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THE IMPACT OF RESTRICTIONS ON FDI

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Abstract

In the 1990s and 2000s most countries, including many emerging economies, lifted some barriers to FDI along with trade liberalization; since the global financial crisis this trend has slowed. In this paper, we assess the impact of FDI restrictions on gross in flows by exploiting the sectoral dimension of FDI flows and of the regulatory restrictiveness index (RRI) reported in the OECD databases. In a sample of 17 OECD countries and 23 sectors over the time span 2012-2018, we find that FDI restrictions significantly dampen foreign investments in the manufacturing and services sectors, particularly when they limit foreign equity acquisitions. We also consider restrictions motivated by national security considerations, which are not scored in the RRI; like other controls involving screening schemes, they have not had any significant impact on the size of FDI flows.

JEL Classification: F21, F38, F52.

Keywords: foreign direct investment, capital controls, national security.

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*Bank of Italy, Economic Research and International Relations.

1 Introduction¹

The goal of this paper is to assess empirically the effectiveness of restrictions on foreign direct investment (FDI) gross inflows, by making use of sectoral information.

An FDI is an investment by an entity resident in one country with the objective of establishing a lasting interest in an enterprise located in another country. As regards the determinants of FDI, it is useful to distinguish between horizontal and vertical ones; the former occur among firms operating in similar lines of business, while vertical FDI involve entities active in different segments of a value chain. Dunning (1993) outlines four motives for firms to engage in horizontal FDI: access to resources, access to markets, efficiency gains, and acquisition of strategic assets. Helpman (1984) shows that vertical FDI activities are complementary to trade, because they allow firms to exploit differences in countries' relative factor proportions. More recently, other studies have highlighted different motivations, including regulatory loopholes and tax treatment (Damgaard et al., 2019a). Moreover, in recent years particular attention has been devoted to the acquisition of technology-based assets with potential repercussions for recipient economies in terms of national security (OECD, 2020).

The volume of FDI has increased significantly over the last two decades, driven by the globalization of capital markets and the development of global value chains. FDI inflows bring benefits to the recipient country, by fostering economic growth through several channels. First, FDI facilitates the diffusion of technology and increases competition in local markets (Carluccio et al., 2019, Alfaro, 2017). Second, the liberalization of FDI (and other capital flows) improves asset diversification and allocative efficiency (Henry, 2007, Koepke, 2019). Third, FDI flows allow to finance capital accumulation in a way that is relatively more stable as compared to other types of capital movements and therefore they are less risky from a financial stability standpoint (Ghosh et al., 2012): this is why the theoretical literature on capital controls has mainly focused on the externalities associated with debt flows (Korinek, 2011, Korinek, 2018).

In the past, countries have largely applied restrictions on FDI, mainly in strategic sectors such as defense, nuclear energy, and sectors with state owned enterprises acting as monopolists (OECD, 2020). Since the seventies, advanced economies have progressively removed restrictions on international investment, adopting international treaties and adhering to international standards such as the OECD Code of Liberalisation of Capital Movements. Emerging economies have been historically more closed than advanced countries and only in the last few decades have started to lift barriers to FDI, along

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with the trend toward trade liberalization. As shown in Figure 1, several restrictions are still in place both in advanced and in emerging economies, even in non-strategic sectors. In recent years, however, FDI liberalization has come to a halt. Moreover, advanced economies are increasingly resorting to restrictions on FDI, ostensibly to address national security concerns (Bickenbach and Liu, 2018, Wehrlé and Pohl, 2016), even though the OECD warns that these measures could still be driven by protectionist intents (OECD, 2018).

Our analysis starts from the consideration that inward FDI equity stocks (as a percentage of GDP) are negatively correlated with the level of restrictions in 2018 (Figure 2); our study aims to verify if indeed restrictions have the effect of reducing FDI inflows, accounting for other factors that may affect investment decisions.

In order to measure the level of restrictions, we make use of the dataset compiled by the OECD, which conveys information about FDI regulations among a large pool of countries through its regulatory restrictiveness index (RRI). The index covers different types of restrictions (as reported in Table 1) and it takes into account their stringency; crucially, it is available at the sectoral level, which constitutes an important improvement in comparison with aggregate indices, in particular the ones based on the IMF Annual Report on Exchange Restrictions (AREAER) database.² We test the effectiveness of restrictions on FDI, by matching and analyzing the impact of the RRI on sectoral FDI flows, as reported in the OECD sectoral FDI database (as described in Table 2). We therefore study the impact of FDI restrictions through a three-dimensional (country – sector – year) panel regression analysis, by exploiting the sectoral variability of the OECD RRI and FDI databases. On the one hand, using sectoral data tends to reduce the feasible time span of our analysis, because enough comparable information is available only since 2012. On the other hand, this approach allows us to exploit the country-sectoral heterogeneity and to address, at least partially, the problem of the very low time variation in the RRI (especially in recent years); moreover, it allows to take explicitly into account sector-specific measures imposed for national security concerns and that are not scored in the RRI. We create an ad-hoc control for these restrictions by making use of the notifications published by the OECD, provided by member countries for transparency.

