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Capital Across Borders, Jobs at Home: The FDI-Unemployment Nexus in the OECD

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Abstract

This paper examines the FDI-unemployment nexus in OECD countries from both theoretical and empirical perspectives. We first build a search and matching model which accounts for inward and outward FDI capital stocks and identifies key channels through which FDI affects unemployment. In a subsequent empirical panel ARDL estimation, we show that both inward and outward FDI can reduce unemployment conditional on technological and institutional factors. Inward FDI is most unemployment-reducing in less innovative and less technologically advanced countries, while for outward FDI this is the case in technologically more advanced countries with sufficient absorptive capacity and stronger bargaining institutions. For inward (outward) FDI, the technology diffusion (reverse spillover and head-office) channel dominates these long run effects. Our findings imply that policies which strengthen absorptive capacity, diffusion, and domestic linkages can make FDI more employment-friendly, whereas in advanced economies the composition and integration of FDI may matter more than broad FDI-attraction alone.

Keywords: FDI, unemployment, panel ARDL, matching model

JEL Classifications: F23, E24, C23

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1 Introduction

Unemployment has remained a policy concern in many OECD economies, despite episodes of steady growth in recent decades. At the same time, worldwide FDI stocks have risen from about USD 2 trillion in the 1990s to more than USD 45 trillion and now approach half of global GDP (UNCTAD (2022)). From the mid-1990s on, policy papers warned that global production networks using foreign direct investments (FDI) could move jobs abroad and put extra pressure on low-skill workers in advanced countries (Baldwin (1995)). Thus, both inward as well as outward FDI have the capacity to affect the unemployment rate.

The last few years have kept the issue of FDI and (un)employment in the spotlight. Global FDI flows collapsed by 42 percent in 2020 during the first COVID-19 wave (UNCTAD (2021)). FDI flows recovered later, but many OECD governments shifted toward more active industrial policies, often justified by resilience and economic-security concerns. In the United States, the Inflation Reduction Act (IRA) of 2022 offers generous tax credits for clean-tech projects; by mid-2024 companies had announced over USD 265 billion in new clean-energy investments (The White House (2024)). Similar objectives are visible elsewhere, for example in the European Union's Green Deal Industrial Plan and the Net-Zero Industry Act and in Canada's Clean Economy Investment Tax Credits, which seek to strengthen domestic production capacity and attract related investment (European Commission (2024); Canada Revenue Agency (2024)). Recently, the second Trump administration has taken a tougher tariff course, arguing that protectionism would bring manufacturing and jobs back to the United States (Reid and Slattery (2024)). The European Union has discussed potential countermeasures on up to EUR 95 billion of US imports if negotiations fail, highlighting renewed trade frictions that can reshape firms' location and FDI decisions (Reuters (2025)). Against this background, it becomes essential to understand when inward and outward FDI translate into changes in unemployment, and why the long-run effects differ across OECD countries.

Empirical evidence on the (un)employment effects of FDI remains mixed, and a clear consensus has yet to emerge. The mechanisms at work are often context-specific and vary across countries with different stages of development or different institutional frameworks (Schmerer (2014); Jude and Silaghi (2016)). Methodological issues further contribute to the lack of consensus. Many studies examine inward or outward FDI in isolation, rather than considering their joint labor-market implications (Girma (2005); Federico and Minerva (2008); Bandick and Karpaty (2011)). Moreover, much of the literature relies on static panel estimators and does not adequately address endogeneity; labor market conditions may not only be shaped by foreign investment decisions, they may also influence them (Schmerer (2014); Jude and Silaghi (2016)). Finally, institutional settings and the degree of market regulation, such as employment protection, wage-setting institutions, and product market competition, can mediate how firms adjust to FDI-induced shocks and how the gains from foreign investment are distributed.

In this paper, we revisit the FDI–unemployment nexus with a specific focus on OECD countries. We start from a Mortensen–Pissarides matching model that embeds inward and outward FDI. The framework separates short-run from long-run effects and predicts sign reversals depending on worker bargaining power and the head-office intensity of outward FDI, that is, the extent to which foreign affiliates rely on headquarter services and high-skilled tasks located in the home country. Using annual data from 2000 to 2019, we examine the unemployment effects of both inward and outward FDI positions, expressed as shares of the domestic capital stock. Besides avoiding scale-related distortions, this ratio captures the relative weight of foreign capital in a country's production system and provides a directly comparable intensity measure across economies, akin to a capital-deepening indicator centered on cross-border ownership. Our empirical strategy builds on the panel Autoregressive Distributed Lag (ARDL) framework, estimated with the Pooled Mean Group (PMG) estimator proposed by Pesaran et al. (1999). Offering a flexible dynamic specification, this method allows for heterogeneous short-run dynamics across countries but with a common long-run relationship. In addition, by explicitly modeling the adjustment process towards the long-run equilibrium, the approach shows some robustness with respect to potential endogeneity of the regressors.

The paper is organized as follows. Section 2 reviews the existing literature on the employment effects of FDI. Section 3 presents the theoretical framework. Section 4 develops the empirical analysis, including the data, econometric specification, and estimation results. Section 5 concludes and discusses policy implications.

2 Literature Review

Initially, the unemployment effects of FDI can be analyzed from a theoretical perspective. On the one hand, inward FDI, particularly greenfield investments, may reduce unemployment directly by creating new jobs. Similarly, outward FDI can also decrease unemployment if multinational firms retain a centralized managerial core in the parent country. On the other hand, outward FDI can increase unemployment in the home country by offshoring low-skilled jobs to host countries. The same effect is possible in the case of inward FDI, if it increases innovation and productivity and therefore reduces labor demand (see Stepanok (2023)). Thus, whether inward and outward FDI ultimately increase or decrease unemployment depends on which force dominates: the relocation effect, where production and jobs are shifted abroad, or the efficiency effect, where higher productivity lowers costs and can support output and employment at home (Eckel (2003)). An overarching survey by Pflüger et al. (2013) links these channels to newer strands of theory. Drawing on heterogeneous-firm models, task-based trade, and the new economic geography, they show that relocation versus efficiency alone do not fully explain the dynamics. Trade and FDI shocks also affect (i) employment volatility through firm entry and exit, (ii) regional unemployment gaps through agglomeration,

and (iii) wage outcomes through country-specific labor-market institutions.

In addition to these channels, a second strand emphasizes that FDI effects are conditional on domestic absorptive capacity and institutions. Host-country spillovers from foreign affiliates are stronger when local linkages, skills and complementary policies are in place, which is consistent with vertically transmitted knowledge and supplier upgrading (Javorcik (2004)). Financial development and human capital amplify these gains in growth settings (Alfaro et al. (2004); Li and Liu (2005)). In the labor-market dimension, coordination and bargaining institutions shape how productivity shocks translate into wages and employment, echoing the classic coordination argument that centralized or sectoral bargaining internalizes employment externalities and can support employment (Calmfors and Driffill (1988)). The *Varieties of Capitalism* literature likewise points to complementarities between coordination, skill formation, and technology adoption (Hall and Soskice (2001)), implying that the diffusion of multinational practices is smoother, and potentially more employment-friendly, where coordination is higher.

Despite the theoretical importance of FDI for unemployment, the economic literature concerned with the nexus is relatively scarce. Most studies investigating the macroeconomic effects of FDI focus on the effects of inward FDI on growth in host countries. In a three-dimensional model of FDI, the financial markets and economic growth, Alfaro et al. (2004) show that FDI is more effective in advancing growth in countries with well-developed financial markets. Li and Liu (2005) examine the role of FDI for economic growth in a panel of 84 countries between 1979 and 1999. Their findings indicate a strong effect of FDI on growth via its interaction with human capital, which suggests an important role of the former in amplifying human capital development. The effects of outward FDI on the economy of the home country are analyzed to a lesser extent. For home economies, reverse technology transfer and repatriated profits can raise headquarter activity and domestic R&D; instrumented firm-level evidence for US multinationals indicates that increases in foreign investment are accompanied by higher domestic investment and employee compensation (Desai et al. (2009)).

Schmerer (2014) investigates the FDI-unemployment nexus for 19 OECD countries using a panel Generalized Methods of Moments (GMM) approach to address endogeneity concerns. The findings suggest that net FDI (inward minus outward FDI) is robustly associated with lower unemployment rates. Furthermore, it appears that it is the net FDI position of a country, measured as the difference between inward and outward FDI flows, that determines the effects of FDI on unemployment. Using a system GMM model of Central and Eastern European economies, Jude and Silaghi (2016) investigate the importance of FDI for employment. While the effects of inward FDI on employment are initially negative, they turn positive in the long run. It is shown that human capital compensates for the initial negative effect.

Consistent with this, for transition economies earlier evidence highlights an additional restructuring channel. Analyzing the 1990s in Central and Eastern European transition economies, Geishecker and

Hunya (2005) document substantial job losses in privatized manufacturing firms as foreign owners downsized inefficient plants and severed local supplier links. They argue that multinationals merely front-loaded restructuring relative to domestic enterprises; later greenfield projects created new capacities and jobs. Their gravity estimates further indicate that FDI shifted the skill composition of employment towards high-skill non-manual and low-skill workers, to the detriment of skilled manual labor. Outside Europe, broad panel studies are scarce. Using data for six MENA countries from 1990-2018, Alalawneh and Nessa (2020) show that inward FDI reduces overall, male and female unemployment in the long run, while no short-run causal link is detected. Their findings highlight that employment effects may unfold only gradually.

To our knowledge, there is still no empirical study of the FDI-unemployment nexus that combines a theory-based framework with empirical evidence from a broad panel, explicitly distinguishes between short- and long-run unemployment effects, and examines both inward and outward FDI while allowing for the effects to vary with institutions. Existing work either develops structural models with net FDI and labor market institutions but relies on more reduced empirical specifications, or estimates dynamic panel models for inward or outward FDI without an explicit institutional dimension. We contribute by bringing these strands together: we show how labor coordination and bargaining can act as institutional complements to FDI, strengthening the realization of technology and innovation spillovers and moderating wage and unemployment dynamics.

