is interesting to note that non-manufacturing activities presented a higher value of $Tang_{it}$ at 50th, 75th and 95th percentiles (coefficients not reported), which helps to explain their higher debt ratio (see Table 2). To identify the origin, we calculated the ratio at division level identifying that it comes mainly from transport and storage activities, accommodation and residential services, telecommunications, and rental activities, among others.

are likely to have more foreign affiliates since they may partly cover the upfront fixed costs of FDI through internal financing.

4.2 Effects of DCFD on Spanish OFDI between manufacturing and non-manufacturing activities and considering different periods of financial stress in Spain

In this subsection instead of obtaining the marginal effect of the difference in the adjusted predictions for the two groups, we present the results separately to compare them with the direct average marginal effect of DCFD. Due to the proliferation of results that would involve performing the analysis with all FV measures, we performed these exercises using our preferred measure, the debt-to-equity ratio, considering both the investment stock position and gross flows as dependent variables.[20]

In Table 2, the first thing to note is the difference in the effects of DCFD relative to the pooled data in Table 1, both at the sectoral level and when considering the different investment variables analyzed. When using the stock position, the predicted mean of DCFD is statistically significant only in non-manufacturing activities (0.564, $p < .05$), column (1), being statistically non-significant for the manufacturing activities regardless the level of $Debt_{it}$ considered, column (2). When analyzing the interactions of DCFD with the levels of $Debt_{it}$ at the parent activity level, we may see that the trends are similar to those in Table 1, (i.e., they decrease as the level of indebtedness increases) except for manufacturing activities.

For further analysis of these results, we introduced the binary variable that reflects the different periods of financial stress in Spain. The first (and important) thing to note is that the measure of $Debt_{it}$ at the parent level presents higher coefficients at all representative values during the period of higher financial stress, columns (6), (8), (10) and (12). Our results indicate that this higher indebtedness have negatively affected the effects of the DCFD on Spanish OFDI in both groups of activities, which would be associated with a lower capacity of the parent companies to provide guarantees.

[20] Additional results can be provided upon request.

Table 2: **Differences in the effects of DCFD on Spanish OFDI stock position and gross flows between sectors and considering different periods of financial stress in Spain**

Dep. Var. K OFDI	Stock position		Gross flows		Stock position				Gross flows			
	Manufacture		Manufacture		Manufacture – Financial stress				Manufacture – Financial stress			
	0	1	0	1	00	01	10	11	00	01	10	11
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
ln(DCFD)	0.564**	0.193	0.357*	0.476*	0.724***	0.456**	0.252	0.188	0.550**	0.256	1.166***	-0.102
	(0.242)	(0.178)	(0.194)	(0.279)	(0.258)	(0.227)	(0.194)	(0.192)	(0.248)	(0.248)	(0.248)	(0.248)
Percentile Debt												
p25	1.08	1.05	1.08	1.05	1.02	1.18	0.99	1.19	1.02	1.18	0.99	1.19
p50	1.53	1.33	1.53	1.33	1.45	1.66	1.21	1.43	1.45	1.66	1.21	1.43
p75	2.20	1.71	2.20	1.71	1.91	2.51	1.55	1.73	1.91	2.51	1.55	1.73
p95	3.42	4.08	3.42	4.08	2.88	3.59	2.28	4.08	2.88	3.59	2.28	4.08
DCFD x Perc. Debt												
p25	0.654**	0.180	0.441*	0.570*	0.765**	0.517**	0.309	0.114	0.528*	0.344	1.286**	-0.09
	(0.259)	(0.181)	(0.232)	(0.315)	(0.312)	(0.237)	(0.215)	(0.170)	(0.270)	(0.321)	(0.515)	(0.234)
p50	0.593**	0.186	0.384*	0.523*	0.732***	0.476**	0.282	0.147	0.545**	0.285	1.231***	-0.10
	(0.246)	(0.178)	(0.201)	(0.295)	(0.267)	(0.228)	(0.204)	(0.174)	(0.248)	(0.257)	(0.453)	(0.228)
p75	0.502**	0.196	0.300	0.458*	0.697***	0.402*	0.241	0.188	0.564**	0.178	1.144***	-0.10
	(0.237)	(0.180)	(0.195)	(0.274)	(0.236)	(0.236)	(0.191)	(0.192)	(0.260)	(0.227)	(0.424)	(0.223)
p95	0.338	0.254	0.146	0.059	0.621**	0.309	0.153	0.514	0.604	0.044	0.958	-0.12
	(0.251)	(0.331)	(0.293)	(0.376)	(0.259)	(0.282)	(0.182)	(0.515)	(0.376)	(0.359)	(0.644)	(0.241)
Control variables	GDPpc, population, distance, common language, trade openness, capital input, property rights protection.											
Observations	85,125		85,125		85,125				85,125			
Invest. Markets	9,525		9,525		9,525				9,525			