Unlike previous studies, we use as our independent variable FDI equity flows, therefore removing the component related to intra-group debt, which has different drivers and could give a distorted picture of acquisitions and green-field investment. In this way, we take into account the fact that FDI flows (especially in the form of debt) can mask other types of investment and tax optimization strategies (Dell’Erba and Reinhardt, 2015 and

²The methodology of the RRI has been updated in 2010, expanding the set of sectors covered and enhancing the way in which FDI measures are scored and weighted, clearly pointing to significant heterogeneity across sectors.

Coppola et al., 2020). In addition, we account for what Damgaard et al. (2019b) have defined “phantom”, namely the role of special purpose entities (SPEs), in passing funds toward other destinations. In line with Fournier (2015), we control that the share of FDI assets owned by SPEs does not exceed 80%.³

Our findings suggest that FDI restrictions have a negative and significant impact on FDI equity inflows. Also, our results are driven by the manufacturing and service sectors, while we do not find a significant impact of regulations in discouraging FDI flows in the primary sectors. Interestingly, as regards the four different types of restrictions included in the RRI (reported in Table 1), we find that the negative effect is driven by equity restrictions, while constraints on the employment of foreigners as key personnel and screening mechanisms do not affect FDI inflows. In addition, measures imposed for national security seem to not affect FDI in our sample. We also show that the effects of FDI restrictions are stronger in advanced economies; this result might depend on our limited country sample for emerging economies, but it could also be explained considering that in emerging economies FDI flows tend to be concentrated in few sectors regardless of the level of restrictions in place.

Our analysis builds on several previous studies on the effects of FDI restrictions. A main difficulty for the empirical research in this area, as surveyed in Rebucci and Ma (2019), is related to limitations regarding the available data on FDI restrictions. In fact, most studies analyzing the impact of FDI restrictions use aggregate country indices based on the IMF AREAER database, which provides information on capital controls for different types of cross-border financial transactions at the country level. Using this kind of indices for FDI, Binici et al. (2010) find a significant impact on FDI equity outflows, whereas they find no evidence on inflows. By contrast, Nispi Landi and Schiavone (2020) document that higher controls on FDI reduce the volume of FDI inflows. The main problem of such analyses is that the indices are aggregated at country level and neither account for the intensity nor for the scope of the restrictions. This constitutes a main issue, given that there exists a large set of FDI restrictions, with varying level of stringency.

In order to address this issue, a number of papers use the RRI in gravity models to estimate the impact of FDI restrictions on countries’ bilateral investments at the aggregate level. Most of them find that restrictions reduce the aggregate volume of bilateral FDI.⁴ Fournier (2015) looks at the impact of different policies affecting the business climate, and finds that not only restrictions but also complex regulatory procedures have a negative effect on inward FDI. Some studies also look into the impact of FDI restrictions

³See also Lane (2020), on the difficulty of measuring and interpreting FDI data and the SPE role.

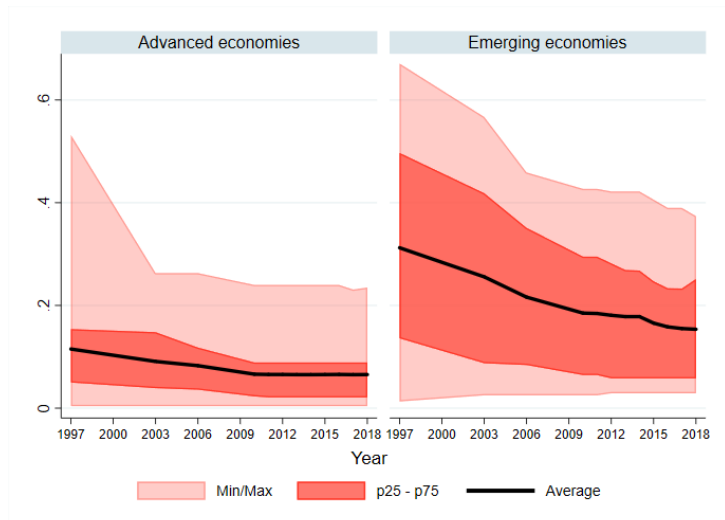
⁴See for example Nicoletti et al. (2003), Kalemli Ozcan et al. (2013).

through panel regression analysis; for example, Ghosh et al. (2012) employ a panel data analysis to study the impact of restrictions on aggregate FDI for OECD countries. They find significant negative effects of restrictions to inflows, although their analysis relies on the former RRI version, with fewer years of observations.

Most papers on FDI restrictions do not delve into the effects at sectoral level; one exception is Mistura and Roulet (2019), which study the impact of FDI restrictions for three macro-sectors (primary, manufacturing, and service sectors), making use of M&A data from Dealogic. Using a gravity model, they find significant negative effects in the service sector, whereas the effect is less strong in manufacturing, and not significant in the primary sector. That paper is close to the present work, as the authors exploit the four types of restrictions detailed in the RRI. They find that equity restrictions are the most effective in discouraging inflows; moreover, they find some significance for the effect of screening in reducing bilateral FDI, whereas we only find significant effects for the equity component. We improve on their work by taking a more granular perspective. In particular, we take advantage of the sectoral breakdown of the RRI index and match it with corresponding data on FDI equity flows. This represents a crucial aspect of our analysis, given that restrictions tend to be sector specific and there is a lot of heterogeneity within countries across sectors. This constitutes an important novelty with respect to the existing literature.