3 Theoretical Framework

This section develops a parsimonious but micro-founded model that links FDI to unemployment. The model is structured to generate both steady-state implications as well as the time-dependent adjustment path consistent with autoregressive distributed lag (ARDL) dynamics in Section 4, which allows for empirical testing of both short- and long-run effects of FDI on unemployment.

3.1 Capital Composition and FDI Channels

Let

$$K_t^{\text{home}} = K_t^D + K_t^F, \tag{1}$$

denote the physical capital located in the host country. Here K_t^D is domestically owned capital at home, and K_t^F is foreign-owned capital at home (inward FDI). We work with

$$\begin{aligned} s_t^{\text{in}} &= \frac{K_t^F}{K_t^{\text{home}}}, \\ s_t^{\text{dom}} &= \frac{K_t^D}{K_t^{\text{home}}}, \\ s_t^{\text{in}} + s_t^{\text{dom}} &= 1, \end{aligned} \tag{2}$$

and define an additional outward-FDI intensity

$$s_t^{\text{out}} = \frac{K_t^O}{K_t^{\text{home}}}, \tag{3}$$

where capital owned by domestic multinationals and located abroad is denoted K_t^O (outward FDI).

Effective domestic capital. Following the knowledge-capital view of multinationals (Markusen and Venables, 1999; Helpman et al., 2004), foreign plants may offer superior technology, while head-office services and knowledge transfer generated by outward FDI can also raise productivity at home (reverse spillovers) (Criscuolo and Martin, 2009; Branstetter, 2006; Herzer, 2011; Bilir and Morales, 2020). We capture these channels in a linear aggregator:

$$K_t^{\text{eff}} \;=\; \psi(\vartheta)\, K_t^D \;+\; \big(1-\psi(\vartheta)\big)\, K_t^F \;+\; \eta\, K_t^O, \qquad 0<\psi(\vartheta)<1,\; 0\le\eta\le 1, \tag{4}$$

where $\vartheta \in (0,1)$ denotes worker bargaining power (defined below). We allow $\psi'(\vartheta) < 0$, so that the foreign-capital weight $1-\psi(\vartheta)$ is larger when coordination and worker representation are stronger. The parameter η captures the strength of the head-office / reverse-spillover channel from outward FDI.

Knowledge spillovers. We assume that inward FDI can generate knowledge spillovers that increase domestic production capabilities in the host country (Coe and Helpman, 1995; Alfaro et al., 2004). Since technology diffusion takes place over time, we allow the technology index A_t to increase with a lagged inward-FDI share (Keller and Yeaple, 2008):

$$A_t = \bar{A}\exp(\chi\, s_{t-\ell}^{\text{in}}), \tag{5}$$

where $\chi \ge 0$ gives the strength of the spillover and ℓ denotes the implementation lag. Consequently, a higher foreign capital share s^{in} leads to a higher A_t in the long run (after ℓ periods), in addition to the direct contribution captured by K_t^{eff}. This formulation is consistent with existing models of FDI technology

diffusion (Wang and Blomström, 1992; Di Giovanni and Levchenko, 2012).

Repatriated profits. A fraction

$$\varphi(s_t^{\text{out}}) = \bar{\varphi} - \kappa s_t^{\text{out}} \tag{6}$$

(with $\kappa \geq 0$) of profits earned abroad is repatriated. It is reasonable to assume that repatriated profits affect the total returns from outward FDI which can influence unemployment dynamics gradually and over time. In the short run, these flows are small relative to the initial investment outlays. In the long run, however, these cash flows provide an internal funding source for R&D and head-office employment (Lipsey, 2004).

3.2 Production and Price Setting

The production function is Cobb-Douglas:

$$Y_t = A_t \big(K_t^{\text{eff}}\big)^{\alpha} L_t^{1-\alpha}, \qquad 0 < \alpha < 1, \tag{7}$$

where A_t is an aggregate technology index measured empirically as total-factor productivity (TFP) (potentially influenced by the foreign-capital share as discussed in Section 3.1).

Intermediate-goods producers face Calvo price rigidity: in each period a fraction $1 - \xi$ can reset its nominal price. Standard value maximization yields the New-Keynesian Phillips curve

$$\pi_t \;=\; \beta\, \mathbb{E}_t \pi_{t+1} \;+\; \lambda_p\, \widehat{MC}_t, \tag{8}$$

$$\lambda_p = \frac{(1-\xi)(1-\beta\xi)}{\xi}, \tag{9}$$

where $\beta \in (0,1)$ is the household discount factor. Lowercase hats denote log deviations from steady state, and we write $a_t = \log(A_t/\bar{A})$. Real marginal costs satisfy

$$\widehat{MC}_t = \hat{w}_t \;-\; a_t \;-\; \alpha\, \hat{k}_t^{\text{eff}}. \tag{10}$$

Higher price rigidity ($\xi \uparrow$) lowers λ_p and flattens the Phillips curve.

3.3 Labor Market and Wage Formation

Vacancies V_t meet unemployed workers U_t via the matching function

$$M_t = m U_t^{\gamma} V_t^{1-\gamma}, \qquad 0 < \gamma < 1. \tag{11}$$

Market tightness $\theta_t = V_t/U_t$ implies job-finding rate

$$f(\theta_t) = m\theta_t^{1-\gamma}. \tag{12}$$

Unemployment evolves as

$$U_{t+1} = (1 - f(\theta_t))U_t + \delta\,(L - U_t), \qquad 0 < \delta < 1, \tag{13}$$

where δ is the separation rate and L denotes the labor force.

Nash wage. Workers with outside option b (benefits + home production) bargain over the match surplus. Let $\vartheta \in (0,1)$ denote worker bargaining power (notation distinct from the discount factor β). The Nash solution gives

$$w_t \;=\; b \;+\; \frac{\vartheta}{1-\vartheta}\,\Pi_t \;-\; \phi\,\omega(\vartheta)\,s_t^{\text{in}}, \tag{14}$$

where $\phi > 0$ and $\omega'(\vartheta) > 0$. OECD replacement rates display little cyclicality (Shimer, 2005); thus treating b as trend-stationary is adequate. The last term captures that inward FDI provides credible internal outside options and organizational discipline that are more effectively internalized under coordinated bargaining, resulting in mild wage moderation proportional to the inward-FDI share.

3.4 Firm Profit, Vacancies, and Steady State

Per-job profit is

$$\Pi_t = (\mu_t - 1)\,\frac{Y_t}{L_t} + (\bar{\varphi} - \kappa s_t^{\text{out}})\,r^O\,K_t^O - w_t, \tag{15}$$

where r^O is the after-tax foreign return and $\mu_t = P_t/MC_t$ the gross mark-up. Free entry of vacancies (c per posting) implies

$$c = q(\theta_t)\,\Pi_t, \tag{16}$$

$$q(\theta_t) = m\,\theta_t^{-\gamma}, \tag{17}$$

$$\theta_t = \left[\tfrac{m\,\Pi_t}{c}\right]^{1/\gamma}. \tag{18}$$

Steady state. With $U_{t+1} = U_t$, the steady-state unemployment rate $u = U/L$ satisfies

$$u = \frac{\delta}{\delta + f(\theta)}. \tag{19}$$

Totally differentiating yields

$$\frac{\partial u}{\partial s^{\text{in}}} = -\Omega(1-2\vartheta)\,\Pi_{s^{\text{in}}}(\vartheta), \tag{20}$$

$$\frac{\partial u}{\partial s^{\text{out}}} = -\Omega(1-2\vartheta)\,\Pi_{s^{\text{out}}}(\vartheta), \tag{21}$$

where

$$\Omega = \frac{u(1-u)}{\delta + f(\theta)} > 0, \tag{22}$$

and we use $\Pi_{s^{\text{in}}} = \partial\Pi/\partial s^{\text{in}}$ and $\Pi_{s^{\text{out}}} = \partial\Pi/\partial s^{\text{out}}$. Because the foreign-capital weight $1-\psi(\vartheta)$ and the wage-moderation sensitivity $\omega(\vartheta)$ both rise with ϑ, the inward-FDI profit effect becomes more favorable under stronger worker representation. Outward FDI affects profits through the head-office / reverse-spillover channel in K_t^{eff} (governed by η) and through repatriated profits (governed by $\bar{\varphi}, \kappa$). Hence, although the Nash-incidence factor $(1-2\vartheta)$ declines in ϑ, the composite long-run effect can become more negative in ϑ. In particular, for empirically relevant values of ϑ, stronger coordination and worker representation can make the unemployment-reducing impact of both inward and outward FDI larger. While these expressions characterize the long-run response of unemployment to FDI, short-run effects are expected to be weaker due to adjustment costs, frictions in capital integration, and technology diffusion lags.

3.5 Short-Run Dynamics

When FDI enters an economy, several well-documented frictions can delay its impact on productivity and employment. With regard to OECD countries (and related evidence from other economies), empirical research points to four frictions that weaken the initial transmission of FDI effects, even though long-run effects can be substantial:

1. **Capital-integration channel.** New inward foreign investments must be installed, integrated, certified, and linked to productive use. During this process, the newly entered foreign capital (and technology) earns only a fraction of its potential return. Thus, its contribution to K^{eff} (and vacancy creation) rises only gradually over time. This idea aligns with the concept of capital adjustment costs linked to various types of capital or "time-to-build" frictions in investment, which means that newly acquired assets are not instantly productive. Using a panel firm-level dataset for eight advanced European countries, Fons-Rosen et al. (2021) show that the productivity of foreign acquired affiliates increases modestly after four years following a foreign acquisition. Studies allowing for dynamic effects even find that productivity can decrease in the short run immediately after foreign entry - likely due to restructuring disruptions - and only recover and improve in subsequent years. Blonigen et al. (2014) observe an initial productivity decline after foreign takeovers in some cases, followed by

a rebound as integration completes. Moreover, Arnold and Javorcik (2009) find that acquired firms in Indonesia saw no immediate jump in TFP, but achieved a 15% productivity increase after 3 years of foreign ownership. Likewise, using a panel dataset of Spanish manufacturing firms, Guadalupe et al. (2012) find a positive impact of inward FDI on productivity that grows larger with time.

