Responsible Sourcing? Theory and Evidence from Costa Rica*

Alonso Alfaro-Ureña,† Benjamin Faber,‡ Cecile Gaubert,§
Isabela Manelici,¶ Jose P. Vasquez‖

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Abstract

Multinational enterprises (MNEs) increasingly impose "responsible sourcing" (RS) standards on their suppliers worldwide, including requirements on worker compensation, benefits and working conditions. Are these policies just 'hot air' or do they impact exposed suppliers? If so, what is the welfare incidence of RS in general equilibrium (GE) on average and across worker types in sourcing origin countries? To answer these questions, we develop a quantitative theoretical model of RS and combine it with a unique new database. In the theory, we show that the welfare implications of RS are *a priori* ambiguous, depending on an interplay between what is akin to an export tax (+) and a labor market distortion (−). Empirically, we build a database covering the near-universe of RS rollouts by more than 400 MNE affiliates in Costa Rica (CR) since 2009, linked with firm-to-firm transactions and matched employer-employee microdata for all CR firms. Using these data, we find that RS rollouts lead to significant reductions in firm sales and employment at exposed suppliers, an increase in their salary payments to initially low-wage workers and a reduction in their low-wage employment share. We then use the estimated effects and the microdata to calibrate the model and quantify counterfactuals in GE. We find that while MNE RS policies have led to significant welfare gains among the roughly 20% of low-wage workers who are employed at exposed suppliers *ex ante*, the real incomes of the remaining majority of low-wage workers in CR decline due to adverse indirect effects on their wages and the domestic price index.

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†Banco Central de Costa Rica and Universidad de Costa Rica.

‡UC Berkeley, CEPR and NBER.

§UC Berkeley, CEPR and NBER.

¶London School of Economics and CEPR.

‖London School of Economics and CEPR.

1 Introduction

Demands by policy-makers and the general public for multinational enterprises (MNEs) to "clean up their supply chains" and implement "responsible sourcing" (RS) requirements for their suppliers in low- and middle-income countries have become widespread over recent years (e.g., ILO, 2016). RS requirements mainly take the form of "supplier codes of conduct" and typically include compulsory standards on working conditions (such as wage floors, guaranteed benefits, maximum working hours, paid leave and safety standards), other production practices (such as worker representation and environmental standards) and enforcement provisions for monitoring and third-party auditing. Despite the growing adoption of RS by MNEs, there is limited theoretical work or empirical evidence on the economic incidence of these policies and their effectiveness at raising the welfare of stakeholders in the sourcing origin countries.[1] Our analysis here sets focus on the part of RS practices that concern workers and working conditions, leaving the analysis of, e.g., their environmental consequences for future research.

In this context, our paper makes several contributions. First, we develop a quantitative general equilibrium (GE) model to guide the analysis and study the incidence of RS. We show that the effect on domestic welfare is a priori ambiguous and sensitive to alternative hypotheses about the motivation behind RS by MNEs and the market environment in which RS is implemented. Second, we build a unique new database that allows us to track the rollout of RS requirements by MNE affiliates and trace their effect on domestic suppliers and their workers in all sectors, including local service providers that account for the majority of firm-to-firm sales to MNEs in the data. The empirical context is Costa Rica (CR), a middle-income country with hundreds of domestically sourcing MNE subsidiaries across a wide range of economic activities, and where RS policies have affected an increasing share of domestic producers. We find that 38% of all production by non-MNE CR firms was subject to an active RS code of conduct by the end of our sample in 2019.[2] We use this database and empirical context to provide new evidence on the effect of RS rollouts on exposed suppliers and their workers. Third, we combine the estimated effects with the model's comparative statics to calibrate the model and conduct counterfactual analyses of the welfare implications of RS in CR on average and across worker types.

Our analysis proceeds in four main steps. In the first step, we develop the theory. In the model, heterogeneous firms in the sourcing origin country produce goods for their domestic market, exports and for intermediate inputs used by foreign-owned subsidiaries of MNEs. We model RS policies as an increase in the labor cost of MNE suppliers that becomes mandatory for selling to the MNE and affects all of the suppliers' production (to all buyers, including domestic ones). Firms employ two types of workers in their production: low-wage workers for whom RS standards may be binding, and high-wage workers for whom RS standards are less likely to be binding. The model nests several alternative hypotheses that matter for the incidence of RS about (i) the motivation underlying RS policies by MNEs, and (ii) the market environment in which these

[1] See discussion of related work below.