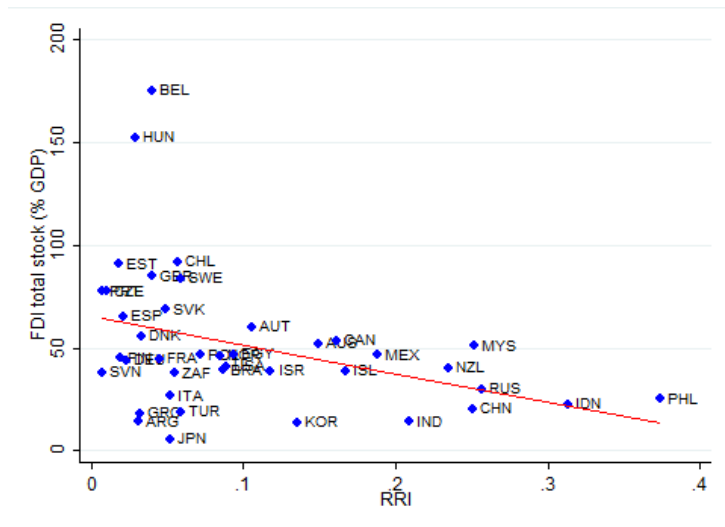
The paper is organized as follows. Section 2 presents the dataset. Section 3 describes the empirical model. Section 4 shows the results and Section 5 concludes with some final remarks.

Figure 1: The Regulatory Restriction Index (RRI)



The RRI ranges between 0 and 1, where higher values correspond to more stringent restrictions. The chart shows the average across countries (where the country level of restrictiveness is the average across sectors) for advanced and emerging economies, together with the lowest and highest values and the interquartile range.

Figure 2: FDI stock vs RRI in 2018



Stock of total FDI (as a share of GDP) against the RRI. We use total FDI from the IMF International Financial Statistics as the OECD collects equity FDI data for member countries only, while the number of countries for which the OECD computes the RRI index is larger.

2 Data

2.1 Dependent variable

Our dependent variable measures FDI equity inflows in a given sector, as a percentage of the recipient country’s GDP.⁵ FDI equity inflows include green field investment and investment made by foreign parent companies in domestic affiliates. We are excluding FDI debt inflows, which consist of changes in the stock of loans made by the foreign parent company to domestic affiliates. We believe this is the most appropriate way to capture genuine investment from foreign investors in a particular country, as FDI debt flows could respond to intra-group financial planning choices. Similarly, we also exclude reinvested earnings in the baseline regressions: the decision to distribute dividends or not and to reinvest profits could also be determined mainly by multinational groups financial strategies rather than real economic motives (e.g. profit-shifting practices highlighted by Coppola et al., 2020). FDI data, both for flows and stocks, are taken from the OECD Foreign Direct Investment Statistics.⁶ The OECD collects sectoral data from 36 member countries. We focus on the time-span 2012-2018, as previous sectoral coverage is more limited. The OECD benchmark definition for FDI statistics was changed in 2008 and fully implemented since 2014; however, earlier data based on the new definition are available.

2.2 Independent variables

We measure restrictions on FDI using the RRI, an index elaborated by the OECD, which accounts for the presence of regulatory barriers to FDI at the sector level (Kalinova et al., 2010). The index is available at the yearly frequency for 22 sectors: this feature is particularly relevant, given that restrictions on FDI are often sector specific.⁷

There are four sub-indicators underlying the RRI. These indicators measure four kinds of restrictions as reported in Table 4: i) foreign equity limitations; ii) screening or

⁵An alternative could be taking FDI equity inflows as a share of the sectoral value added. However, given that in our dataset value added features several missing values, we prefer to divide the equity flows by GDP and present a regression based on equity inflows as a share of the sectoral value added (as an average in a given country-sector) in the sensitivity analysis.

⁶OECD FDI data are presented based on the asset/liability principle. We consider inward liability flows (positions), that is net liabilities incurred (accumulated) because of foreign parents’ equity investment and lending to recipient country’s affiliates. This measure is gross of reverse investment and lending made by resident affiliates in foreign parents.

⁷The RRI relies on two main information sources: the reservations to the OECD Code and the exceptions to the National Treatment Instrument (NTI). The reservations are temporary dispensations from the obligations set out in the Code, and allow adhering countries to protect specific sectors by keeping restrictions on FDI inflows. The exceptions to the NTI concern the activity of foreign firms in specific sectors, and hence they are not aimed at posing restrictions on FDI inflows per se; however, given that these regulations discriminate against the activity of foreign firms, they have a bearing on foreign investors and therefore may be assimilated to restrictions on FDI.

approval mechanisms; iii) restrictions on the employment of foreigners as key personnel; iv) operational restrictions, e.g. restrictions on branching and on capital repatriation or on land ownership. The highest score for any sub-indicator in each sector is 1 (i.e. FDI is not allowed in that sector) and the lowest is 0 (there are no restrictions to FDI in that sector). The RRI is computed as the minimum between 1 and the sum of the four sub-indicators: as a result, the RRI lies in the interval $[0, 1]$.⁸

The RRI does not systematically cover restrictions on FDI introduced for national security purposes, because countries may decide whether to submit these measures under the OECD Code or to notify them only for transparency. Only in the former case is this restriction scored in the RRI. In order to address this potential bias, we use information collected by the OECD through the notifications that member countries are committed to signal for transparency, when they introduce restrictions for national security purposes. Thus, we build a dummy *security* that is 1 when a country applies security restrictions on FDI that are not reflected in the RRI, in a given sector and year. Throughout our estimation sample, there are 22 observations for sectors where a national security measure is in place. In order to have a comprehensive view of restrictions on FDI, we believe that it is important to include these measures, which represent around 1.7% of our observations. The sectors most affected by these restrictions are electricity (sector 15) and information and communication (sector 20).