2. **Technology absorption-lag channel.** Although FDI can bring superior technologies and know-how to the host country, the domestic firms experience the productivity spillover with a certain delay. The main reasons are gradual learning and diffusion processes. Domestic firms need time to learn and adopt new techniques and practices and absorb know-how from foreign entrants. Moreover, spillover also occurs over time via worker mobility (employees moving from multinationals to local firms). Thus, the short run impact of inward FDI on the host country's TFP can be limited - or even negative - while in the long run, the impact can be substantial after the diffusion process. Using a large panel of Chinese manufacturing firms, Liu (2008) shows that an increase in FDI lowers the short run productivity level while raising the long run rate of productivity growth of domestic firms in the same industry. This is consistent with earlier observations by Aitken and Harrison (1999) that foreign entrants can exert a short-run negative "business-stealing" effect on incumbent firms' productivity (by capturing market share and pushing incumbents up their cost curves), even as they provide opportunities for learning in the longer run. More generally, Haskel et al. (2007) have pointed out that FDI spillovers "may take time to arise" through mechanisms like labor turnover, and thus empirical analyses often allow for lagged effects. For OECD countries, evidence of immediate horizontal spillovers is mixed or modest, but positive long-run spillovers are frequently detected when looking at longer time horizons or backward supply-chain linkages. Javorcik (2004), for instance, finds no contemporaneous spillover in same-industry (horizontal) productivity in Eastern Europe, but significant gains via backward linkages as domestic suppliers learn from foreign clients – a process that unfolds over several years. In summary, technology and productivity benefits from FDI accrue gradually: they are limited in the short run but substantial in the long run once knowledge diffusion and capacity-building have taken effect.

3. **Hiring-and-training diffusion channel.** MNEs often use and introduce state-of-the-art human resource practices, (digital) recruitment methods, and structured training programs in the host country. These practices can improve the efficiency of matching workers to jobs – for example, through modern digital job platforms, better screening and interview techniques, or structured training that upgrades workers' skills. However, the improvement in overall matching efficiency rises only gradually as domestic firms observe and imitate the best practices of MNEs with a certain lag. In the short run, domestic companies could be slow to adopt the new techniques while workers need time to accumulate

the provided know-how through these new training programs. Over time, the presence of MNEs can lead to broad improvements in hiring and training processes across the economy. For example, they can demonstrate the effectiveness of new HR technologies or create a pool of skilled labor that other firms can draw on, thereby raising the aggregate matching efficiency. A study in Norway found that workers with prior experience in foreign-owned firms contribute about 20% more to their plant's productivity than workers without such experience (Balsvik, 2011). Similarly, research in Brazil showed that domestic establishments enjoyed higher wages and presumably higher productivity after hiring workers from MNEs, indicating that the MNE-trained workers brought valuable human capital and practices with them (Poole, 2013).

4. **Outward-FDI relocation and reverse spillovers.** A newly overtaken affiliate or a greenfield investment abroad could initially substitute for home production, lowering domestic vacancies (substitution effect). However, reverse technology spillovers and the profit repatriation channel will gradually become apparent with a certain time lag, when the affiliate and the invested capital are fully operational and the knowledge flows back to headquarters. Thus, Δs^{out} may raise unemployment in the short run, but reduce it in the long run when higher η and $\bar{\varphi}$ appear.

In summary, these frictions could give smaller and more gradual short-run effects of FDI on productivity and unemployment, while long-run steady-state effects can be substantial once the adjustment process is complete.

3.6 Simulations

Equations (20)–(21) decompose the FDI effect on unemployment into two parts: the response of the per-job surplus to FDI, captured by $\Pi_{s^{\text{in}}}$ and $\Pi_{s^{\text{out}}}$, and the wage-setting wedge that determines how much of this surplus is absorbed by wages, summarized by the Nash-incidence term $(1 - 2\vartheta)$. In our setup, the inward productivity premium $\psi(\vartheta)$ governs how strongly inward FDI shifts the surplus, the outward head-office / reverse-spillover intensity η governs how outward FDI shifts the surplus, and wage bargaining power ϑ affects both Nash incidence and the strength of these complementarities.

We work at annual frequency to stay consistent with OECD worker-flow evidence.[1] The outputs are (i) a 4×3 heatmap figure over the FDI space, (ii) a "threshold" plot that isolates how institutional coordination amplifies FDI effects, and (iii) a compact short-run vs. long-run bar chart. The last exhibit mirrors the error-correction logic we will use in the empirical section with panel ARDL estimates.

[1] We convert monthly job-finding and separation rates to annual figures following Hobijn and Şahin (2007). Country medians are taken from the OECD flow synthesis in Elsby et al. (2013).

Steady state and mapping. The flow steady state is

$$u \;=\; \frac{\delta}{\delta + f(\theta)}, \qquad f(\theta) \;=\; 1 - \exp\!\big(-\, m\,\theta^{\,1-\gamma}\big), \qquad \theta \;=\; \Big[\tfrac{m\,\Pi}{c}\Big]^{1/\gamma}.$$

We use the Poisson mapping for $f(\theta)$ to keep the annual job-finding probability in $(0,1)$ and to preserve variation for large surpluses Π. In steady state, the implementation lag ℓ in the diffusion term drops out, so we write $A = \bar{A}\exp(\chi s^{\text{in}})$. The effective surplus reflects the channels in Section 3: inward premium through ψ, diffusion through A, outward head-office / reverse spillovers through η (via K^{eff}), repatriated profits governed by $(\bar{\varphi}, \kappa)$, and bargaining complementarity (lower ψ and stronger wage moderation at higher ϑ; stronger outward returns when ϑ is high).

3.6.1 Calibration

We pin the annual separation rate δ and the OECD median steady state $u^\star$ from the flow table (Appendix A). The matching scale m is calibrated so that the model reproduces $u^\star$ at a baseline point $(s^{\text{in}}, s^{\text{out}}) = (0.20, 0.10)$ in the low-ψ/low-ϑ regime. All other objects are standard normalizations or level knobs. Table 1 summarizes the parameters used in the figures.

Table 1: Calibration for simulation figures

Parameter	Symbol	Value	Note
Capital share	α	0.33	Standard macro calibration.
Matching elasticity	γ	0.50	Mid-range in matching literature.
Separation rate (annual)	δ	OECD median	From the flow mapping (Appendix).
Target steady state	$u^\star$	OECD median	From the flow mapping (Appendix).
Matching efficiency	m	calibrated	Matches $u^\star$ at $(0.20, 0.10)$ in low-ψ/low-ϑ.
Vacancy cost	c	0.06	Keeps u in a plausible band after m calibration.
Markup (gross)	μ	1.40	Consistent with AE markup evidence.
Outside option	b	0.30	Wage/benefit knob.
Foreign return	r^O	0.07	Order of magnitude for FDI income yields.
Baseline repatriation share	$\bar{\varphi}$	0.28	Plausible repatriation rate.
Reverse spillovers	η	$\{0.05, 0.25, 0.45\}$	Columns in the heatmap figure.
Inward diffusion strength	χ	0.12	In $A = \bar{A}e^{\chi s^{\text{in}}}$.
Repatriation slope	κ	0.08	Linear penalty in s^{out}.
Bargaining complementarity in ψ	$\psi(\vartheta)$	$\psi - \kappa_\psi(\vartheta - 0.5)$	$\kappa_\psi = 0.25$ (clamped to $[0.05, 0.95]$).
Inward wage moderation	W_{mod}	$\phi_{\text{in}}\,\omega_\vartheta\,s^{\text{in}}$	$\phi_{\text{in}} = 0.10$, $\omega_\vartheta = 1 + \mu_\theta(\vartheta - 0.5)$, $\mu_\theta = 0.60$.
HQ/return complementarity (outward)	R_{out}	$\propto (1 + \rho_{\text{out}}(\vartheta - 0.5))$	$\rho_{\text{out}} = 0.50$.
Regimes	(ψ, ϑ)	$\{0.40, 0.60\} \times \{0.35, 0.65\}$	Four rows in the heatmap figure.

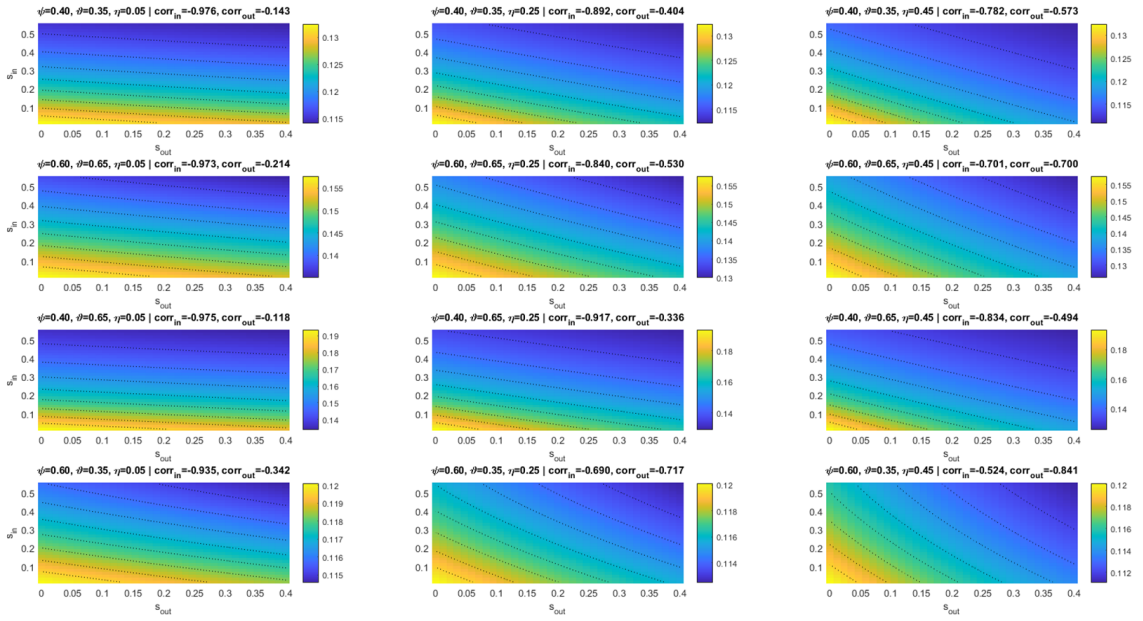
Notes: Annual frequency. Normalizations for $\bar{A}$ and L are omitted.