Notes: (i) *p<0.1, **p<0.05, ***p<0.01. (ii) Constant term, time and activity fixed effects included in all regressions. (iii) Standard errors using the delta method in parentheses. (iv) All right-hand variables lagged one period, except for sector and financial stress variables. (v) IRLS optimization algorithm used in all regressions. (vi) Investment market is a country-activity pair (c, i). (vii) DCFD. Time-varying measure of destination countries financial development. (viii) Debt. Time-varying measure of financial vulnerability defined as the debt-to-equity ratio of parent activities (ix) Financial stress encompasses the period (2008-2013).

At first glance, this lower capacity might help to explain why manufacturing activities present a reversal in the DCFD trend (i.e., higher effects of DCFD as the level of indebtedness increases) especially in column (8), when considering the period of higher leverage and financial stress in Spain. This higher indebtedness, and the lower availability of credit in the Spanish financial market, would have made it necessary to seek financing it in the destination countries where Spanish MNEs already had affiliates with capacity to borrow providing collateral. This reasoning would be in line with Desbordes & Wei (2017) who found DCFD to have a direct positive effect on the intensive margin of expansion FDI, and could have led us to reject hypothesis 2 in this particular situation. However, in our case the fact that the estimated coefficients are statistically non-significant could show a lower positive effect due to the high corporate and country risk of Spain, making foreign affiliates far from being considered safe borrowers that can benefit from the guarantees provided by their parent companies. However, this reasoning although plausible, should be treated with caution as it could be conditioned by changes in the stock position due to certain divestments. Therefore, it is of interest to analyze the gross investment flows and compare the results obtained in order to clarify possible ambiguities about the effects of DCFD.

When considering the gross investment flows as the dependent variable, columns (3) and (4), results vary significantly. The predicted mean of DCFD is statistically significant at the 10% level in both groups, with manufacturing activities having a higher estimated coefficient (0.476, $p < .1$), which after a detailed analysis of the original data, we identify it as coming mainly from a significant growth since 2015.

This expansion seems to be a consequence of the deleveraging process that took place during the period of economic recession and higher financial stress in Spain,[21] which is represented by the lower values of $Debt_{it}$ in columns (5), (7), (9) and (11). Once the parent companies improved their financial capacity and risk profiles, it seems that their foreign affiliates could have made the investments at the end of the study period by obtaining bank financing in the destination countries using the parent company as guarantor.

This reasoning would explain the evolution of the coefficients of DCFD in both groups of activities up to the 95th percentile level of indebtedness during the period with lower leverage and financial stress, columns (9) and (11). If we consider that the more irregular behavior in the manufacturing activities stock position comes from divestments made in certain years, their higher increase in investment flows during the second

[21] Between 2004 and 2008, the Spanish non-financial corporate sector significantly increased its debt-to-GDP ratio, which remained relatively stable until 2011, when it reached its peak. Since then, the ratio decreased continuously until 2015 (Eurostat). In addition, Spanish companies benefited from a large decline in debt servicing costs, which brought the debt burden in 2016 to levels similar to those of 1999 (BIS).

period would show a reinvestment process that would lead us to support Hypothesis 3 due to a different behavior at the activity level.

4.3 Effects of DCFD on Spanish OFDI by destination region and considering different periods of financial stress in Spain

In this subsection, as in 4.2., we create a model factorial specification with multiple interaction terms presenting the results separately to compare them with the direct average marginal effects of DCFD.

In Table 3, the stock position exhibits positive and statistically significant average marginal effects of DCFD when considering the non-Latamca region (1.180, $p < .01$), column (1), and the OECD-A group of countries (0.887, $p < .05$), column (4), decreasing the effects as the value of $Debt_{it}$ at the parent level increases. Based on these initial results we might state that the local financing was an important lever for Spanish OFDI to these regions.

However, when entering our time variable, we may see that during the period with higher leverage at the parent level, columns (6), (8), (10) and (12), these positive effects diminished significantly in all groups of countries, being statistically significant only in the non-Latamca region. As in subsection 4.2, it seems that it might be a causal effect between the higher leverage at the parent level and the lower effects of DCFD. To reinforce this thought, we also analyzed the gross investment flows in order to compare the results between both investment variables and their evolution during both periods.