[2] 38% of output by non-MNE CR firms in 2019 was produced by firms selling to MNE buyers with active RS codes.

requirements are implemented.

As to the MNE's motivation, they face output demand on world markets that may be a direct function of their sourcing practices, capturing potential pressure by their consumers to implement more equitable practices across the globe. In this setting, RS rollouts can be rationalized through the lens of profit maximization (trading off potential shifts in output demand vs. higher input costs). Alternatively, RS practices may also be motivated by reasons not directly related to short- or medium-run MNE profit maximization (i.e. without a discernible shift in MNE output demand). As to the market environment, large MNE buyers may exert monopsonistic market power when sourcing inputs from the origin markets, leading to an imperfect pass-through of higher production costs from their suppliers to MNE input prices. Conversely, domestic firms may exert monopsonistic market power in the labor market, leading to pre-existing markdowns on wages (and thus providing a potential policy rationale for MNE-imposed wage floors). Finally, RS rollouts may lead to direct productivity effects on suppliers due to contemporaneous transfers of technology or expertise by the MNE that may accompany RS announcements.

In this setting, we first derive expressions for partial equilibrium comparative statics that we can estimate in the data: comparing changes in firm and worker outcomes due to a new RS rollout event among "exposed suppliers" – those above a productivity cutoff for selling to the MNE prior to the RS rollout – to changes among suppliers to other MNEs that were not exposed to the rollout event. We then proceed to derive expressions for the average and distributional welfare implications of RS in GE, and characterize to what extent the alternative hypotheses about RS matter for its incidence on workers in the sourcing origin country. We show that if 100% of the output produced by RS-affected MNE suppliers were destined for exports, then RS requirements become isomorphic to an export tax, and hence welfare-improving to the first order for the origin economy through a classic terms-of-trade effect. However, these suppliers may also produce for domestic consumption so that the RS policy "leaks" into the domestic price index. This force is akin to a labor market distortion where RS leads to a misallocation of labor between RS-compliant vs. non-exposed producers. The interplay between these two opposing forces is present in each of the alternative hypotheses nested in the model. In addition, we show that buyer market power by MNEs vis-a-vis their suppliers attenuates the gains from the export tax effect (due to imperfect cost pass-through to the MNE), whereas the extent to which there are additional direct effects on labor productivity or positive global demand shocks for MNE output due to RS lead to additional welfare gains in the origin country.[3] Turning to the distributional implications of RS, we show that RS in principle leads to symmetric GE welfare effects for initially low- and high-wage workers in the aggregate. However, there are meaningful distributional effects across exposed and non-exposed workers within those groups: in particular, between the low-wage workers employed at MNE suppliers prior to RS rollouts (exposed), and those employed at other firms that are not directly exposed to RS rollouts in the rest of the economy. The former

[3]We find no support in the data for the comparative statics in the case of labor market monopsony, and so focus on GE welfare expressions without this feature.

experience direct potential benefits from the RS policies in addition to indirect effects, whereas the latter only experience indirect GE adjustments on wages and the domestic price index. We also consider the robustness of these results to allowing for unemployment and derive alternative expressions of the welfare incidence for comparison.

In the second step, we provide empirical evidence on the effect of RS rollouts on exposed vs. non-exposed suppliers and their workers. To do so, we make use of several administrative datasets covering the period 2008-2019, including matched employer-employee data, firm-to-firm transactions, customs microdata, corporate tax returns, foreign ownership registry data and linked information on the global outcomes of MNE affiliates in CR from the ORBIS database. We combine these data sources with a novel dataset covering the introduction of RS supplier codes of conduct for 481 MNEs with susidiaries sourcing on the ground in CR over this period. Using a comprehensive double-blind search and data entry based on corporate websites, filings, reports, press releases and media coverage, we identify 165 RS rollouts by 135 MNEs targeted at improving working conditions at CR suppliers over this period (including wage floors, guaranteed employee benefits and safety standards). This database allows us to trace the evolution of firm and worker outcomes among MNE suppliers before and after the rollout of new MNE-specific supplier codes of conduct over this period. It also allows us to assess the scale and relevance of RS codes of conduct in our empirical setting for the quantification in GE in the final step.