3.6.2 Heatmaps over FDI space

We compute u on a rectangular grid with $s^{\text{out}} \in [0, 0.40]$ (horizontal) and $s^{\text{in}} \in [0.02, 0.55]$ (vertical). Figure 1 shows 4×3 panels: rows fix the regime (ψ, ϑ), columns vary $\eta \in \{0.05, 0.25, 0.45\}$. Colors indicate the

level of u; thin contours help to read slopes (we do not force a common color scale across panels to keep level shifts visible).

Figure 1: Steady-state unemployment across the FDI space.



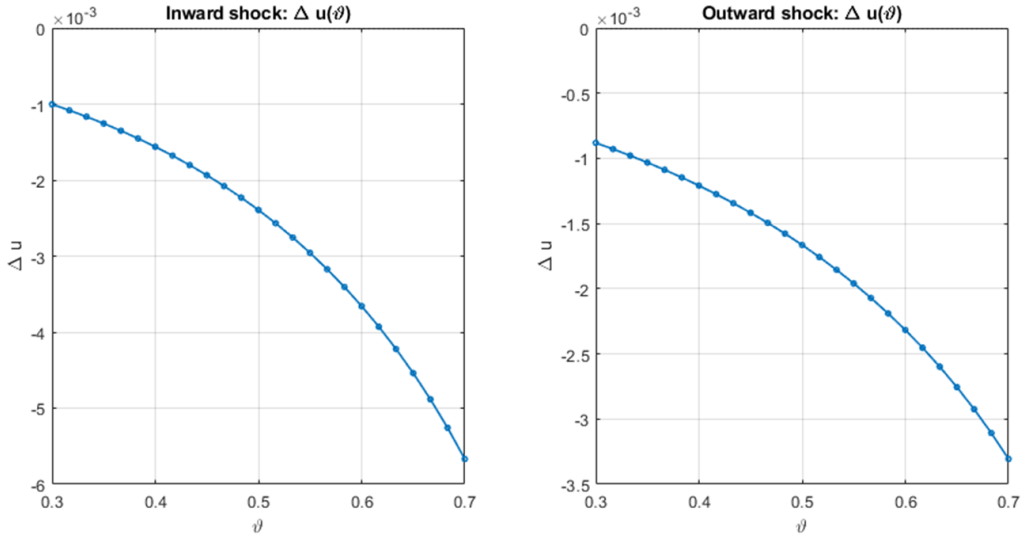
Notes: Rows: $(\psi, \vartheta) \in \{(0.40, 0.35), (0.60, 0.65), (0.40, 0.65), (0.60, 0.35)\}$. Columns: $\eta \in \{0.05, 0.25, 0.45\}$. Axes: $x = s^{\text{out}}$, $y = s^{\text{in}}$. The reported corr_{in} and corr_{out} are correlations between u and s^{in} and between u and s^{out} over the grid.

Three patterns stand out. (i) When the inward premium is strong (low ψ), unemployment falls steeply in s^{in}; the vertical gradient is clearly negative in each column. (ii) Outward FDI lowers u increasingly with η; raising η shifts more of the action to the s^{out} margin through head-office and repatriation channels. (iii) Bargaining power ϑ shifts levels and interacts with both margins; the monotone amplification effect of coordination is isolated in Figure 2. In short, ψ selects which margin dominates, η scales the strength of the outward arm, and ϑ amplifies both.

3.6.3 Bargaining thresholds and SR vs. LR magnitudes

To isolate amplification, we plot the long-run change in u after a small FDI shock as a function of $\vartheta \in [0.30, 0.70]$, holding $(s^{\text{in}}, s^{\text{out}})$ at their medians (Figure 2). Both curves slope down: stronger coordination lowers unemployment more for a given FDI impulse. This complements the heatmaps: by symmetry, moving to a lower ψ (a bigger inward premium, proxied later by distance to the US technology frontier or patent intensity) tilts the effect toward the inward margin, while a higher η strengthens the outward margin.

Figure 2: FDI-bargaining complementarity

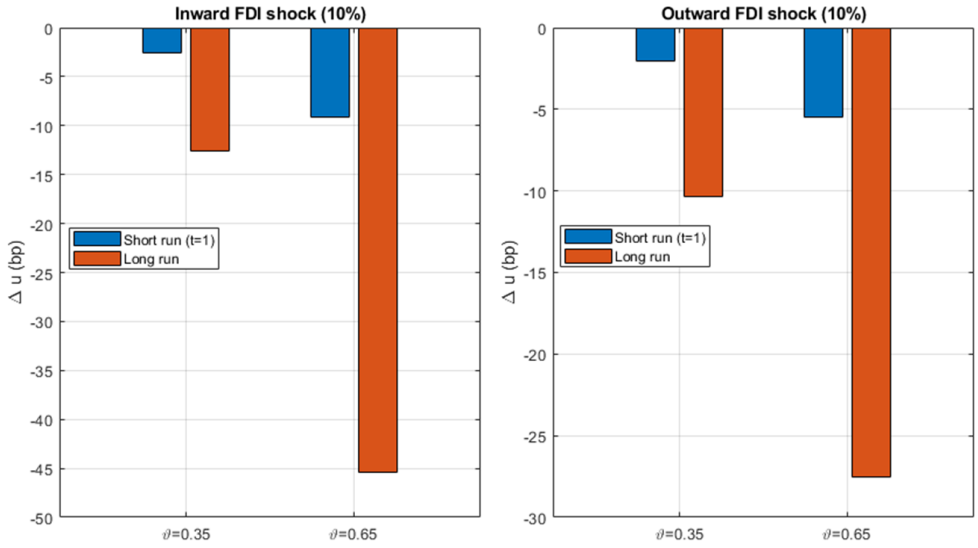


Notes: Long-run $\Delta u(\vartheta)$ after a +10pp shock in s^{in} (left) and in s^{out} (right), evaluated at median FDI levels and the middle column η. Negative values indicate a fall in unemployment.

Finally, to connect tightly to the empirical ECM/ARDL, we report short-run vs. long-run effects for a +10pp shock (Figure 3). Let u_0 denote the pre-shock steady state and u^{LR} the post-shock steady state implied by the new $(s^{\text{in}}, s^{\text{out}})$. The short-run bar equals $\lambda(u^{LR} - u_0)$ with $\lambda = 0.20$ interpreted as a one-period speed of adjustment; the long-run bar is the steady-state difference $u^{LR} - u_0$. Two messages are robust: (i) short-run effects are modest compared to long-run adjustments, consistent with diffusion and vacancy-creation frictions; (ii) the long-run reduction in unemployment is markedly stronger at high ϑ. Quantitatively, the inward arm is larger in our baseline when ψ is low, while the outward arm strengthens as η rises.

What we take to the data. The simulations deliver three testable predictions for the panel ECM/ARDL. (i) Long-run unemployment falls with inward FDI, and this effect is stronger when the inward premium is higher (low ψ) and when bargaining coordination is stronger (ϑ high). We proxy the premium with distance to the technology frontier and with patent intensity. (ii) Long-run unemployment also falls with outward FDI, and the effect scales with reverse-spillover intensity η; coordination again amplifies the response. (iii) Short-run reactions are small relative to long-run adjustments. We therefore estimate interactions of inward and outward FDI with bargaining proxies and with frontier/patent measures, allowing the data to discipline the roles of ψ and η alongside ϑ.

Figure 3: Short-run vs. long-run effects



Notes: Short-run vs. long-run effects (basis points) of a +10pp FDI shock at low vs. high bargaining power. Left: inward FDI shock; right: outward FDI shock. Short run: t=1 in an ECM with $\lambda = 0.20$. Long run: steady-state difference.

4 Empirical Analysis

4.1 The Panel ARDL Model

As mentioned previously, we use a panel ARDL model for the empirical estimation. The panel ARDL model is not only suitable to distinguish between short-term and long-term effects and to model the adjustment process; due to its dynamic structure it also is able to deal with any potential endogeneity. In addition, the model can be estimated regardless of whether the included variables are $I(0)$ or $I(1)$ and is therefore able to deal with nonstationary without losing any important long-term relationships between the variables.

The panel ARDL specification takes the following form:

$$\Delta u_{it} = \sum_{j=1}^{p} \tau_{ij} \Delta u_{i,t-j} + \sum_{j=0}^{q} \zeta_{ij} \Delta X_{i,t-j} + \phi_i (u_{i,t-1} - \sigma_i^{'} X_{it}) + \nu_i + \varepsilon_{it} \tag{23}$$

where u_{it} is the unemployment rate for country i at time t where $i = 1, 2, ..., N$ and $t = 1, 2, ..., T$, $(u_{i,t-1} - \sigma_i^{'} X_{it})$ is the error correction term with ϕ_i as the speed of adjustment parameter, X_{it} is a vector of explanatory variables and Δ is the difference operator. The vector X_{it} includes the following set of variables: either the ratio of inward FDI stock to domestic capital stock IN_{it} or the ratio of outward FDI stock to domestic capital stock OUT_{it}, the inflation rate INF_{it} to account for the Phillips curve effect, real output

growth GDP_{it}, the real wage RW_{it} and total factor productivity TFP_{it}. ν_i are individual country effects and $\sigma_i^{'}$ describes the long-term relationship between the variables. For a long-run equilibrium relationship to exist, the coefficient ϕ_i must be negative and significant. To determine the order of integration of the individual variables in the model, we employ several panel unit root tests by Levin et al. (2002), Harris and Tzavalis (1999) and Breitung (2001). The results, reported in Appendix B which confirm that all variables in the model are stationary in first differences.

The Pooled Mean Group (PMG) estimator proposed by Pesaran et al. (1999) allows the short-term coefficients to differ between the groups, while there is one set of common long-term coefficients. In our case this means that the PMG estimator restricts the long-term effects of FDI on unemployment to be equal across all countries in the model and allows one to obtain consistent and efficient estimates if the assumption of long-term slope homogeneity is true. In case it is not, the estimates are inconsistent. A Hausman test is performed to decide between the pooled and mean-group estimators, where the latter allows for both short- and long-term slope heterogeneity. The results reported in Appendix C support the use of the PMG estimator.