This exercise is performed in Table 4. As in Table 3, the direct average marginal effects of the DCFD are positive and statistically significant in the non-Latamca region (0.821, $p < .01$), column (1), and in the OECD-A group of countries (0.607, $p < .1$), column (4), being now also significant in the non-OECD-A group of countries (0.383, $p < .05$), column (3), decreasing the effects at higher levels of indebtedness in all of them. These results considering the whole period would a priori reinforce the idea that financing in destination countries was an important lever for Spanish OFDI, except for the Latamca region, column (2).

This result is consistent with the importance of the lending channel in the sense of Raff et al. (2018), which implies that FDI depends on the ability and terms under which banks lend, and would be in line with Calice & Zhou (2018) who state that the Latamca region has a specific idiosyncrasy regarding costs since financial intermediation expenses are particularly high.[22]

[22] Cea et al. (2021) obtained similar inferences using measures of financial efficiency such as the bank net interest margin, and the bank overhead costs as a percentage of total assets, which presented negative effects on Spanish exports to this region.

Table 3: **Differences in the effects of DCFD on Spanish OFDI stock position by regions and considering different periods of financial stress in Spain**

	Latamca		OECD-A		Latamca - Financial stress				OECD-A - Financial stress			
	0	1	0	1	00	01	10	11	00	01	10	11
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
ln(DCFD)	1.180***	0.029	0.196	0.887**	1.386***	0.989***	0.186	-0.027	0.300	0.163	1.225***	0.600
	(0.282)	(0.313)	(0.171)	(0.415)	(0.306)	(0.275)	(0.361)	(0.300)	(0.203)	(0.161)	(0.422)	(0.416)
Percentile Debt												
p25	1.06	1.06	1.06	1.06	1.01	1.19	1.01	1.19	1.01	1.19	1.01	1.19
p50	1.45	1.45	1.45	1.45	1.31	1.53	1.31	1.53	1.31	1.53	1.31	1.53
p75	1.98	1.98	1.98	1.98	1.80	2.20	1.80	2.20	1.80	2.20	1.80	2.20
p95	3.42	3.42	3.42	3.42	2.87	3.60	2.87	3.60	2.87	3.60	2.87	3.60
DCFD x Perc. Debt												
p25	1.303***	0.032	0.197	1.115**	1.644***	0.977***	0.211	-0.069	0.298	0.142	1.597***	0.667
	(0.329)	(0.336)	(0.185)	(0.442)	(0.365)	(0.321)	(0.376)	(0.324)	(0.210)	(0.170)	(0.470)	(0.449)
p50	1.228***	0.030	0.197	0.975**	1.493***	0.984***	0.196	-0.047	0.299	0.153	1.380***	0.632
	(0.297)	(0.320)	(0.176)	(0.421)	(0.329)	(0.288)	(0.364)	(0.310)	(0.204	(0.164)	(0.439)	(0.423)
p75	1.126***	0.028	0.196	0.785*	1.249***	0.996***	0.172	-0.003	0.301)	0.175	1.028**	0.562
	(0.273)	(0.307)	(0.169)	(0.417)	(0.282)	(0.281)	(0.365)	(0.295)	(0.205	(0.162)	(0.406)	(0.429)
p95	0.847**	0.021	0.195	0.268	0.715***	1.021**	0.121	0.087	0.305	0.221	0.256	0.419
	(0.347)	(0.320)	(0.187)	(0.539)	(0.258)	(0.467)	(0.451)	(0.325)	(0.252)	(0.197)	(0.427)	(0.636)
Control variables	GDPpc, population, distance, common language, trade openness, capital input, property rights protection.											
Observations	85,125		85,125		85,125				85,125			
Invest. Markets	9,525		9,525		9,525				9,525			

Notes: (i) *p<0.1, **p<0.05, ***p<0.01. (ii) Constant term, time and activity fixed effects included in all regressions. (iii) Standard errors using the delta method in parentheses. (iv) All right-hand variables lagged one period, except for sector and financial stress variables. (v) IRLS optimization algorithm used in all regressions. (vi) Investment market is a country-activity pair (c, i). (vii) DCFD. Time-varying measure of destination countries financial development. (viii) Debt. Time-varying measure of financial vulnerability defined as the debt-to-equity ratio of parent activities (ix) Financial stress encompasses the period (2008-2013).

As for the investment stock position, when introducing the time variable into the analysis, the predicted means of DCFD are lower in all groups of countries during the period with higher leverage at the parent level, being statistically non-significant at all representative values of $Debt_{it}$. These results would help to consider the possible causal relationship between the higher leverage at the parent level and the lower effects of DCFD.