We complement our dataset with further sectoral data from the OECD STAN database, in particular industry value added, labour costs, and number of employees.⁹ Given that the information for some sectors is available at a different level of detail for FDI data, the RRI, and STAN variables, we define a common classification (Table 2). We attribute the same RRI to multiple sectors when the sector classification of FDI data is more granular than the RRI classification (this occurs, for instance, for some manufacturing activities). We impute the simple average of the RRI values when FDI and STAN data are available only at a higher level of aggregation (for instance for the aggregate of agriculture, forestry, and fishing).

⁸Our sample mostly include European Union member countries, whose restrictions apply only to countries outside the region: the RRI takes into account this fact by reducing the index for EU members by a factor of 55%. Restrictions of EU countries are mainly targeted to the transportation, the fishing, and the real estate sectors.

⁹The OECD STructural ANalysis (STAN) database includes annual measures of output, value added and its components, labour input, investment and capital stock at the industry level.

Table 1: Scoring of restrictions of the RRI

| I. Foreign equity limits | Scores |
|--|----------------------------|
| | Start-ups and acquisitions |
| No foreign equity allowed | 1 |
| Foreign equity < 50% of total equity | 0.5 |
| Foreign equity > 50% but < 100% of total equity | 0.25 |
| | Acquisitions |
| No foreign equity allowed | 0.5 |
| Foreign equity < 50% of total equity | 0.25 |
| Foreign equity > 50% but < 100% of total equity | 0.125 |
| <hr/> | |
| II. Screening and approval (*) | |
| <hr/> | |
| Approval required for new FDI/acquisitions of < USD 100mln or if corresponding to < 50% of total equity | 0.2 |
| Approval required for new FDI/acquisitions above USD100mn or if corresponding to > 50% of total equity | 0.1 |
| Notification with discretionary elements | 0.025 |
| <hr/> | |
| III. Restrictions on key foreign personnel/directors | |
| <hr/> | |
| Foreign key personnel not permitted | 0.1 |
| Economic needs test for employment of foreign key personnel (**) | 0.05 |
| Time bound limit on employment of foreign key personnel (**) | 0.025 |
| Nationality/residence requirements for board of directors | |
| Majority must be nationals | 0.075 |
| At least one must be national | 0.02 |
| <hr/> | |
| IV. Other restrictions | |
| <hr/> | |
| Establishment of branches not allowed/local incorporation required | 0.05 |
| Reciprocity requirement | 0.1 |
| Restrictions on profit/capital repatriation | 1-0.1 |
| Access to local finance | 0.1 |
| Acquisition of land for business purposes (***) | 0.1 |
| Land ownership not permitted but leases possible | 0.05-0.01 |
| <hr/> | |
| Total | Up to 1 |

*Excludes reviews of foreign investment based solely on national security grounds.

**If both restrictions apply, 0.05 is added to score.

***Score scaled by 1/3 when the measure applies only to border and coastal areas, and by a factor of 5 for agriculture and forestry.

Table 2: Sector Codes

| Sector code | Code OECD | Sector OECD | Code stan. | Sector STAN | RRI |
|-------------|-----------|--|------------|--|------------|
| 1 | A | Agriculture, forestry and fishing | D01T03 | Agriculture, forestry and fishing | 1, 2, 3 |
| 2 | B | Mining and quarrying | D05T09 | Mining and quarrying | 4 |
| 3 | C10T12 | Food products | D10T12 | Food products, beverages and tobacco | 5 |
| 4 | C13.14 | Textiles and wearing apparel | D13+D14 | Textiles + Wearing apparel | 5 |
| 5 | C16T18 | Wood, paper, printing | D16T18 | Wood and paper products, and printing | 5 |
| 6 | C19 | Coke and refined petroleum products | D19 | Coke and refined petroleum products | 6 |
| 7 | C20 | Chemicals and chemical products | D20 | Chemicals and chemical products | 6 |
| 8 | C21 | Basic pharmaceutical products | D21 | Basic pharmaceutical products | 6 |
| | | and pharmaceutical preparations | D21 | and pharmaceutical preparations | |
| 9 | C22 | Rubber and plastic products | D22 | Rubber and plastic products | 6 |
| 10 | C24.25 | Basic metals and fabricated metal products, except machinery and equipment | D24T25 | Basic metals and fabricated metal products, except machinery and equipment | 7 |
| 11 | C26 | Computer, electronic and optical products | D26 | Computer, electronic and optical products | 8 |
| 12 | C28 | Machinery and equipment n.e.c | D28 | Machinery and equipment n.e.c | 7 |
| 13 | C29 | Motor vehicles, trailers and semi-trailers | D29 | Motor vehicles, trailers and semi-trailers | 9 |
| 14 | C30 | Other transport equipment | D30 | Other transport equipment | 9 |
| 15 | D35 | Electricity, gas, steam and air conditioning supply | D35 | Electricity, gas, steam and air conditioning supply | 10 |
| 16 | F | Construction | D41T43 | Construction | 11 |
| | G45 | Wholesale and retail trade and repair of motor vehicles and motorcycles | | Wholesale and retail trade | |
| 17 | G46 | Wholesale trade, except of motor vehicles and motorcycles | D45T47 | and repair of motor vehicles and motorcycles | 12, 13 |
| | G47 | Retail trade, except of motor vehicles and motorcycles | | | |
| 18 | H | Transportation and storage | D49T53 | Transportation and storage | 14 |
| 19 | I | Accommodation and food service activities | D55T56 | Accommodation and food service activities | 15 |
| 20 | J | Information and communication | D58T63 | Information and communication | 16, 17 |
| 21 | K | Financial and insurance activities | D64T66 | Financial and insurance activities | 18, 19, 20 |
| 22 | L | Real estate activities | D68 | Real estate activities | 22 |
| 23 | M | Professional, scientific and technical activities | D69T75 | Professional, scientific and technical activities | 21 |