4.2 Data and Variable Construction

We use annual data from 2000 to 2019 for OECD countries[2], which provides an interesting case due to large differences in FDI intensity between individual OECD countries. Inward and outward FDI stock data (millions of US dollar, current prices) are obtained from the United Nations Conference on Trade and Development (UNCTAD). Domestic capital stock data (millions of US dollar, current prices) are taken from the Penn World Table (PWT 10.01, Feenstra et al. (2015)). We compute inward- and outward-FDI-to-capital-stock ratios (in percent). From the same source we take total factor productivity (TFP at constant national prices, 2017=1) and real GDP (at constant 2017 national prices, millions of US dollar) and use the latter to compute annual real GDP growth. In addition, we use the PWT variable for the TFP level at current PPPs (USA=1) to construct our measure of the distance to the technology frontier. The gap to the US technology frontier is defined as 1 minus that country's relative TFP level, so that higher values indicate a larger gap to the US frontier. Data on the unemployment rate and the consumer price index (CPI) are taken from the OECD database. From the same database we obtain PPP-converted wage rates in constant prices to represent real wages.

Previous studies have examined the role of institutional factors for the economic effects of FDI (Pflüger et al. (2013)). We are specifically interested in uncovering whether the FDI effects on unemployment differ depending on the regulatory framework of a country. For this purpose we collect additional variables from

[2]We exclude Luxembourg from the sample of countries due to its outlier role in the relative size of FDI to capital stock ratios.

the Fraser Institute to divide countries into groups depending on the quality and development of their institutions. The first one is business regulations, which measures bureaucracy costs, the regulatory burden on business activity, the partiality of public administration and tax compliance. A higher (lower) score suggests a fewer (more) regulations and is deemed more (less) business-friendly. The second one is labor market regulations, which includes minimum wage laws, hiring and firing regulations, union bargaining power, working hours regulation and mandated costs of worker dismissal. A higher (lower) score here indicates a less (more) regulated labor market which is deemed more flexible (tight).

To test the relative contributions of the ψ and ϑ parameters for the FDI-unemployment nexus, we use an indicator for union bargaining power from the Fraser institute as a proxy for the bargaining parameter. For the panel ARDL analysis we transform several of these variables before including them in the Panel ARDL model. The gap to the US technology frontier and the bargaining power indicator are standardized to z-scores (mean zero and unit variance) over the OECD country-year sample. Inward and outward FDI-to-capital ratios are also standardized to z-scores when used in the baseline specifications and in the interactions with the technology gap and bargaining power, so that their coefficients can be interpreted as the effect of a one-standard-deviation change in the respective FDI-to-capital ratio. Patent intensity has a strongly right-skewed distribution, with many observations at low levels and a few countries with very high patent counts, so we take logs to dampen the influence of these extremes and to allow for nonlinear responses. Patent intensity in logs is then mean-centered, so that its average value in the sample is zero. For the interactions with patent intensity we use mean-centered versions of the FDI-to-capital ratios as well, so that both variables in the interaction term are centered around their sample means. This scaling avoids that the estimates depend on arbitrary measurement units and makes coefficients for different interaction specifications more comparable. It also implies that the main coefficients on the FDI-to-capital ratios and the marginal effects we report are evaluated at average levels of the interaction variables.

4.3 Panel ARDL Results

In this section we present the results obtained from the empirical Panel ARDL model. The baseline results in the first columns of Tables 2 and 3 show the effects of inward and outward FDI-to-capital shares on unemployment for all OECD countries. Beginning with the control variables we observe mostly theory-consistent effects on unemployment. Inflation is negatively related to unemployment in the short run, while long-run inflation effects are small and not robust across specifications, which is in line with the conventional Phillips-curve view. Faster GDP growth reduces the unemployment rate in the long run, consistent with an Okun-type relationship, although the sign is not fully robust once interactions are introduced. A higher labor share is associated with lower unemployment only in the short run, pointing to temporary labor-demand

adjustments rather than a permanent shift. Technology, instead, reduces the unemployment rate in both the short and the long run, suggesting it lowers both transition and steady-state unemployment. The error-correction terms are negative and statistically significant across all specifications, with magnitudes mostly around -0.2 to -0.3. This confirms the existence of a stable long-run relationship between unemployment and the covariates and suggests a moderate speed of adjustment, where roughly one fifth to one third of any deviation from the long-run path is corrected within one year.

Turning to FDI, the short-run effects are insignificant, which is consistent with our expectations that the short-run mechanisms emphasized in the theory (capital-integration channel, technology absorption-lag channel, hiring-and-training diffusion channel, and outward-FDI relocation and reverse-spillover effects) do not materialize quickly. In the long run, however, we do expect to find significant effects. This is only true in the case of outward FDI in the baseline model, where a higher outward FDI-to-capital ratio reduces steady-state unemployment. While the evidence points towards the existence of an outward FDI-unemployment nexus, the baseline model does not directly control for key transmission channels, such as the wage-bargaining channel. Likewise, the absence of any effects in the case of inward FDI suggests that the inward productivity premium is not well accounted for by inward FDI alone. Since the unemployment effects of inward FDI operate through the foreign-capital productivity premium and depend on the interaction with domestic institutions, we proceed to control for both next.

Based on the theoretical framework and simulation results, we now account for the relative importance of key transmission channels of FDI and heterogeneities between countries to that respect. Specifically, we control for the inward premium ψ and bargaining power ϑ by including interaction terms between the inward and outward FDI share variables and proxies that represent each of these factors, as outlined in the Data section. The results for inward FDI, which are reported in Table 2 show that the long-run coefficient on the inward FDI capital share becomes negative and statistically significant once we allow for these interactions. Since the inward FDI variable enters the regression in z-score form, this coefficient can be interpreted as the effect of a one-standard-deviation increase in the inward FDI-to-capital ratio. At the sample mean of the technology gap, the estimated long-run marginal effect is about -1.2, implying that a one-standard-deviation increase in the inward FDI share is associated with roughly 1.2 percentage points lower steady-state unemployment. A higher gap to frontier, referring to less technologically advanced countries, increases unemployment. However, less technologically advanced countries seem to benefit more strongly from inward FDI, likely because they can better exploit foreign technologies and attract high-tech multinationals.

The number of patents relative to the size of the population significantly reduces steady-state unemployment. At average patent intensity, the marginal long-run effect of inward FDI is negative and statistically significant, but this unemployment-reducing effect becomes smaller as innovation capacity rises. Quan-

Table 2: Inward FDI with Interaction

	Baseline	Gap to Frontier	Patents per Capita	Bargaining Power
IN	0.0476	-1.178**	-0.106***	-0.743*
	(0.37)	(-2.58)	(-4.13)	(-2.03)
GAP		0.639***		
		(6.57)		
$IN \times GAP$		-0.878***		
		(-4.54)		
PAT			-1.031***	
			(-4.85)	
$IN \times PAT$			0.0613***	
			(5.94)	
$BARGAIN$				2.589***
				(9.22)
$IN \times BARGAIN$				-1.418***
				(-4.87)
INF	0.00460	0.115*	-0.297***	0.00919
	(0.07)	(2.13)	(-7.97)	(0.16)
GDP	-0.390***	0.0878***	-0.176***	-0.412***
	(-6.44)	(5.64)	(-6.29)	(-8.12)
TFP	-0.273***	0.0602***	-0.274***	-0.236***
	(-9.83)	(5.73)	(-12.35)	(-9.51)
LAB	-2.153	6.039	2.093	-3.221
	(-0.30)	(1.79)	(0.46)	(-0.59)
ECT	-0.185***	-0.285***	-0.220***	-0.179***
	(-7.23)	(-4.22)	(-6.00)	(-5.67)
ΔU_{t-1}	0.351***	0.513***	0.363***	0.376***
	(6.60)	(8.40)	(6.09)	(6.14)
ΔIN	-1.519	-0.563		-2.904
	(1.64)	(-0.11)		(-0.64)
ΔGAP		-3.621		
		(-1.44)		
$\Delta IN \times GAP$		-3.031	2.583	
		(-0.66)	(0.98)	
ΔPAT			-5.779	
			(-0.57)	
$\Delta IN \times PAT$			-0.472	
			(-0.49)	
$\Delta BARGAIN$				0.370
				(0.19)
$\Delta IN \times BARGAIN$				1.140
				(0.32)
ΔINF	-0.0930***	-0.156***	-0.0625	-0.115***
	(-3.55)	(-4.59)	(-1.78)	(-3.78)
ΔGDP	-0.00730	-0.0390*	-0.0230	-0.00883
	(-0.49)	(-2.26)	(-1.37)	(-0.44)
ΔLAB	-21.78***	-13.88*	-19.41**	-16.93**
	(-3.60)	(-2.02)	(-2.79)	(-2.70)
ΔTFP	-0.130**	-0.204***	-0.126*	-0.125**
	(-3.20)	(-3.96)	(-2.51)	(-3.22)
$CONSTANT$	6.992***	-0.787*	7.668***	6.453***
	(7.68)	(-2.42)	(6.73)	(5.81)
N	662	662	662	662

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: Outward FDI with Interaction