This financial situation at the parent level could have affected both the extensive and intensive margins. In addition, it could indirectly indicate that the presence of local branches and subsidiaries of Spanish multinational banks in the main destinations of Spanish investments[23] did not significantly support Spanish investments during this period. The fact that international Spanish banks might have been able to collect better information of their Spanish MNEs clients to monitor the leverage and the availability of collateral and share it with their foreign branches in order to reduce risks, could have been detrimental to the foreign affiliates in regard to receiving financing in the destination countries. Besides, this situation could have also affected other local banks unwilling to lend if Spanish financial institutions did not participate in the financing.

This reasoning would be in line with the argument that the multinational banking model could lead to a greater risk-taking if information asymmetry effects predominate (Argimón, 2019). As the quality of the portfolio is determined by the level of monitoring (Acharya et al., 2006), in order to protect it, we understand that during the period of higher leverage and worse credit rating at the parent level the flow of information might have increased.

As in Table 3, lower levels of parent leverage during the period of lower financial stress in Spain, columns (5), (7), (9) and (11), appear to have led to a reversal of the DCFD trend in all regions since 2014. This turnaround shows that financing in destination countries was an important lever for Spanish investment flows once the parent companies had room to provide more collateral. This reasoning is consistent with the importance of the collateral channel (Raff et al., 2018).

These results would eliminate the possible ambiguity when considering the stock position and show how different leverage ratios at the parent level impacted the effects of the DCFD on Spanish OFDI differently, which also leads us to support Hypothesis 4 due to the different behavior by region.

[23] The presence of Spanish banks abroad is mainly concentrated in Europe, notably in the United Kingdom, Latin America, and the United States (Argimón, 2019). Spanish banks also had presence in other significant markets where Spanish MNEs invest such as China, India, Morocco, among others.

Table 4: **Differences in the effects of DCFD on Spanish OFDI gross flows by regions and considering different periods of financial stress in Spain**

	Latamca		OECD-A		Latamca - Financial stress				OECD-A - Financial stress			
	0	1	0	1	00	01	10	11	00	01	10	11
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*	*(12)*
ln(DCFD)	0.821***	0.455	0.383**	0.607*	1.390***	0.382	1.084**	0.052	0.749***	0.161	1.158**	0.314
	(0.281)	(0.324)	(0.171)	(0.415)	(0.412)	(0.402)	(0.470)	(0.341)	(0.283)	(0.212)	(0.501)	(0.522)
Percentile Debt												
p25	1.06	1.06	1.06	1.06	1.01	1.19	1.01	1.19	1.01	1.19	1.01	1.19
p50	1.45	1.45	1.45	1.45	1.31	1.53	1.31	1.53	1.31	1.53	1.31	1.53
p75	1.98	1.98	1.98	1.98	1.80	2.20	1.80	2.20	1.80	2.20	1.80	2.20
p95	3.42	3.42	3.42	3.42	2.87	3.60	2.87	3.60	2.87	3.60	2.87	3.60
DCFD x Perc. Debt												
p25	0.955***	0.606	0.479**	0.783**	1.270***	0.469	1.118*	0.183	0.753**	0.290	0.837	0.614
	(0.313)	(0.407)	(0.236)	(0.389)	(0.484)	(0.456)	(0.587)	(0.338)	(0.336)	(0.223)	(0.563)	(0.577)
p50	0.873***	0.514	0.421**	0.676*	1.340***	0.423	1.098**	0.115	0.750**	0.223	1.024**	0.457
	(0.288)	(0.351)	(0.205)	(0.368)	80.422)	(0.425)	(0.513)	(0.331)	(0.302)	(0.210)	(0.509)	(0.543)
p75	0.762***	0.387	0.341*	0.528	1.454***	0.334	1.066**	-0.019	0.747***	0.090	1.328**	0.148
	(0.283)	(0.304)	(0.188)	(0.384)	80.443)	(0.382)	(0.429)	(0.371)	(0.265)	(0.231)	(0.530)	(0.510)
p95	0.459	0.044	0.125	0.129	1.704**	0.148	0.994**	-0.300	0.738**	-0.183	1.994**	-0.493
	(0.420)	(0.409)	(0.293)	(0.613)	(0.837)	(0.397)	(0.480)	(0.595)	(0.293)	(0.402)	(0.912)	(0.602)
Control variables	GDPpc, population, distance, common language, trade openness, capital input, property rights protection.											
Observations	85,125		85,125		85,125				85,125			
Invest. Markets	9,525		9,525		9,525				9,525			