Sector code: our classification. Sector OECD: classification of sectors in OECD FDI data. Sector STAN: classification of sectors in STAN data.
Code OECD: where multiple codes are listed, the flows and stocks for our sector are the sum of the flows and stock, respectively, of the listed sectors.
RRI: codes refer to the original codes as in (Kalinova et al., 2010) . Where multiple codes are listed, the corresponding index for our sector is the average.

2.3 Sample

Given that our data sources do not use the same sector classifications, after matching sectoral FDI with sectoral restrictions and STAN variables, we end up with a sample of 20 countries, 23 sectors, and 7 years.¹⁰ Only three countries out of 20 are emerging economies, according to the IMF WEO classification. In the baseline specification, we prefer to remove these countries in order to have a more homogeneous sample, providing estimates with the full sample in a sensitivity analysis. We also drop some observations for Slovenia in 2017 and 2018, because they all present the same implausible value: we are not able to recover the correct value using the information available on sub-sectors.¹¹

We note that FDI information is affected by the country’s reporting practice, and it is presented differently along some dimensions, so that data for all the sectors are not available for all countries. These issues make our panel unbalanced: we take care of this concern by estimating our model both on the full dataset and on a restricted sample that include only country-year pairs with values for at least ten sectors. Table 3 presents summary statistics for the RRI and its components, FDI flows and stocks, and further variables used in robustness checks.

Table 3: Summary Statistics

| | Source | Mean | Min | Max | Sd | N |
|--------------------|-----------------|-------|--------|--------|-------|------|
| RRI | OECD | 0.039 | 0.000 | 1.000 | 0.102 | 1704 |
| RRI (equity) | OECD | 0.026 | 0.000 | 1.000 | 0.094 | 1704 |
| RRI (screening) | OECD | 0.002 | 0.000 | 0.200 | 0.012 | 1704 |
| RRI (personnel) | OECD | 0.001 | 0.000 | 0.061 | 0.006 | 1704 |
| RRI (other) | OECD | 0.010 | 0.000 | 0.119 | 0.026 | 1704 |
| Dummy security | Our elaboration | 0.028 | 0.000 | 1.000 | 0.166 | 1704 |
| FDI flows (% GDP) | OECD, IMF | 0.035 | -0.946 | 1.166 | 0.211 | 1704 |
| FDI stocks (% GDP) | OECD, IMF | 1.743 | -0.001 | 30.019 | 3.838 | 1680 |
| Value added* | OECD STAN | 0.996 | 0.028 | 3.935 | 0.646 | 1689 |
| Labor cost* | OECD STAN | 0.656 | 0.201 | 2.275 | 0.412 | 1553 |

* As defined in section 5.

¹⁰The sample includes the following countries: Austria, Czech Republic, Estonia, Finland, France, Greece, Hungary, Iceland, Italy, Korea, Latvia, Lithuania, Poland, Portugal, Slovak Republic, Slovenia, Sweden, Switzerland, Turkey, United States.

¹¹We drop observations for multiple sectors whose reported value for the equity flow is the same and corresponds to more than 80% of the total inward FDI in the country in 2017, and more than 98% in 2018.

3 Empirical Specification

Our baseline specification consists of the following panel regression model:

$$Y_{i,s,t} = \alpha + \beta RRI_{i,s,t-1} + \gamma ST_{i,s,t-1} + \delta_{i,t} + \zeta_s + \varepsilon_{i,s,t}. \quad (1)$$

The dependent variable $Y_{i,s,t}$ is FDI equity inflows as a share of GDP in country i , sector s , and year t ; $RRI_{i,s,t-1}$ is the FDI restriction index: we take its lagged value, in order to reduce endogeneity concerns. $ST_{i,s,t-1}$ is the sectoral FDI stock as a share of GDP, in order to control for investment already in place. $\delta_{i,t}$ is a country-time fixed effect, which captures all the time-varying variation within the country common across sectors: including $\delta_{i,t}$ allows us to ignore, among others, business cycle variables such as growth and inflation, institutional variables such as governance quality, financial variables such as exchange rates and stock-market indexes, and global variables such as world GDP and interest rates. ζ_s is a sector fixed effect, to capture the fact that some sectors receive more FDI inflows, on average. We also highlight that flows and stocks are winsorized at the 2% to dampen the impact of outliers. In additional specifications described below, we also winsorize other country-specific variables that may feature outliers.