In the empirical analysis, as in the model above, we define "exposure" to a new RS rollout by comparing changes in outcomes among suppliers that were selling to the MNE in the year before the supplier code of conduct takes effect to those of suppliers to other MNEs over the same period. To do so convincingly, we implement an event study design and build on recent contributions on the identification and inference for treatment effects using difference-in-differences (DiD) with multiple time periods and variation in treatment timing (DiD with staggered treatments).[4] We also address concerns that MNEs targeted their RS rollouts at time periods in which their CR suppliers experienced other shocks (e.g. changes in productivity that also may not be apparent in the observed pre-trends). To do so, we estimate event study coefficients after instrumenting for the RS rollout treatment timeline with only rollouts that were decided at the global headquarters of the MNE (affecting supplier codes of conduct for the MNE worldwide).

We find that RS rollouts lead to a significant reduction in total firm sales and employment at exposed suppliers. Firm sales decline by -7% four years after the RS rollout and employment by -6%. These effects are concentrated among smaller suppliers in less regulated service sectors of the economy. They are also most pronounced when implemented by MNEs with headquarter locations in countries with higher management scores and stricter labor regulations. Moving from supplier- to worker-level event studies in the employer-employee data, we find that those effects are accompanied by a roughly 1.6 percent average increase in monthly earnings among exposed firms. This effect is driven by workers in the bottom quarter of initial earnings, for whom

[4]See recent contributions by e.g. Borusyak et al. (2021), Callaway and Sant'Anna (2020), De Chaisemartin and d'Haultfoeuille (2020), Goodman-Bacon (2018), Sun and Abraham (2020), Baker et al. (2021), Roth and Sant'Anna (2021).

we find an average increase of 4.5 percent 4 years after the rollout. The relative employment of initially low vs. high-wage workers (bottom vs. top quartiles) decreases by 12.5% over the same period. Using the firm-to-firm transaction data, we find that both supplier sales to non-RS buyers as well as sales to the RS-MNE are decreasing post-rollout – and for the latter both on the intensive margin among complying suppliers and on the extensive margin (those who decide to stop selling to the RS-MNE). We also investigate the timeline of outcomes of the RS-MNE and find no statistically significant effect on sales or employment of the CR affiliate firm or its relative share in the global sales of the MNE group in the matched Orbis data. To further investigate the timing of the RS rollout decision by the MNEs, we use additional information on thousands of annual NGO campaigns against MNE production practices from the Sigwatch database (Koenig et al., 2021), and find that while negative NGO campaigns have a significant negative effect on global MNE sales in the Orbis data, RS rollout decisions do not appear to be triggered by such campaigns – suggesting longer-term considerations by the MNE.

While these findings suggest that RS requirements are on average not just 'hot air' – with effects on exposed suppliers and workers that are consistent with increases in labor-related costs of production that are concentrated among initially low-wage workers – this reduced-form evidence, by design, is able to capture partial equilibrium adjustments only: comparing the timeline of changes among exposed vs. non-exposed suppliers and workers in the wake of individual RS rollouts, but leaving overall output and labor markets unchanged. In the third step, we then use the microdata and the event-study estimates to calibrate the model for counterfactual analysis in GE. We estimate the key parameters by interpreting the event-study estimates described above through the lens of the model's comparative statics. We quantify the implied increase in the marginal cost of production due to RS, in addition to the degree of imperfect cost pass-through, the potential demand shock for MNE output and the shape parameter of the domestic productivity distribution from a combination of estimated RS impacts on exposed supplier total sales, sales to non-RS buyers, sales to the RS-MNE among complying suppliers and sales of the MNE CR subsidiary – solving four comparative static equations for four unknown parameters. We estimate the elasticity of substitution across worker types in production from the estimated effect on relative firm employment of initially low-wage vs. high-wage workers among exposed suppliers. To estimate the extent of potential direct changes in labor productivity among suppliers due to RS, we measure whether the policy has an effect on the monthly earnings of initially high-wage workers at exposed suppliers (defined as the top quarter of worker monthly earnings). For them, RS rollouts on working conditions are unlikely binding, but they may still benefit from productivity effects. We find no compelling evidence of such direct productivity effects in our context.