	Baseline	Gap to Frontier	Patents per Capita	Bargaining Power
OUT	-4.903**	3.088***	-0.122**	-0.786
	(0.53)	(10.70)	(-2.91)	(-1.67)
GAP		-3.232***		
		(-13.70)		
$OUT \times GAP$		1.699***		
		(5.77)		
PAT			-0.451	
			(-1.81)	
$OUT \times PAT$			0.0614**	
			(3.13)	
$BARGAIN$				2.349***
				(8.20)
$OUT \times BARGAIN$				-1.750***
				(-4.13)
INF	-0.0134	-0.286***	-0.0261	-0.0000409
	(-0.18)	(-10.40)	(-0.47)	(-0.00)
GDP	-0.471***	-0.206***	-0.295***	-0.442***
	(-6.78)	(-8.13)	(-6.59)	(-7.57)
TFP	-0.257***	-0.446***	-0.213***	-0.237***
	(-9.07)	(-20.71)	(-9.08)	(-8.99)
LAB	-13.63	2.097	1.375	-10.75
	(-1.86)	(0.70)	(0.28)	(-1.73)
ECT	-0.198***	-0.197***	-0.248***	-0.191***
	(-10.00)	(-6.91)	(-8.85)	(-8.33)
ΔU_{t-1}	0.361***	0.367***	0.341***	0.360***
	(7.71)	(6.21)	(6.52)	(6.40)
ΔOUT	3.004	24.15	-0.160	-4.604
	(3.34)	(1.13)	(-0.23)	(-0.45)
ΔGAP		1.741		
		(0.14)		
$\Delta OUT \times GAP$		4.764		
		(0.22)		
ΔPAT			-0.844	
			(-0.22)	
$\Delta OUT \times PAT$			0.0181	
			(0.05)	
$\Delta BARGAIN$				-5.324
				(-1.04)
$\Delta OUT \times BARGAIN$				-9.816
				(-1.05)
ΔINF	-0.0927**	-0.0658	-0.0914*	-0.121***
	(-3.24)	(-1.81)	(-2.33)	(-3.61)
ΔGDP	0.00236	-0.0273	0.00727	-0.00743
	(0.15)	(-1.41)	(0.42)	(-0.44)
ΔLAB	-20.61***	-20.31**	-17.35**	-18.06**
	(-3.50)	(-2.68)	(-2.85)	(-3.20)
ΔTFP	-0.112**	-0.137**	-0.109*	-0.0867*
	(-3.02)	(-2.74)	(-2.11)	(-2.52)
$CONSTANT$	8.626***	10.65***	6.989***	7.618***
	(9.82)	(6.93)	(8.98)	(7.96)
N	662	662	662	662

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

titatively, at low levels of patent intensity (around the 10th percentile of the distribution), the marginal long-run effect of inward FDI-to-capital is about -0.3 percentage points and strongly significant. At high patent intensity (around the 90th percentile), the marginal effect turns small and slightly positive (about +0.03 percentage points) and is no longer statistically different from zero at conventional levels. It seems that, once domestic firms are already technologically strong, additional foreign knowledge mainly replaces activity in less productive local firms instead of generating broad-based upgrading, so that crowding-out effects can offset part of the expected employment gains from inward FDI.

Bargaining power, on the other hand, amplifies the benefits of inward FDI for domestic jobs. In the bargaining specification, the long-run coefficient on the inward FDI-to-capital ratio is about -0.74, so that at average bargaining power a one-standard-deviation increase in inward FDI-to-capital is associated with a reduction in the unemployment rate of roughly 0.7 percentage points. The interaction term with bargaining power is large and negative (around -1.4), indicating that the unemployment-reducing effect of inward FDI becomes stronger as bargaining power increases. Quantitatively, at one standard deviation below (above) the mean of the bargaining-power index, suggesting weaker (stronger) unions and more (less) employer-friendly institutions, the implied long-run effect of inward FDI on unemployment is positive (negative). This implies that inward FDI tends to increase unemployment when bargaining power is very weak, but becomes strongly unemployment-reducing once bargaining power reaches at least moderate levels.

Table 3 presents the results for outward FDI. In the gap-to-frontier specification a one-standard-deviation increase in outward FDI-to-capital is associated with roughly 3 percentage points higher unemployment. The positive interaction term with the standardized technology gap further indicates that this unemployment-increasing effect becomes stronger as countries move further away from the US frontier. In more technologically advanced economies, the estimated marginal effect of outward FDI on unemployment is about 1.4 percentage points, whereas in less advanced economies it rises to almost 4.8 percentage points. These results may reflect outward-FDI relocation effects and weak domestic absorption of complementary headquarter services, so that employment at home falls before reverse-spillover and head-office complementarities materialize.

At average levels of patenting a higher outward FDI-to-capital ratio is associated with lower steady-state unemployment, but this unemployment-reducing effect becomes weaker as innovation capacity rises. At low patent intensity (around the 10th percentile of the log patent distribution) a one percentage-point increase in the outward FDI-to-capital ratio is associated with a reduction in the unemployment rate of about 0.33 percentage points, while at the median this marginal long-run effect is much smaller, at roughly 0.08 percentage points. At high patent intensity the marginal effect is close to zero. Thus, outward FDI appears to be most employment-friendly in countries with low to intermediate patent intensity, while in highly innovative economies additional outward FDI no longer generates clear net employment gains at

Table 4: Inward FDI with Interaction and Business Environment

	More Business-friendly	Less Business-friendly	More Business-friendly	Less Business-friendly	More Business-friendly	Less Business-friendly
IN	1.155***	-4.999**	-0.299***	-0.173**	-1.326**	-1.857***
	(6.30)	(-2.71)	(-6.33)	(-2.90)	(-2.71)	(-3.90)
GAP	-0.0645	0.879				
	(-0.21)	(1.54)				
$IN \times GAP$	0.663**	4.066**				
	(2.84)	(2.63)				
PAT			-1.230***	-1.204**		
			(-3.58)	(-3.21)		
$IN \times PAT$			0.142***	0.0387		
			(7.52)	(1.52)		
$BARGAIN$					2.478***	1.276***
					(8.17)	(3.79)
$IN \times BARGAIN$					-1.871***	2.210***
					(-4.88)	(5.77)
INF	-0.492***	0.318***	-0.460***	-0.123**	-0.0488	0.219**
	(-14.32)	(3.46)	(-9.02)	(-2.79)	(-0.52)	(3.14)
GDP	-0.0485*	0.234***	-0.0962***	-0.368***	-0.383***	0.150***
	(-2.16)	(7.16)	(-3.44)	(-6.59)	(-6.21)	(3.67)
TFP	-0.154***	-0.0179	-0.275***	-0.199***	-0.235***	-0.650***
	(-6.33)	(-0.76)	(-8.22)	(-6.68)	(-6.28)	(-18.25)
LAB	-4.980	22.19***	-17.88***	-13.14	-11.74*	51.08***
	(-1.94)	(4.06)	(-3.42)	(-1.29)	(-2.02)	(5.79)
ECT	-0.236***	-0.254*	-0.235***	-0.214***	-0.215***	-0.190***
	(-4.76)	(-2.19)	(-4.85)	(-4.10)	(-4.53)	(-3.95)
ΔU_{t-1}	0.550***	0.391***	0.502***	0.221**	0.451***	0.279**
	(5.96)	(4.27)	(5.54)	(3.13)	(5.26)	(2.94)
ΔIN	3.060	-7.311	-0.143	5.672	-2.100	-4.868
	(1.17)	(-0.88)	(-0.23)	(0.99)	(-0.35)	(-0.58)
ΔGAP	-1.568	-2.208				
	(-1.03)	(-0.67)				
$\Delta IN \times GAP$	-0.935	-1.490				
	(-0.31)	(-0.22)				
PAT			2.981	-15.03		
			(1.02)	(-0.68)		
$\Delta IN \times PAT$			0.223	-1.311		
			(0.62)	(-0.62)		
$\Delta BARGAIN$					-1.051	6.802
					(-0.46)	(1.84)
$\Delta IN \times BARGAIN$					-0.249	9.560
					(-0.05)	(1.46)
ΔINF	-0.103	-0.128**	-0.0481	-0.0649	-0.134**	-0.0924*
	(-1.86)	(-2.98)	(-0.83)	(-1.75)	(-2.75)	(-2.14)
ΔGDP	-0.0783**	-0.00741	-0.0756**	0.0428*	-0.0531*	0.00859
	(-2.92)	(-0.27)	(-2.81)	(2.48)	(-2.13)	(0.31)
ΔLAB	-19.10**	-9.745	-11.67	-18.65	-18.09*	-17.27
	(-2.79)	(-0.82)	(-1.48)	(-1.62)	(-2.53)	(-1.82)
ΔTFP	-0.151*	-0.243***	-0.0881	-0.158*	-0.0513	-0.207*
	(-2.10)	(-3.37)	(-1.17)	(-2.54)	(-1.19)	(-2.55)
$CONSTANT$	6.001***	-0.516	10.79***	7.759***	8.534***	8.752***
	(4.92)	(-1.20)	(4.84)	(4.93)	(4.25)	(4.11)
N	342	320	342	320	342	320

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5: Outward FDI with Interaction and Business Environment