Notes: (i) *p<0.1, **p<0.05, ***p<0.01. (ii) Constant term, time and activity fixed effects included in all regressions. (iii) Standard errors using the delta method in parentheses. (iv) All right-hand variables lagged one period, except for sector and financial stress variables. (v) IRLS optimization algorithm used in all regressions. (vi) Investment market is a country-activity pair (c, i). (vii) DCFD. Time-varying measure of destination countries financial development. (viii) Debt. Time-varying measure of financial vulnerability defined as the debt-to-equity ratio of parent activities (ix) Financial stress encompasses the period (2008-2013).

Finally, after analyzing the different results of the investment variables at both the economic activities and regional level, we may conclude that financing in the destination countries did not seem to offset the negative effect of the financial restrictions existing in Spain during the period of higher financial stress, which would lead us to reject hypothesis 5. Possibly, the size of the foreign affiliates of Spanish MNEs in the different activities analyzed could have been a handicap when it came to obtaining financing, to which it may be added that the parent companies could not help by providing guarantees to make them grow.

4.4 Robustness checks

These results and the fit of the models are robust to several tests. First, to the introduction of additional control variables, which we took from Donaubauer et al. (2019), section 4.3 (i.e., regional trade agreements, bilateral investment treaties, double taxation treaties, all of them between Spain and each of the destination countries, and natural resources rents normalized by GDP). Second, all time-variant data were also constructed as two-year averages to smooth out cyclical fluctuations of the dependent variables. Third, dropping those years in which the amount of the OFDI stock position had negative values in the original data. Lastly, we tested the impact of outliers in our model in several ways (i.e., by replacing them with missing values, or calculating mean values between adjacent data) obtaining similar results.

5. Conclusion

The sensitivity of OFDI to the availability of external financing is receiving increasing attention in the literature, to which we make two contributions. First, contrary to what the literature has traditionally done, we explored the importance of variations in country-specific financial development at representative values of financial vulnerability at the parent level, showing how the effects on OFDI vary. Second, we focus our work from the individual perspective of a country with two different periods, one of them with high financial stress and credit restrictions in its local financial market.

To perform our analysis, we used Spanish OFDI stock positions and gross flows to 127 destination countries considering 75 different activities over the period 2008-2017. Throughout the period, the different economic and financial phases led to changes in the dynamics of Spanish OFDI and to the possibilities of financing investment projects in the destination countries. By using time-varying measures of financial vulnerability, and not providing a single value to reflect the average marginal effects of the interaction terms, we were able to analyze the evolution of the leverage ratios and how they might have led to different responses.

During the period of higher financial stress in Spain, it seems that the higher leverage and lower financial capacity at the parent level (together with a higher country risk profile) negatively affected the effects of DCFD on Spanish OFDI, which could have impacted on both the extensive and intensive margins. These results are relevant as

they show that, in addition to the existing credit restrictions in Spain, financing in the destination countries did not contribute significantly to Spanish OFDI during this period. In this scenario, the possible flow of information between the parent companies and their relationship creditors in Spain, including their international branches, could have been detrimental by disrupting access to financing, which could have also affected other local banks by making them unwilling to lend. In addition, it could be argued that Spanish foreign affiliates might have experienced a hold-up problem, which would be important for companies highly dependent on bank credit such as the Spanish ones.

Once the deleveraging process was carried out and the financial capacity at the parent level improved, it seems that Spanish affiliates were able to provide more collateral using the parent as a guarantor to undertake investments by obtaining bank financing in the destination countries.

This reasoning could lead us to understand the change in the performance of investments gross flows at the end of the study period compared to the period of higher leverage, and the significant differences between activities and destination regions.

Our results open several paths for future research. One possible avenue could be to analyze how public instruments of official support may help Spanish companies in carrying out their foreign investment projects during periods of financial vulnerability, especially to the Latamca region. Due to the economic recession caused by the Covid-19 pandemic, which had a significant impact on the companies' equity position, it would be interesting to analyze several instruments, and the possibility of creating a guarantee fund to support the investments of Spanish companies. Another possible line of work could be to analyze the performance of Spanish multinational banks credits to Spanish foreign affiliates by size and equity situation of the parent companies.