In the final step, we use the calibrated model to evaluate the welfare implications of MNE RS policies in CR that we have documented in the database over this period. In particular, we quantify changes in domestic outcomes after moving from an initial equilibrium without RS to one with the observed extent of RS in the data at the end of our sample in 2019. We find that RS in CR has had positive but minor aggregate implications on welfare, both for initially low-wage and high-wage workers (+0.2%). These aggregate effects, however, mask significant heterogeneity within worker types: we find that the 21% of low-wage workers employed at exposed MNE suppliers *ex ante* experience significant welfare gains (+9.1%), while the remaining majority of low-wage workers at non-exposed firms in the economy experience significant real income losses (-2.2%) due to adverse GE effects on their wages and leakage into the domestic price index. These counterfactuals isolate the incidence of RS policies targeted outside the MNEs' own production (at their suppliers), assuming MNEs had already implemented the same policies among their own workers in the initial equilibrium. Alternatively, we quantify welfare changes when RS policies are implemented both within MNE subsidiaries and imposed on suppliers, and find the fraction of exposed low-wage workers increases to roughly one third, with welfare gains of 7.9% for the exposed and losses of 3.5% among the non-exposed.

To better understand the forces at work and assess the sensitivity of these findings, we report a number of additional results under alternative assumptions, both on the parameter values and other model assumptions (on what fraction of RS-induced costs is captured by workers and allowing for unemployment). We also compare the estimated size of the RS-induced cost shock to the optimal tariff chosen by a planner to verify that RS in CR falls on the increasing side of the inverted U-shape for optimal trade policy. These results are informative to assess the sensitivity of our baseline point estimates in the setting of CR. They also point to ways in which the impact of RS may be different or similar in other empirical contexts.

It is also important to highlight some of the limitations of our study. First, CR is a relatively developed economy (middle-income) compared to many poorer low-income countries in which RS has also been implemented in recent years. The RS requirements we are able to study here (on improved compensation, benefits, working conditions) are likely distinct from other aspects of RS in low-income countries, such as child labor bans. Whereas RS in CR appears to benefit initially low-wage workers, it would in theory be a very different counterfactual to instead ban a certain type of employment (see e.g. Faber et al. (2017)). This and other differences in the institutional and labor market environments naturally demand some caution when extrapolating findings from one study to other contexts. Second, while our database is arguably unique, there are still limitations to what we can observe. In particular, informal work arrangements are unlikely captured in the employer-employee database. Since RS is in part aimed at enforcing domestic labor regulations (and requiring formality), this is a potentially important limitation. For example, it could imply that we fail to capture the true employment effect of initially low-wage workers among exposed suppliers or additional wage increases from workers switching into formal employment. If exposed suppliers partly relied on informal employment to start with, we may thus not be able to fully capture the true increase in the cost of production by only looking at salaries and employment in the data. In our current approach, we address this concern by estimating the unobserved cost shock to the firm not from observed salary increases among low-wage workers, but instead by using the exposed firms' observed sales response combined with knowledge of other model parameters. As mentioned above, we then also assess the sensitivity of our welfare results to different assumptions of how much of that estimated cost increase is actually captured by low-wage workers.

This paper contributes to a small but growing empirical literature on the effects of MNE sourcing policies on supplier outcomes. Harrison and Scorse (2010) study the effect of anti-sweatshop campaigns targeting contractors for MNEs in the textile, footwear, and apparel sector in Indonesia. Using a DiD design across sectors and regions, the authors find that the campaigns led to wage increases, falling profits, and some firm exit. More recently, Boudreau (2021) studies an RCT on the introduction of safety committees across apparel producers in Bangladesh, and Amengual and Distelhorst (2020) study compliance with Gap Inc's code of conduct for labor standards. Both studies find that RS requirements increase compliance with the law and safety measures.[5] Relative to the existing literature in this space, this paper develops an open-economy general equilibrium model to study the welfare implications of RS and combines the theory with the near-universe of RS rollouts and firm-to-firm transaction data in CR.

The paper also relates to a larger literature on the direct effects of MNE production (through foreign direct investment (FDI)) on worker and firm outcomes in developing countries–including through the MNE's in-house policies on working conditions in their plants (see e.g., Harrison and Rodríguez-Clare (2010) for a review, Javorcik (2004), and Alfaro-Ureña et al. (2022) and Alfaro-Ureña et al. (2021) for two recent studies in CR). Related to in-house MNE labor policies, Hjort et al. (2020) find that MNEs frequently set wages similarly across countries and that wage increases at the headquarters lead to reduced employment among foreign plants of the MNE.[6] Instead of adding to the growing evidence on the impacts of FDI on host locations, this paper evaluates the implications of the relatively more recent increase in RS policies by MNEs for their suppliers in global value chains. Given these policies have the stated objective to benefit the welfare of workers in origin markets, our analysis sets out to fill this gap.