	More Business-friendly	Less Business-friendly	More Business-friendly	Less Business-friendly	More Business-friendly	Less Business-friendly
OUT	4.229***	-6.304***	0.0408	-0.924***	-0.361	-3.421***
	(7.19)	(-4.72)	(0.56)	(-3.37)	(-0.94)	(-7.10)
GAP	-4.638***	1.606*				
	(-7.79)	(2.34)				
$OUT \times GAP$	1.888*	7.900***				
	(2.45)	(12.04)				
PAT			-0.817*	2.949*		
			(-2.26)	(2.54)		
$OUT \times PAT$			0.0223	0.153		
			(0.83)	(1.60)		
$BARGAIN$					1.671***	0.0380
					(4.82)	(0.10)
$OUT \times BARGAIN$					-2.770***	2.876***
					(-8.76)	(8.99)
INF	-0.146	-0.146***	-0.0932	-0.134***	-0.542***	0.137**
	(-1.01)	(-9.57)	(-1.22)	(-3.89)	(-5.90)	(2.61)
GDP	-0.425***	-0.306***	-0.276***	-0.257***	-0.467***	-0.173**
	(-5.65)	(-12.67)	(-5.14)	(-17.57)	(-7.93)	(-2.71)
TFP	-0.708***	-0.360***	-0.294***	-0.0936***	-0.545***	-0.239***
	(-10.78)	(-9.04)	(-6.78)	(-5.68)	(-9.57)	(-7.52)
LAB	-2.838	9.157**	17.13**	64.78***	-52.42***	41.16***
	(-0.36)	(3.14)	(2.67)	(22.76)	(-7.49)	(6.12)
ECT	-0.146***	-0.212***	-0.225***	-0.199***	-0.171***	-0.233***
	(-5.55)	(-6.62)	(-5.38)	(-6.76)	(-4.98)	(-6.85)
ΔU_{t-1}	0.348***	0.310***	0.375***	0.259***	0.393**	0.325***
	(3.64)	(4.62)	(3.98)	(4.81)	(3.27)	(4.57)
ΔOUT	60.97	11.92	0.337	-2.327	-5.611	2.889
	(1.04)	(0.55)	(0.46)	(-0.95)	(-0.54)	(0.21)
ΔGAP	-19.99	9.002				
	(-0.97)	(0.44)				
$\Delta OUT \times GAP$	-32.49	17.42				
	(-0.90)	(0.47)				
PAT			1.607	-13.56		
			(0.52)	(-1.35)		
$\Delta OUT \times PAT$			0.188	-1.286		
			(0.54)	(-1.26)		
$\Delta BARGAIN$					-4.527	1.300
					(-0.91)	(0.18)
$\Delta OUT \times BARGAIN$					-8.795	0.776
					(-0.88)	(0.06)
ΔINF	-0.108*	-0.0395	-0.0845	-0.0888	-0.0853	-0.0970*
	(-2.24)	(-0.93)	(-1.30)	(-1.94)	(-1.39)	(-2.44)
ΔGDP	-0.0491*	0.0155	-0.0527*	0.0467*	-0.0541*	0.0132
	(-2.03)	(0.57)	(-2.23)	(2.10)	(-2.11)	(0.56)
ΔLAB	-18.73**	-16.73	-17.13*	-25.91*	-17.41*	-21.77**
	(-2.60)	(-1.17)	(-2.35)	(-2.28)	(-2.26)	(-2.70)
ΔTFP -0.0971	-0.141*	-0.0161	-0.213**	-0.0246	-0.181**	
	(-1.36)	(-2.31)	(-0.23)	(-2.84)	(-0.55)	(-2.72)
$CONSTANT$	11.55***	8.481***	6.052***	-4.238***	16.22***	1.876***
	(5.27)	(7.25)	(5.48)	(-4.44)	(4.94)	(6.11)
N	342	320	342	320	342	320

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Inward FDI with Interaction and Labor Market Flexibility

	More Labor Flexibility	Less Labor Flexibility	More Labor Flexibility	Less Labor Flexibility	More Labor Flexibility	Less Labor Flexibility
IN	0.672*	-15.99**	-0.291***	-0.0459	-2.454*	-2.081**
	(2.38)	(-3.28)	(-6.86)	(-0.76)	(-2.54)	(-2.73)
GAP	-1.960***	10.65***				
	(-12.58)	(5.43)				
$IN \times GAP$	2.132***	13.32***				
	(7.07)	(3.33)				
PAT			-1.234***	-0.708		
			(-4.12)	(-1.70)		
$IN \times PAT$			0.138***	0.0437*		
			(8.14)	(2.22)		
$BARGAIN$					1.957*	-0.520
					(2.39)	(-1.18)
$IN \times BARGAIN$					1.811*	-1.233
					(2.03)	(-1.60)
INF	-0.0131	0.134	-0.456***	0.0363	0.385**	0.246***
	(-0.38)	(1.27)	(-9.01)	(0.83)	(2.68)	(3.66)
GDP	-0.129***	-0.224**	-0.106***	0.0110	-0.683***	0.127***
	(-3.55)	(-3.05)	(-3.85)	(0.53)	(-5.02)	(4.31)
TFP	-0.437***	-0.371***	-0.282***	0.00941	-0.233***	0.0748***
	(-20.82)	(-7.06)	(-9.87)	(0.58)	(-3.58)	(4.47)
LAB	13.81**	24.84*	-17.63***	29.30***	125.3***	27.23***
	(3.23)	(2.53)	(-3.48)	(5.66)	(6.03)	(5.33)
ECT	-0.227***	-0.181**	-0.225***	-0.307***	-0.0882**	-0.222**
	(-3.55)	(-3.26)	(-4.05)	(-5.65)	(-2.91)	(-3.14)
ΔU_{t-1}	0.408***	0.274**	0.407***	0.373***	0.331***	0.425***
	(5.70)	(3.09)	(4.73)	(4.89)	(5.16)	(4.08)
ΔIN	0.598	10.16*	5.233	-0.464	-1.241	4.668
	(0.10)	(2.18)	(1.03)	(-0.69)	(-0.19)	(0.74)
ΔGAP	-3.462	-6.812*				
	(-1.71)	(-2.15)				
$\Delta IN \times GAP$	-4.886	-11.15				
	(-1.20)	(-1.94)				
PAT			-13.55	4.057		
			(-0.69)	(1.20)		
$\Delta IN \times PAT$			-1.322	0.523		
			(-0.71)	(1.43)		
$\Delta BARGAIN$					4.290*	-0.517
					(2.43)	(-0.17)
$\Delta IN \times BARGAIN$					6.557	2.649
					(1.87)	(0.46)
ΔINF	-0.115*	-0.0990*	-0.0438	-0.128**	-0.121**	-0.181***
	(-2.21)	(-2.47)	(-0.77)	(-2.60)	(-2.93)	(-4.06)
ΔGDP	-0.0430	-0.00902	-0.0274	-0.0287	-0.00303	-0.0569*
	(-1.81)	(-0.43)	(-0.98)	(-1.66)	(-0.09)	(-2.25)
ΔLAB	-12.00	-23.85*	-13.11	-22.77*	-11.15	-17.78*
	(-1.46)	(-2.02)	(-1.34)	(-2.26)	(-1.13)	(-2.04)
ΔTFP	-0.0625	-0.154*	-0.144	-0.174*	-0.152**	-0.187*
	(-0.90)	(-2.22)	(-1.87)	(-2.31)	(-2.74)	(-2.53)
$CONSTANT$	9.959***	4.260***	10.55***	-2.903***	-3.487*	-3.264**
	(3.80)	(3.38)	(4.32)	(-5.03)	(-2.44)	(-3.05)
N	338	324	338	324	338	324

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Outward FDI with Interaction and Labor Market Flexibility

	More Labor Flexibility	Less Labor Flexibility	More Labor Flexibility	Less Labor Flexibility	More Labor Flexibility	Less Labor Flexibility
OUT	0.628	-3.289**	-0.253***	0.0172	-1.900**	-14.78***
	(1.73)	(-2.61)	(-5.86)	(0.41)	(-3.21)	(-4.71)
GAP	-2.197***	-2.711***				
	(-11.07)	(-6.33)				
$OUT \times GAP$	3.554***	1.623				
	(9.16)	(1.53)				
PAT			-0.737*	-0.368		
			(-2.27)	(-0.79)		
$OUT \times PAT$			0.115***	0.00497		
			(5.82)	(0.14)		
$BARGAIN$					-1.709**	2.398***
					(-3.06)	(5.46)
$OUT \times BARGAIN$					-0.111	-2.940
					(-0.17)	(-1.37)
INF	-0.184***	-0.101	-0.175*	0.0548	0.472***	0.0345
	(-8.78)	(-1.54)	(-2.25)	(1.63)	(5.66)	(0.37)
GDP	-0.184***	0.147***	-0.261***	0.0534***	-0.597***	-0.630***
	(-10.78)	(4.89)	(-5.11)	(4.64)	(-6.50)	(-5.26)
TFP	-0.484***	-0.328***	-0.267***	0.00379	-0.0972**	-0.0856*
	(-19.70)	(-10.37)	(-8.29)	(0.30)	(-2.72)	(-2.20)
LAB	3.576	27.59***	-7.887	14.24***	18.04*	-19.79
	(1.42)	(4.59)	(-1.30)	(5.13)	(1.98)	(-1.64)
ECT	-0.227***	-0.230***	-0.274***	-0.443***	-0.174***	-0.149***
	(-5.44)	(-3.78)	(-6.16)	(-4.09)	(-7.16)	(-4.23)
ΔU_{t-1}	0.451***	0.281***	0.380***	0.399***	0.444***	0.313***
	(8.10)	(3.63)	(4.72)	(5.17)	(7.50)	(3.90)
ΔOUT	43.73	6.284	1.301	-1.077	10.68	3.819
	(1.03)	(0.31)	(1.02)	(-1.23)	(0.99)	(0.34)
ΔGAP	-15.36	19.24				
	(-1.01)	(0.91)				
$\Delta OUT \times GAP$	-27.11	35.95				
	(-1.01)	(0.95)				
PAT			4.814	0.234		
			(0.63)	(0.09)		
$\Delta OUT \times PAT$			0.646	0.228		
			(0.84)	(0.61)		
$\Delta BARGAIN$					0.900	-3.215
					(0.19)	(-0.74)
$\Delta OUT \times BARGAIN$					0.171	-5.137
					(0.02)	(-0.60)
ΔINF	-0.0662	-0.115**	-0.0666	-0.149*	-0.180***	-0.0854
	(-1.18)	(-2.84)	(-1.11)	(-2.47)	(-4.22)	(-1.76)
ΔGDP	-0.0324	-0.0543*	0.00621	-0.0269	0.0147	-0.00160
	(-1.01)	(-2.44)	(0.22)	(-1.28)	(0.54)	(-0.08)
ΔLAB	-9.208	-30.38**	-12.10	-20.45*	-13.76	-17.85*
	(-0.73)	(-2.89)	(-1.40)	(-2.13)	(-1.74)	(-1.97)
ΔTFP	-0.0482	-0.195*	-0.0986	-0.157	-0.0723	-0.101
	(-0.76)	(-2.16)	(-1.29)	(-1.89)	(-1.41)	(-1.92)
$CONSTANT$	12.41***	6.231***	10.35***	-0.567	1.082***	4.001***
	(5.51)	(3.75)	(6.14)	(-1.20)	(5.05)	(4.10)
N	338	324	338	324	338	324

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

home.

The case is different for bargaining power, which appears to be a key channel through which outward FDI lowers unemployment. At average bargaining power a one-standard-deviation increase in the outward FDI-to-capital ratio is associated with a reduction in the unemployment rate of roughly 0.8 percentage points. The interaction term with the standardized bargaining index is large and negative (around -1.75), implying that the unemployment-reducing effect of outward FDI becomes stronger as bargaining power increases. With bargaining power one standard deviation below (above) its mean the implied marginal long-run effect of outward FDI-to-capital is positive (negative), around 0.96 (-2.5) percentage points. This pattern suggests that outward FDI tends to raise unemployment when unions are weak and employment protection is low, but becomes clearly unemployment-reducing once bargaining power reaches at least moderate levels. In the presence of strong union representation, multinational firms have less flexibility to displace domestic jobs through offshoring, so that outward FDI is more closely tied to head-office, coordination and export activities that support domestic employment and lower steady-state unemployment.