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APPENDIX

Table A: List of Destination Countries

East Asia and Pacific	Australia, Brunei Darussalam, China, Hong Kong SAR, China, Indonesia, Japan, Korea, Rep., Macao SAR, China, Malaysia, Mongolia, Myanmar, New Zealand, Philippines, Singapore, Thailand, Vietnam
Europe and North America	Albania, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Moldova, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, United States
Latin America and the Caribbean	Argentina, Bahamas, The, Barbados, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panamá, Paraguay, Peru, Trinidad and Tobago, Uruguay
Middle East and North Africa	Algeria, Egypt, Iran, Islamic Rep., Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, United Arab Emirates
Central and South Asia	Bangladesh, India, Kazakhstan, Kyrgyz Republic, Pakistan, Sri Lanka, Tajikistan
Sub-Saharan Africa	Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Gabon, Kenya, Lesotho, Madagascar, Malawi, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Togo, Uganda, Zambia, Zimbabwe

Note: Split by regions for a better identification.

Table B: List of Activities. Division level NACE 2009

Division	Title	Division	Title
A - AGRICULTURE, FORESTRY AND FISHING		50	Water transport
01	Crop and animal production, hunting &	51	Air transport
02	Forestry and logging	52	Warehousing and support activities for
03	Fishing and aquaculture	53	Postal and courier activities
C – MANUFACTURING		I - ACCOMMODATION AND FOOD SERVICE ACTIVITIES	
10	Manufacture of food products	55	Accommodation services
11	Manufacture of beverages	56	Food and beverage service activities
12	Manufacture of tobacco products	J - INFORMATION AND COMMUNICATION	
13	Manufacture of textiles	58	Publishing activities
14	Manufacture of wearing apparel	59	Motion picture, video and television
15	Manufacture of leather and related	60	Programming and broadcasting activities
16	Manufacture of wood and of products of	61	Telecommunications
17	Manufacture of paper and paper products	62	Computer programming, consultancy and
18	Printing and reproduction of recorded	63	Information service activities
19	Manufacture of coke & refined petroleum	L - REAL ESTATE ACTIVITIES	
20	Manufacture of chemicals and chemical	68	Real estate activities
21	Manufacture of basic pharmaceutical	M - PROFESSIONAL, SCIENTIFIC AND TECHNICAL	
22	Manufacture of rubber and plastic products	69	Legal and accounting activities
23	Manufacture of other non-metallic mineral	70	Activities of head offices; management
24	Manufacture of basic metals	71	Architectural and engineering activities;
25	Manufacture of fabricated metal products,	72	Scientific research and development
26	Manufacture of computer, electronic and	73	Advertising and market research
27	Manufacture of electrical equipment	74	Other professional, scientific and technical
28	Manufacture of machinery & equip. n.e.c.	75	Veterinary activities
29	Manufacture of motor vehicles, trailers &	N - ADMINISTRATIVE AND SUPPORT SERVICE	
30	Manufacture of other transport equipment	77	Rental and leasing activities
31	Manufacture of furniture	78	Employment activities
32	Other manufacturing	79	Travel agency, tour operator reservation
33	Repair & installation of machinery & equip.	80	Security and investigation activities
D - ELECTRICITY, GAS, STEAM AND AIR		81	Services to buildings and landscape
35	Electricity, gas, steam and air conditioning	82	Office administrative, office support and
E - WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES		P – EDUCATION	
		85	Education
36	Water collection, treatment and supply	Q - HUMAN HEALTH AND SOCIAL WORK ACTIVITIES	
37	Sewerage	86	Human health activities
38	Waste collection, treatment and disposal	87	Residential care activities
39	Remediation activities and other waste	88	Social work activities without
F – CONSTRUCTION		R - ARTS, ENTERTAINMENT AND RECREATION	
41	Construction of buildings	90	Creative, arts and entertainment activities
42	Civil engineering	91	Libraries, archives, museums and other
43	Specialized construction activities	92	Gambling and betting activities
G – WHOLESALE		93	Sports activities and amusement and
45	Wholesale & retail trade & repair of m.v. &	S - OTHER SERVICE ACTIVITIES	
46	Wholesale trade, except of m. v. & m.	95	Repair of computers & personal & house
47	Retail trade, except of m. v. & m.	96	Other personal service activities
H - TRANSPORTATION AND STORAGE			
49	Land transport & transport via pipelines		

Table C: Countries' financial development. (Average whole period)