The paper also relates to an existing literature on the implications of "fair trade" certification (e.g., Dragusanu and Nunn, 2018, De Janvry et al., 2015, Podhorsky, 2013, 2015). Both the existing theory and evidence have emphasized the notion that fair trade redistributes the returns of agricultural production from imperfectly competitive intermediary wholesalers to farmers in developing countries (e.g., Dragusanu and Nunn, 2018, Podhorsky, 2015). In contrast, in our setting RS requirements are chosen and implemented by the MNEs on their own supply chain.

[5] Bossavie et al. (2020) study the effects of improvements in Bangladeshi labor regulations after the tragic garment factory collapse of Rana Plaza in 2013. Using a synthetic control approach, they find that working conditions improved whereas female wages decreased on average. Herkenhoff and Krautheim (2020) introduce cost savings from unethical practices as a new determinant in a model of global sourcing decisions with incomplete contracts. Koenig et al. (2021) study the endogenous geography of international NGO campaigns against unethical practices in a model of international trade.

[6] Méndez-Chacón and Van Patten (2021) propose a historical case study of MNE investments by the United Fruit Company in non-wage amenities for its workers, also in the context of CR. They find that these investments can have positive long-run effects both locally and in the aggregate. McLaren and Im (2021) propose a model of the optimal labor bargaining chosen by origin countries who face a trade-off between attracting MNEs and domestic investment on one side and sharing in MNE rents on the other. They find that lowering cross-border transaction costs does not imply a race to the bottom across countries in this setting.

More recently, Macchiavello and Miquel-Florensa (2019) study a "buyer-driven" quality and sustainability upgrading program among coffee farmers in Colombia by a large MNE in the global coffee trade. Using a spatial RD design, they find that eligible farmers increased the quality of their coffee and that the program led to sizeable income gains.

Finally, we also relate to a literature that studies the more general concept of Corporate Social Responsibility and firms' pro-social behavior. This literature discusses, in particular, the motivations (profit-maximization vs. ulterior motives) for these policies and their potential rationale, compared to having governments implement such policies (see Campbell, 2007, Hart and Zingales, 2017, Bénabou and Tirole, 2010, Eichholtz et al., 2010, Fioretti, 2020). Besley and Ghatak (2007) shows that it can be rational for firms to provide privately a public good when consumers value it, while Kotchen (2006) emphasizes the joint-production aspect of private and public goods.

The remainder of the paper proceeds as follows. Section 2 develops the theory. Section 3 describes the data and empirical context. Section 4 presents empirical evidence on the impact of RS rollouts in origin markets. Section 5 proceeds to model estimation. Section 6 presents the welfare analysis, counterfactual quantification and sensitivity analysis. Section 7 concludes.

2 Theory

Consider a model with two countries, Home (CR in our empirical analysis) and Foreign (the rest of the world). Foreign MNEs have subsidiaries in Home that source inputs from Home producers. Perhaps motivated by the demand of Foreign consumers, MNEs may engage in Responsible Sourcing (RS) policies that increase labor costs at their suppliers at Home. We are concerned with analyzing the impact of these MNE policies on production and welfare of workers at Home.

We lay out the model and derive comparative statics with respect to these policies for observable outcomes in the Home market. These comparative statics depend, in particular, on how markets are structured at Home and what motivates the MNE to implement an RS policy. These comparative statics will be confronted to data in Sections 4 and 5 to estimate the key parameters of the model. We conclude this section by deriving the welfare implications of RS policies in general equilibrium for the Home country. Additional details and derivations are provided in the Appendix.