We are interested in the estimate of β : a negative estimated coefficient would reveal that sectoral FDI equity inflows are negatively associated with restrictions on sectoral FDI equity. Obvious endogeneity issues do not allow to make clear-cut causality statements: for example, countries may have relatively high restrictions in sectors that receive relatively high capital flows, in order to discourage further foreign investment in those sectors. In this case, the estimate of our coefficient of interest would be upward biased: if we find a negative coefficient on capital controls, reverse causality would make the result even more robust (see for example Ostry et al., 2012, Bruno et al., 2017, and Nispi Landi and Schiavone, 2020). Moreover, including country-time fixed effects helps exclude all the confounding factors that are linked to the evolution of national macroeconomic and financial conditions. This does not imply that the identification of the coefficient is clean: we prefer to be cautious and interpret our estimates as partial correlations.

4 Results

In the baseline specification, we find that the coefficient of interest is negative and statistically significant (Table 4, column 1). The estimated coefficient (-0.225) appears to be large in terms of economic magnitude: a standard deviation increase in the restriction index (about 0.09) is associated with an average reduction in sectoral flows as a share of GDP by 0.020 percentage points (a 50% reduction with respect to the estimation sample

mean of FDI inflows).

We also estimate (1) by including the *security* dummy, to control for the introduction of national security regulations that are not captured by the RRI (Table 4, columns 2). The coefficient of the dummy is not statistically significant. There are at least a couple of reasons to explain this result. First, many restrictions for national security reasons have been implemented only recently; thus our sample does not include most current cases. Second, these policies often target some particular industries or assets within a sector, so that the level of detail of our data may be not granular enough to capture their effect on FDI flows, if any.¹²

Which types of restrictions have the largest effect in discouraging FDI inflows? As reported in Table 1, the FDI restriction index is made of four sub-indicators: equity, screening/approval, key foreign personnel, and other restrictions. We include the individual four sub-indicators in the baseline regression (Table 5, first column): the negative coefficient of the aggregate indicator is mainly driven by restrictions on equity. When we include each sub-indicator in a separate regressions (Table 5, columns 2-5) also the coefficient on the key foreign personnel RRI is statistically significant.¹³ Restrictions on the acquisition of a larger share of equity, as expected, are those discouraging foreign investors the most, being the main obstacle to obtaining the desired stake in a company. Screening mechanisms and notification requirements seem to be less of a burden, lending support to the view that well-designed regulations, by imposing defined procedures and deadlines, contribute to reduce the uncertainty on the possible government intervention in a deal.

Which sectors are more responsive to FDI restrictions? We group sectors in three macro-industries: primary, manufacturing, and service sectors. First, we interact a dummy industry with the RRI (Tab 6, column 1). Second, we run separate regressions for each industry (Tab 6, columns 2-4). We find the largest effect in the service sectors; in the manufacturing sectors, we find a negative and significant coefficient; we do not find any effects in the primary sector. We also estimate a regression where we interact the RRI with the 23 sector dummies: restrictions on real estate activities (sector 22),

¹²As an additional control, instead of the *security* dummy, we include a dummy for all countries in the four sectors considered of national interest by the EU (electricity, gas, steam and air condition supply; Computer, electronic and optical products; Transportation and storage; Information and communication). The result is not statistically different from the baseline. Also we exclude these four sectors from the analysis and we obtain a larger negative coefficient, which is however not statistically different from the baseline estimate. Finally, we consider only observations for the four sectors above and the coefficient on RRI becomes not statistically different from zero.

¹³As the national security measures mostly consist in screening and authorization mechanisms, we also check whether the estimated coefficient for screening restrictions changes if we take this information into account. To do so, when the *security* dummy is equal to 1, we replace the value of the screening sub-component with 0.25 (the maximum of the screening sub-indicator): the coefficient is again not statistically significant.

and for professional and business activities (sector 23) are those most effective.¹⁴ These results are consistent with the findings in Mistura and Roulet (2019), which suggest that the effects of restrictions are negligible in the primary sectors, and that they are larger in the service sectors than in manufacturing. The authors also argue that restrictions on FDI in service sectors could have a negative bearing also on inflows to the manufacturing, given the complementarity between the manufacturing and the service sectors. This would occur because less competition in service sectors results in higher cost and lower quality of inputs.

All in all, our analysis suggests that FDI restrictions, especially on equity holdings, are effective in discouraging FDI equity inflows. Restrictions seem more effective in the service industries. Our use of more granular data compared to previous studies allows to show that restrictions are more effective in some specific sectors, such as real estate activities and professional and business activities. Newly imposed regulations introduced for protecting national security interests are not associated to a significant impact on FDI equity flows.

5 Sensitivity Analysis

We verify the sensitivity of this result to the following battery of robustness checks.