In summary, it seems that the long-run effects of both inward and outward FDI-to-capital depend strongly on the initial innovative capacity of the country and institutional labor market factors. As a next step we further explore heterogeneities by accounting for the overall business-friendliness and the flexibility of the labor market.

Tables 4 and 5 show the results under different degrees of business friendliness while Tables 6 and 7 report the results under different labor market flexibilities for inward and outward FDI-to-capital. Overall, the business-environment split suggests that whether FDI is associated with lower unemployment depends not only on innovative capacity and the technology gap, but also on how easily firms can restructure and reallocate activity (a setting where relocation effects can dominate before complementarities materialize). A more business-friendly environment can enhance the unemployment-reducing effects of inward FDI-to-capital when supported by a higher innovative capacity and a relatively small gap to the technology frontier, and when bargaining power does not become excessively strong. However, for business-friendly economies that are still far from the frontier, inward FDI is associated with higher unemployment, which fits an interpretation where efficiency-seeking and export-platform FDI dominate and crowd out domestic production. These productivity gains and employment effects become weaker as countries become more technologically advanced and the marginal contribution of additional foreign capital to domestic upgrading declines. For outward FDI, a larger technology gap tends to be associated with higher unemployment, suggesting increased offshoring in this case and limited domestic absorption of headquarter services. In less business-friendly countries, inward FDI more consistently lowers unemployment, but a large technology gap and very strong bargaining power can dampen this effect. Outward FDI is only unemployment-reducing when technological capabilities are strong, i.e. when economies are more advanced and institutions restrict

very rapid displacement of domestic jobs. In the labor-market-flexibility split, the unemployment effects of both inward and outward FDI are comparatively modest, and the interaction patterns with technology, innovative capacity and bargaining power are less clear-cut than in the business-environment splits.

5 Conclusion

This paper examined the FDI-unemployment nexus in OECD countries. We first developed a theoretical basis for the effects of the in- and outward FDI share on unemployment in a search-and-matching model. The related simulation results show that inward FDI consistently reduces unemployment, while outward FDI tends to do so more when reverse spillovers are strong. Higher bargaining power increases the unemployment gains of FDI shocks.

Finally, using a pooled-mean group panel ARDL model, we empirically traced out the transmission channels identified in the theoretical framework. The results are consistent with the theoretical framework and confirm a stable long-run relationship between unemployment and FDI. The adjustment speed is moderate which points towards gradual technology diffusion, capital deepening and reverse spillovers.

It is shown that country heterogeneities in the FDI-unemployment nexus are influenced by the level of technological advancement, regulatory environment and institutional quality, which influence both capital integration capacity and technology diffusion. Inward FDI is more unemployment-reducing in countries which are further from the technology gap and less patent-intensive, suggesting that the ability to benefit from FDI spillovers is larger in less innovative and technologically advanced countries. Outward FDI is beneficial for lowering unemployment in countries with strong bargaining institutions, suggesting that high absorptive capacity and strong labor-market institutions allow outward FDI to add to domestic employment even before complementary technologies and spillovers can fully materialize.

Under these conditions, the FDI–unemployment nexus is strongest in countries with a more business-friendly environment, which facilitates the adjustment process and accelerates convergence to the steady state, whereas variations in labor-market flexibility are associated with only modest and less systematic differences in the employment effects of FDI.

Our findings reveal several policy implications. First, FDI is not a unique job policy tool. Attracting FDI seems to reduce unemployment if the host economy is able to translate foreign capital and associated technological improvements into domestic production processes. Thus, policies that strengthen supply chain linkages and technology diffusion could help to reinforce this mechanism – especially in countries further away from the technological frontier: supplier development programs, training efforts that fit local skill needs, and cooperation formats where multinationals and domestic firms work together. Second, in the case of more advanced and highly innovative economies, the composition and integration of FDI seems to

be more important than an active FDI-attraction policy. More generally, in shaping the impact of both inward and outward FDI on unemployment, (labor) market competition policies and institutions appear to be crucial conditioning factors. Hence, policy measures related to employee rights, social security, and worker representation can make FDI more employment-friendly by limiting pure offshoring and by shifting adjustment toward productivity-enhancing reorganization. At the same time, these institutions should be understood as a complement to innovation and diffusion capacity within the economy.

Nevertheless, several limitations exists in our study. The used proxies for bargaining power innovative capacity, and technology-gap to frontier are imperfect. Moreover, given the aggregated data on FDI, it is not possible to distinguish (i) between the effects of greenfield and M&A FDI and (ii) between different outward FDI motives (e.g. market seeking, efficiency seeking or technology sourcing) on unemployment dynamics. Using disaggregated sectoral or firm-level data could give a deeper insight into the nexus between FDI and unemployment.

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A Flow-based calibration details

This appendix documents the worker-flow mapping used in Section 3.6. We rely on the cross-country worker-flow dataset assembled by Elsby, Hobijn, and Şahin (EHS) for OECD economies (Elsby et al., 2013) and the frequency-mapping approach set out by Hobijn and Şahin (Hobijn and Şahin, 2007).

Table 8 reports, for each country in the EHS OECD set, the monthly job-finding and separation hazards (f_m, s_m) and their annual counterparts, constructed as

$$f_y = 1 - (1 - f_m)^{12}, \qquad \delta_y = 1 - (1 - s_m)^{12}.$$

The final column gives the implied flow steady state at annual frequency, $u_y^\star = \delta_y/(\delta_y + f_y)$.

As described in Section 3.6.2, the heatmap calibration uses only two aggregates from this table: (i) the sample median of δ_y as the annual separation rate in the model and (ii) the sample median of $u_y^\star$ to pin the matching-efficiency scale m at a baseline FDI point. All other entries are reported for transparency and for potential heterogeneity analyses.

Construction notes.

- Monthly hazards are taken from the EHS OECD compilation (Elsby et al., 2013); the annual mapping follows standard compounding used in the flow literature (Hobijn and Şahin, 2007).
- Medians are computed over the reported country rows; these medians are the only flow inputs entering the steady-state heatmaps in Section 3.6.
- Technology and labor normalizations ($\bar{A}$, L) are unit choices and are therefore omitted here.

Table 8: OECD worker-flow hazards: monthly rates and annual mappings (EHS sample, 14 countries)

Country	f_m (monthly)	s_m (monthly)	f_y (annual)	δ_y (annual)	$u_y^\star$ (implied)
Australia	0.22829	0.01650	0.95539	0.18102	0.15929
Canada	0.26135	0.02358	0.97362	0.24902	0.20367
France	0.07721	0.00672	0.61870	0.07775	0.11163
Germany	0.06029	0.00537	0.52583	0.06261	0.10639
Ireland	0.05860	0.00604	0.51548	0.07016	0.11980
Italy	0.04298	0.00446	0.40969	0.05227	0.11315
Japan	0.18939	0.00608	0.91952	0.07055	0.07125
New Zealand	0.28495	0.01740	0.98213	0.18991	0.16203
Norway	0.38482	0.01560	0.99706	0.17194	0.14708
Portugal	0.06319	0.00408	0.54310	0.04793	0.08109
Spain	0.06270	0.01060	0.54025	0.12002	0.18177
Sweden	0.29199	0.01172	0.98413	0.13192	0.11820
United Kingdom	0.13909	0.01048	0.83423	0.11875	0.12461
United States	0.56452	0.03565	0.99995	0.35316	0.26100
Sample median	**0.16424**	**0.01054**	**0.87687**	**0.11939**	**0.12221**

B Panel Unit Root and Cointegration Test Results

Table 9: Panel Unit Root Tests

	Levin-Lin-Chu	Harris-Tzavalis	Breitung
u_t	0.0000	0.8035	0.2129
IN_t	0.0273	0.0866	0.9999
OUT_t	0.2154	0.3273	1.0000
INF_t	0.0000	0.0000	0.0000
GDP_t	0.0000	0.0000	0.0000
LAB_t	0.0000	0.1600	0.1063
TFP_t	0.0000	0.8497	1.0000
GAP_t	0.0041	0.9876	0.9906
PAT_t	0.0000	0.0029	0.9991
$BARG_t$	0.0000	0.0000	0.0000
Δu_t	0.0000	0.0000	0.0000
ΔIN_t	0.0000	0.0000	0.0000
ΔOUT_t	0.0000	0.0000	0.0000
ΔINF_t	0.0000	0.0000	0.0000
ΔGDP_t	0.0000	0.0000	0.0000
ΔLAB_t	0.0000	0.0000	0.0000
ΔTFP_t	0.0000	0.0000	0.0000
ΔGAP_t	0.0000	0.0000	0.0000
ΔPAT_t	0.0000	0.0000	0.0000
$\Delta BARG_t$	0.0000	0.0000	0.0000

Notes: P-values of panel unit root tests.

Table 10: Panel Cointegration Tests

	Kao	Pedroni	Westerlund
Inward FDI			
Baseline	0.0001	0.0000	0.0001
Gap to Frontier	0.0013	0.0000	0.0003
Patents per Capita	0.0000	0.0000	0.0000
Bargaining Power	0.0001	0.0000	0.0000
Outward FDI			
Baseline	0.0001	0.0000	0.0133
Gap to Frontier	0.0016	0.0000	0.0024
Patents per Capita	0.0000	0.0000	0.0000
Bargaining Power	0.0002	0.0000	0.0000

Notes: P-values of panel cointegration tests for individual model specifications.

C Hausman Test Results

Table 11: Hausman Test

	Inward FDI	Outward FDI
Baseline	0.1571	0.1417
Gap to Frontier	0.0038	0.0556
Patents per Capita	0.1089	0.1854
Bargaining Power	0.2956	0.4619

Notes: P-values of Hausman test of mean-group (MG) versus pooled mean-group (PMG) estimators.