2.1 Model Setup

Workers The economy features two types of workers, low- and high-wage workers, indexed by $t = l, h$. Workers of each type are endowed with one unit of labor that they supply inelastically. The aggregate supply of type t in country k is $\bar{L}_k^t$. Workers derive utility from the consumption of a variety of local and imported goods ω, with CES utility:

$$U_i = \left(\int_{\Omega_i} d_\omega {q_\omega}^{\frac{\sigma-1}{\sigma}} d\omega \right)^{\frac{\sigma}{\sigma-1}}, \tag{1}$$

where Ω_i is the set of varieties available for final consumption in country $i = H, F$ (for Home and Foreign), q_ω denotes consumption of the final variety ω, and the parameter d_ω is a demand shifter for variety ω. We denote the corresponding CES price index $P_i = \left(\int_{\Omega_i} {p_\omega}^{1-\sigma} d\omega \right)^{\frac{1}{1-\sigma}}$. Workers derive income from their labor and their collective ownership of local firms, whose profits are distributed proportionally to labor income.

Producers The model features two types of producers: "firms" and "MNEs". Foreign hosts a fixed mass N_M of symmetric MNEs, which are headquartered in Foreign and have a subsidiary at Home. Each MNE headquarter sells a final variety x. The variety is produced by the MNE subsidiary at Home, then exported to the headquarter in Foreign that markets the product to final consumers. In addition, a fixed mass of non-MNE firms N_i operate in country i. They are hereafter simply referred to as "firms". Each firm produces a unique variety for final consumption, ω. Home firms may also produce distinct intermediate inputs for MNEs. Specifically, the subsidiary of MNE x at Home uses intermediate inputs $\omega(x) \in \Omega_x$ for its production.

Firms Firms are heterogeneous in productivity z, and use labor as the sole factor of production. To produce in each market (the final good market or the intermediate input market for MNE x), they have to incur a fixed cost of production in terms of labor and then produce at constant marginal cost, so that their production functions are:

$$q_\omega = z \left(\ell_\omega - f_{ii} \right) \tag{2}$$

$$m_{\omega(x)} = z \left(\ell_{\omega(x)} - f_M \right), \tag{3}$$

where q_ω denotes the final variety and $m_{\omega(x)}$ denotes the intermediate input demanded by MNE x, ℓ is a labor composite, f_{ii} is a fixed operating cost to produce and market final varieties in country $i = H, F$ and f_M denotes the fixed operating cost incurred to produce an MNE-specific intermediate input. Firms may export their final variety. In order to export, they face both fixed costs of exporting f_{ij} for $i \neq j$ and variable costs of exporting in the form of iceberg trade costs ϱ. The presence of fixed costs in production and export leads to firm selection, a la Melitz (2003). We assume that fixed costs are ordered such that firms that serve MNEs are the most positively selected, followed by firms that export, and lastly firms that only serve the domestic market, consistent with empirical evidence (Alfaro-Ureña et al., 2022).

The two labor types are imperfect substitutes in production, with constant elasticity of substitution ρ, so that the labor composite ℓ_i for firms operating in $i = H, F$ is as follows:

$$\ell_i = \left[\alpha_i^l {\ell^l}^{\frac{\rho-1}{\rho}} + \alpha_i^h {\ell^h}^{\frac{\rho-1}{\rho}} \right]^{\frac{\rho}{\rho-1}}. \tag{4}$$

In each country, firm productivities z are distributed Pareto with parameter $\theta \geq \sigma - 1$ and with minimum $\underline{z}_i$:

$$G_i(z) = 1 - \left(\frac{z}{\underline{z}_i}\right)^{-\theta}. \tag{5}$$

MNEs The subsidiary of MNE x at Home combines intermediate inputs $\omega(x) \in \Omega_x$ and local labor to produce variety x according to the CES production function:[7]

$$M = \left(\int_{\Omega_x} m_{\omega(x)}^{\frac{\sigma-1}{\sigma}} d\omega(x) + \xi \ell_M^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}}, \tag{6}$$

where the local labor composite ℓ_M used by MNE subsidiaries is :

$$\ell_M = \left[\alpha_M^l {\ell^l}^{\frac{\rho-1}{\rho}} + \alpha_M^h {\ell^h}^{\frac{\rho-1}{\rho}}\right]^{\frac{\rho}{\rho-1}}. \tag{7}$$

We denote the corresponding CES cost index for the MNE subsidiary $R = \left(\int_{\Omega_x} p_{HM}(\omega(x))^{1-\sigma} d\omega(x) + \xi^\sigma W_M^{1-\sigma}\right)^{\frac{1}{1-\sigma}}$, where W_M is the cost index associated with direct labor costs (7).