Reduced sample. In our sample, some countries report observations only for very few sectors in some years: we exclude country-time observations with less than 10 sectors. The coefficient becomes smaller in absolute value (-0.17 , Table 7, column 2), but still significant. Given that our sample mainly include European Union members countries, we also estimate the baseline regression only for these countries: results become significant at the 1% level (Table 7, column 3).

Separate FE. We repeat the analysis including country and time fixed effects separately: the estimated coefficient is very close to the baseline estimate (Table 7, column 4).

EME. We include observations for emerging markets in the sample (Turkey, Poland, and Hungary). The coefficient is halved with respect to the baseline estimate, with a p-value of 0.11 (Table 7, column 5). In particular, Hungary and Poland are responsible for weakening the main result.

Not large RRI. The RRI is higher than 0.25 only for 2% of observation in the sample. We verify whether these observations are driving the results, restricting the sample only for observations with RRI below 0.25 (Table 7, columns 6 and 7). The coefficient more than doubles in absolute value, but given that the RRI standard deviation is smaller

¹⁴This regression table is available upon request.

in this reduced sample, the overall effect of one standard deviation increase in the RRI would imply a 80% reduction of the average flow, much larger than the baseline estimate.

Sectoral variables. We verify whether the magnitude of the estimated coefficient changes by including other sectoral variables in the regression. In order to control for the attractiveness of economic sectors for foreign investors, we include in the regressions two measures of comparative advantage that are computed using the sectoral value added and labor cost. The first variable is the value added/GDP ratio in country i , sector s and year t , relatively to its sample mean. The second variable is unitary labour cost in USD, relatively to its sample mean.¹⁵ The coefficient of interest decreases compared to the baseline estimate, and it is also estimated less precisely (Table 7, column 1 vs 8). The estimated coefficients for the additional sectoral variables are not statistically significant.

Scaling by value added. As a further robustness check, we run a regression using as dependent variable equity inflows (and as a control equity positions) as percentage of sectoral value added. As our series for value added features several missing values, we use the average value added in a given country-sector. The estimated coefficient is significantly negative (Table 7, column 9), and its impact on flows is smaller than in the baseline regression, implying a 28% reduction of the average inflow.

Reinvested earnings. Finally, we change our dependent variable by adding reinvested earnings to equity flows, and we run the baseline regression (Table 7, column 10). The RRI is smaller but significantly negative. If we only consider positive earnings, so as to avoid losses to be accounted as divestment, the coefficient is closer to the original estimates.

¹⁵In our database, value added, labor costs, and the number of employees feature many missing values. In order to avoid the loss of many observations, we replace these missing values taking an average across time of the values available for that specific variable in a given country-sector.

Table 4: Regression analysis: baseline

| Variables | (1) Baseline | (2) Nat. Security |
|-------------------------------|----------------------|-------------------------|
| RRI _{t-1} | -0.225** (0.0217) | -0.223** (0.0232) |
| FDI stock _{t-1} | 0.001 (0.929) | 0.001 (0.928) |
| Dummy security _{t-1} | | 0.023 (0.496) |
| Constant | 0.048** (0.0452) | 0.048** (0.0453) |
| Observations | 1313 | 1313 |
| <i>R</i> ² | 0.179 | 0.179 |
| Clusters | 17 | 17 |
| Country-time FE | ✓ | ✓ |
| Time FE | ✗ | ✗ |
| Country FE | ✗ | ✗ |
| Sector FE | ✓ | ✓ |

Robust p-values in parentheses

*** p<0.01, ** p<0.05, * p<0.10

Standard errors clustered by country

Table 5: Regression analysis: RRI sub-components

| Variables | (1) | (2) | (3) | (4) | (5) |
|------------------------------|-----------------------|----------------------|-------------------|---------------------|------------------|
| | Sub-components RRI | Equity RRI | Screening RRI | Personnel RRI | Other RRI |
| FDI stock _{t-1} | 0.000 (0.934) | 0.000 (0.938) | 0.001 (0.891) | 0.001 (0.908) | 0.001 (0.903) |
| RRI equity _{t-1} | -0.213** (0.0337) | -0.220** (0.0358) | | | |
| RRI screening _{t-1} | -0.297 (0.167) | | -0.261 (0.211) | | |
| RRI personnel _{t-1} | -1.210 (0.164) | | | -1.518* (0.0788) | |
| RRI other _{t-1} | 0.102 (0.879) | | | | 0.265 (0.699) |
| Constant | 0.045 (0.185) | 0.041* (0.0641) | 0.023 (0.288) | 0.031 (0.196) | 0.017 (0.609) |
| Observations | 1313 | 1313 | 1313 | 1313 | 1313 |
| R^2 | 0.180 | 0.179 | 0.175 | 0.176 | 0.175 |
| Clusters | 17 | 17 | 17 | 17 | 17 |
| Country-time FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Sector FE | ✓ | ✓ | ✓ | ✓ | ✓ |