Country	Avg	SD	Country	Avg	SD	Country	Avg	SD
Albania	38.3	2.1	Honduras	52.6	3.6	Nigeria	15.5	3.5
Algeria	17.6	4.2	Hong Kong SAR	197.9	29.7	Norway	130.8	9.1
Angola	19.8	3.5	Hungary	48.2	11.3	Oman	51.5	15.1
Argentina	14.0	1.3	Iceland	124.5	39.6	Pakistan	18.9	4.2
Armenia	38.5	11.1	India	50.6	1.5	Panamá	81.9	5.7
Australia	128.6	8.0	Indonesia	33.5	5.2	Paraguay	32.4	8.6
Austria	91.6	5.8	Iran, Islamic Rep.	54.5	7.2	Peru	34.6	7.9
Azerbaijan	23.9	7.7	Iraq	6.5	2.4	Philippines	36.2	6.8
Bahamas, The	60.0	5.4	Ireland	102.6	45.8	Poland	50.8	2.5
Bangladesh	41.9	4.1	Israel	67.2	1.8	Portugal	138.3	20.7
Barbados	82.5	2.7	Italy	88.9	4.6	Qatar	52.8	16.6
Belarus	29.2	6.9	Jamaica	29.9	2.8	Romania	33.9	4.7
Belgium	59.3	4.0	Japan	162.7	3.4	Russia	50.7	11.2
Benin	21.9	1.8	Jordan	74.0	3.2	Rwanda	17.5	3.7
Botswana	30.1	2.6	Kazakhstan	37.9	6.8	Saudi Arabia	44.5	8.7
Brazil	58.6	7.5	Kenya	30.1	3.4	Senegal	24.5	3.8
Brunei Darussalam	36.2	6.2	Korea, Rep.	140.5	4.5	Serbia	41.9	3.2
Bulgaria	62.1	6.9	Kuwait	75.8	19.0	Sierra Leone	6.1	1.3
Burkina Faso	22.9	5.8	Kyrgyz Republic	16.7	4.1	Singapore	112.9	13.1
Burundi	17.6	2.6	Latvia	67.6	22.0	Slovakia	49.2	5.9
Cameroon	13.0	2.0	Lebanon	91.1	11.5	Slovenia	66.9	16.4
Canada	124.4		Lesotho	15.4	3.0	South Africa	146.1	3.7
Central African Rep.	10.3	2.3	Libya	19.7	11.0	Sri Lanka	35.6	7.5
Chile	105.4	4.7	Lithuania	49.6	10.3	Sudan	10.0	1.8
China	134.8	17.7	Luxembourg	96.4	8.1	Sweden	127.8	4.3
Colombia	46.2	4.5	Macao SAR, China	75.9	26.1	Switzerland	165.0	8.3
Costa Rica	51.9	5.9	Madagascar	12.8	1.3	Tajikistan	19.0	4.4
Croatia	65.9	4.4	Malawi	11.9	1.8	Thailand	132.6	16.6
Cyprus	233.9	18.4	Malaysia	114.6	8.8	Togo	31.4	8.9
Czech Republic	48.8	2.8	Malta	105.0	16.7	Trinidad & Tobago	32.9	5.3
Denmark	180.5	12.5	Mauritania	19.1	1.6	Tunisia	74.6	8.4
Dominican Republic	24.3	2.8	Mauritius	94.2	9.4	Turkey	54.9	13.5
Ecuador	26.3	2.9	Mexico	27.7	5.0	Uganda	14.8	1.6
Egypt	31.1	5.5	Moldova	31.0	4.6	Ukraine	68.9	16.9
El Salvador	48.6	2.4	Mongolia	48.5	9.2	UAE	72.5	10.4
Estonia	77.6	12.7	Morocco	84.4	12.2	United Kingdom	159.8	25.4
Finland	90.9	4.7	Mozambique	26.5	6.0	United States	189.6	5.9
France	96.1	2.4	Myanmar	12.0	7.7	Uruguay	25.4	3.0
Gabon	11.6	2.6	Namibia	53.1	7.4	Vietnam	106.1	14.3
Georgia	44.5	11.7	Netherlands	114.1	2.3	Zambia	14.0	3.4
Germany	84.3	7.7	New Zealand	146.5	6.1	Zimbabwe	17.0	3.9
Greece	107.6	11.5	Nicaragua	32.5	5.4			
Guatemala	29.9	4.4	Niger	13.7	1.6			