The MNE headquarter located in Foreign imports M_x from its subsidiary subject to an iceberg trade cost ϱ and markets it as a final good q_x , i.e.:

$$q_x = M_x/\varrho. \tag{8}$$

The headquarter can export the final good to Home, subject to iceberg trade costs ϱ. MNEs act as monopolistic competitors, and their profits are distributed to workers in Foreign.

Market structure In this baseline, all product markets are monopolistically competitive and the labor market is competitive. We revisit these assumptions as part of the comparative statics below, and the Appendix explores an alternative setup where firms have monopsony power on the Home labor market.

2.2 Responsible Sourcing and Alternative Hypotheses

We describe here how we model the RS policies put in place by MNEs. How RS impacts the Home market and, ultimately, the welfare of Home workers depends on various parameters of conduct that we describe below and estimate in Section 5.

Increase in labor costs at suppliers MNEs can decide to impose RS policies on their Home suppliers. In the model, we assume that MNEs ask their suppliers to incur labor costs that are

[7] We assume the same elasticity of substitution between Home suppliers in domestic production and intermediate inputs, which simplifies the analysis. The Appendix provides the full derivations in the case when the two elasticities are allowed to differ. And the quantitative analysis revisits this assumption.

higher than the prevailing market wage. This could capture both reduced hours at the same salary (through e.g., paid sick leave, maternity leave etc.), higher labor-related operating costs (through e.g., safety standards) and/or higher hourly wages. We assume that this increase in labor costs is binding for low-wage workers, but not for high-wage workers. In accordance with standard RS practices described in Section 3, a local firm that is part of an RS supply chain has to apply the same labor standards to all its workers, including those working on production lines dedicated to the final goods market.

Formally, we assume that the cost of labor for low-wage workers at RS suppliers must be at least $\tau_R^l w$, where w is the prevailing market wage for low-wage workers at Home and $\tau_R^l \geq 1$ is the net increase in the labor cost of low-wage workers at RS-suppliers. Therefore, the parameter τ_R^l indexes the size of the RS policy. For high-wage workers, the policy is not binding, and the cost of high-wage labor for an RS-supplier is the prevailing market wage. To summarize, we denote $w_{H,r}^t$ the wage of workers of type t working at firms whose RS status is $r = R$ (for RS-firms) or $r = N$ (for Non-RS-firms), and we have:

$$w_{H,R}^t = \tau_R^t w_{H,N}^t \quad \text{for } t = h, l, \tag{9}$$

where $\tau_R^t = 1$ when $t = h$ and $\tau_R^l > 1$ indexes the size of the RS policy.

Labor costs at MNE subsidiary In addition to relying on suppliers, MNE subsidiaries directly hire local employees. We allow for the labor policies that impact these employees to be different from the one in place at Home firms. Indeed, the literature has established that MNE's tend to pay their employees at a premium, and that the labor standards at MNE subsidiaries in sourcing countries tend to reflect their headquarters' labor standards rather than the sourcing country labor standards (e.g. Hjort et al. (2020)). Formally, let $w_{M,r}^t$ denote the cost of labor for worker type t in an MNE subsidiary with RS status $r = R, N$. We assume:

$$w_{M,r}^t = \tau_{M,r}^t w_H^t, \tag{10}$$

where $\tau_{M,r}^t \geq 1$ captures the pay premium for type t in an MNE of RS status r. In the baseline model, we maintain the assumption that all MNEs pay their employees at a premium, whether or not these MNEs implement RS, and that this premium is equal to the RS premium. That is, we assume that:

$$\tau_{M,R}^t = \tau_{M,N}^t = \tau_{H,R}^t, \text{for } t = \{l, h\}. \tag{11}$$

Alternatively, we also consider the case in which RS-MNEs put in place RS policies at their subsidiaries at the same time as at their suppliers, while non-RS-MNEs do not have them in place, that is:

$$\tau_{M,r}^t = \tau_{H,r}^t, \text{for } t = \{l, h\}; r = \{N, R\}. \tag{12}$$

Pass-through of labor cost increase An important question, which will mitigate the effect of RS policies on Home welfare, is whether those policies are paid for by Home firms or whether their cost is passed through to the MNE. We allow for the possibility that the labor cost increase of RS is, at least in part, passed through to the MNE through higher input price. Specifically, we capture a range of possible pass-through rates of the RS policy to the input price paid by the MNE subsidiary with a reduced-form parameter $\beta \in (0, 1)$, taken to be constant across firms. When $\beta = 0$, Home firms bear the full cost of the RS policy; when $\beta = 1$ these costs increase are fully passed-through to the MNE.