Robust p-values in parentheses

*** p<0.01, ** p<0.05, * p<0.10

Standard errors clustered by country

Table 6: Regression analysis: macro-sectors

| | (1) | (2) | (3) | (4) |
|----------------------------------|-------------------------|-------------------|-----------------------|-----------------------|
| Variables | Industry interaction | Primary | Manufacturing | Services |
| FDI stock _{t-1} | 0.009** (0.0165) | 0.070 (0.113) | -0.003 (0.714) | 0.012** (0.0133) |
| RRI _{t-1} | 0.069 (0.545) | 0.014 (0.748) | -0.088* (0.0667) | -0.150** (0.0389) |
| Manufacturing | -0.002 (0.925) | | | |
| Services | 0.061* (0.0956) | | | |
| Manufacturing*RRI _{t-1} | -0.162 (0.233) | | | |
| Services*RRI _{t-1} | -0.269* (0.1000) | | | |
| Constant | 0.008 (0.717) | -0.006 (0.651) | 0.014*** (0.00970) | 0.054*** (0.00629) |
| Observations | 1313 | 109 | 729 | 475 |
| R ² | 0.151 | 0.605 | 0.244 | 0.233 |
| Clusters | 17 | 12 | 15 | 15 |
| Country-time FE | ✓ | ✓ | ✓ | ✓ |
| Sector FE | ✗ | ✗ | ✗ | ✗ |

Robust p-values in parentheses

*** p<0.01, ** p<0.05, * p<0.10

Standard errors clustered by country

Table 7: Regression analysis: robustness

| Variables | (1) Baseline | (2) Min. 10 sectors | (3) EU countries | (4) Separate FE | (5) Full sample | (6) Not large RRI | (7) Not large RRI (full) | (8) Sectoral variables | (9) Baseline (% VA) | (10) Equity and earnings |
|---------------------------------|----------------------|---------------------------|------------------------|-----------------------|-----------------------|-------------------------|--------------------------------|------------------------------|---------------------------|--------------------------------|
| RRI _{t-1} | -0.225** (0.0217) | -0.174** (0.0243) | -0.295*** (0.00510) | -0.222** (0.0198) | -0.121 (0.110) | -0.599* (0.0507) | -0.486** (0.0498) | -0.172* (0.0640) | -5.544* (0.0691) | -0.167** (0.0262) |
| FDI stock _{t-1} | 0.001 (0.929) | -0.004 (0.625) | 0.001 (0.879) | -0.001 (0.899) | -0.003 (0.584) | 0.000 (0.965) | -0.003 (0.551) | 0.001 (0.775) | | 0.017* (0.0732) |
| Value added _{t-1} | | | | | | | | 0.006 (0.414) | | |
| Labour cost _{t-1} | | | | | | | | 0.012 (0.660) | | |
| FDI stock (% VA) _{t-1} | | | | | | | | | 0.002 (0.669) | |
| Constant | 0.048** (0.0452) | 0.045* (0.0522) | 0.041 (0.123) | 0.058 (0.146) | 0.030* (0.0592) | 0.067* (0.0728) | 0.046* (0.0582) | 0.018 (0.550) | 1.313 (0.131) | 0.046** (0.0117) |
| Observations | 1313 | 1233 | 1079 | 1313 | 1704 | 1284 | 1653 | 1161 | 1298 | 1313 |
| R ² | 0.179 | 0.159 | 0.154 | 0.097 | 0.146 | 0.182 | 0.149 | 0.151 | 0.117 | 0.267 |
| Clusters | 17 | 12 | 13 | 17 | 20 | 17 | 20 | 15 | 17 | 17 |
| Country-time FE | ✓ | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Time FE | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Country FE | ✗ | ✗ | ✗ | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Sector FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

Robust p-values in parentheses

*** p<0.01, ** p<0.05, * p<0.10

Standard errors clustered by country

6 Conclusions

In the latest decades, the volume of FDI inflows has increased significantly, driven by the globalization of financial markets and the development of global value chains. Even if FDI flows are a relatively less risky source of financing from the standpoint of receiving countries, as compared to other types of foreign investment, countries have been using several forms of capital controls to manage FDI, mainly in strategic sectors.

We test empirically whether FDI restrictions discourage FDI equity inflows, using sectoral data. Our analysis suggests that these restrictions are effective, in particular those targeted to equity holding and on flows directed to the service sectors. Equity restrictions are effective as they prevent foreign investors from increasing their stakes in participated companies or, in extreme cases, prohibit foreign ownership altogether. On the contrary, well-designed screening and notification mechanisms do not have a significant impact on aggregate FDI flows. We conjecture that this could be due to the fact that clear rules and deadlines for the government for intervening in planned takeovers reduce uncertainty. We do not find evidence that newly imposed regulations introduced to protect national security interests have had a significant impact on FDI equity flows so far. We consider this as a first step in understanding how FDI are affected by restrictions imposed for national security reasons. This is becoming a prominent topic, also given the growing number of restrictions imposed (five additional measures in 2019, only in OECD countries).

Several caveats apply to our results and there is room for further research in this area. Crucially, given that restrictions are not randomly assigned, the biggest challenge is to provide a clean identification strategy, aimed at identifying solid causal effects. Moreover, more granular data could allow to better match investment information with the definitions of protected activities, which are established by national laws and are often more narrowly defined than FDI data available from official statistics. Specifically, this occurs when restrictions target specific sectors that are relevant to national security, as for instance the production of semiconductors or the management of cloud infrastructures. As new data on FDI and restrictions are released, we believe the present methodological framework could be extended and provide additional insights.

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