Table D: Variables Description and Sources of Data

Variable	Description	Source
Response variables:		
S_FDI_{cit}	Spanish OFDI stock position in investment market$_{ci}$ at year *t*, in thousand euros	Spanish MoITT[2]
F_FDI_{cit}	Spanish OFDI gross flows to investment market$_{ci}$ at year *t*, in thousand euros	Spanish MoITT[2]
Independent variables:		
Dom. credit private sector$_{ct}$	Financial resources provided to the private sector by financial corporations, in country *c,* at year *t* (% of GDP)	WB-GFD
Measures of FV (ratios)		
Debt-to-equity (Debt)	We used the debt-to-equity ratio, measured as total liabilities divided by total equity.	CBSDO. BoS[3]
Solvency (Solv)	Measured as total assets divided by total liabilities.	CBSDO. BoS[3]
Interest coverage (IntCov)	Measured as profits (before interests and taxes) divided by interest payments.	SABI-BvD
Asset tangibility (Tang)	Measured as plant, property, and equipment divided by total assets.	CBSDO. BoS[3]
Asset turnover (AsTur)	Measured as total revenues divided by average total assets.	SABI-BvD
Control variables:		
GDPpc$_{ct}$ *(ln)*	GDP per capita of country *c,* at year *t* in euros.	WB-WDI
Population$_{ct}$ *(ln)*	Total population of country *c,* at year *t*.	WB-WDI
Distance$_{c}$ (*ln*)	Weighted distance between the biggest cities of Spain and country *c*.	CEPII Database
Common language$_{c}$	Dummy variable being 1 if country *c* has the same official language (Spanish) as Spain, 0 otherwise.	CEPII Database
Trade openness$_{ct}$	Sum of exports and imports of goods and services in country *c,* at year *t* (% of GDP).	UNCTAD
Capital input_1$_{ct}$	Capital input considered as gross fixed capital formation (% of GDP).	UNCTAD
Capital input_2$_{ct}$ [1]	Capital input using the user cost of capital, the implicit rental price of capital & the level of capital services.	PWT 9.1
Property rights protection$_{ct}$	Proxied using Rule of Law. Perceptions of quality of contract enforcement, property rights, and courts, among others.	WB-WGI
Regional trade agreement$_{ct}$	Dummy variable being 1 if country *c* has a regional trade agreement (in force) with Spain at year *t*, 0 otherwise.	Mario Larch DB
Bilateral investment treaty$_{ct}$	Dummy variable being 1 if country *c* has a bilateral investment agreement (in force) with Spain at year *t*, 0 otherwise.	UNCTAD
Double taxation treaty$_{ct}$	Dummy variable being 1 if country *c* has a double taxation treaty (in force) with Spain at year *t,* 0 otherwise.	Spanish MoF[4]
Natural resources rents$_{ct}$	Weighted Average of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents (% of GDP).	WB-WDI

Notes: All FV measures are time-varying NACE 2009 at two-digits (division level). [1] Which uses 9 different sectors. [2] Spanish Ministry of Industry, Trade and Tourism. [3] Central Balance Sheet Data Office. Bank of Spain [4] Spanish Ministry of Finance.

Table E: Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Response variables:					
$Stock\_FDI_{cit}$ (*k euros*)	85,125	25,620	338,335	0	23,071[1]
$Flow\_FDI_{cit}$ (*k euros*)	85,125	1,965	74,795	0	15,041[1]
Independent variables:					
Dom. credit private sector$_{ct}$	85,125	3.81	0.84	0.99	5.53
Debt to equity (Debt)	85,125	1.70	0.97	0.43	9.42
Solvency (Solv)	85,125	1.77	0.33	1.16	3.46
Asset tangibility (Tang)	85,125	0.27	0.15	0.01	0.77
Interest coverage (IntCov)	85,125	1.78	1.31	-2.57	8.72
Asset turnover (AsTur)	85,125	1.32	0.64	0.02	3.33
Control variables:					
GDPpc$_{ct}$ *(euros)*	85,125	13,303	16,714	136	94,303
Population$_{ct}$ *(million)*	85,125	50.5	167	0.28	1,380
Distance$_{c}$ (*km*)	85,125	5,613	3,542	680	19,517
Common language$_{c}$	85,125	0.12	0.32	0	1
Trade openness$_{ct}$	85,125	0.92	0.60	0.16	4.43
Capital input_1$_{ct}$	85,125	0.23	0.06	0.03	0.52
Capital input_2$_{ct}$	75,675	1.04	0.17	0.55	2.74
Property rights protection$_{ct}$	85,125	0.53	0.28	0.01	1
Regional trade agreement$_{ct}$ (*0,1*)	85,125	0.44	0.50	0	1
Bilateral investment treaty$_{ct}$ (*0,1*)	85,125	0.48	0.50	0	1
Double taxation treaty$_{ct}$ (*0,1*)	85,125	0.59	0.49	0	1
Natural resources rents$_{ct}$	85,125	7.18	11.10	0	64.50

Notes: [1] M euros.

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