Increase in productivity The RS policy described above is a net increase in labor costs for firms hiring low-wage workers. However, it is possible that RS policies incentivize firms to make their workers more productive, or that they are accompanied by transfers of technology or expertise by the MNE to its suppliers, making workers more productive at RS suppliers. We therefore allow for RS to be potentially accompanied by such direct changes in labor productivity. To that end, we define labor productivity gains associated with RS as $T_R \geq 1$ and assume that they impact the labor productivity of all workers of the firm affected by an RS policy, low- and high-wage workers alike, on all production lines. We assume that these labor productivity gains are paid to workers. Denoting $\tilde{w}^t_{H,R}$ the compensation paid to a type t worker by a supplier adopting RS policies, we therefore have, for $t = l, h$:

$$\tilde{w}^t_{H,R} = T_R \tau^t_R w^t_H,$$

From the point of view of suppliers, the net labor costs $w^{t,RS}_H$ incurred for high- and low-wage labor per efficiency unit are given by (9). That is, τ^l_R measures the pure labor cost increase on low-wage workers faced by a RS supplier, net of any labor productivity gains.

Labor market power RS policies may be implemented to raise wages in a context where wages are too low in the first place. However, in the baseline model presented here, labor markets are perfectly competitive so that wages are those that clear the market. Therefore, they are not too low from an efficiency perspective and raising these wages introduces, a priori, a distortion. Alternatively, it could be that, absent RS, wages are set too low compared to an efficient benchmark. This is the case when Home firms exert labor market power on the Home labor market, setting wage at a markwodn compared to an efficient benchmark. In this case, raising wages through RS may partially offset the inefficiency stemming from labor market power. In the Appendix, we entertain this possibility by extending the model to feature an upward-sloping labor supply curve that Home firms are facing, so that Home firms exert labor market power and home wages are marked down compared to the marginal revenue of labor in the baseline equilibrium. We come back to disentangling this version of the model, compared to the baseline, when confronting the model's comparative statics with the data in Sections 4 and 5.

Motivation behind the RS policy Finally, a natural question is: why do MNE's impose these cost-increasing policies in the first place? The literature on Corporate Social Responsibility (CSR) (e.g. Bénabou and Tirole, 2010) typically considers and debates two views as to why firms engage in CSR activities. These activities could reflect a choice made by the management pursuing altruistic motives; or they could be a profit-enhancing response to an exigence of foreign consumers, employees, or investors. In our analysis, we therefore allow for the possibility that RS responds to a demand by stakeholders for fairer labor conditions in sourcing countries. In the context of our model, we capture this force in a reduced-form way by allowing the demand shifter d_x for the variety produced by MNE x in (1) to depend positively on labor conditions implemented by the MNE in the sourcing country.[8] Formally, we assume that a RS policy can be accompanied by a demand shock $d\log d_x \geq 0$. In the presence of this demand shifter, MNE rolling out RS see their profits negatively impacted by higher production costs on the one hand, but they are impacted positively by the corresponding demand shock on the other hand.

2.3 Impact of RS Policies: Comparative Statics

We now examine how firm-level outcomes are impacted by the roll-out of a RS policy, with the empirical application of Section 4 in mind. We consider the implementation of a small RS policy. We assume that some MNE implement RS while other do not. In all the comparative statics presented here we compare the outcomes of firms impacted by RS (the treated group) to the outcomes of similar firms – in terms of productivity –, but that sell to MNEs that do not implement RS (the control group). Table 1 provides a summary of the comparative statics we derive below for outcomes related to firm sales, broken up by buyer types and between exposed suppliers and the MNE subsidiary.

Notations We use hat notations $\hat{y} = d\log y$ to denote log changes in variable y following the implementation of RS. We derive comparative statics by computing the relative effect of a small RS policy summarized by $\left(\hat{\tau}_R, \hat{T}_R, \hat{d}_R, \beta\right)$, where firms that implement RS get a demand shock $d\log d_x = \hat{d}_R$. Furthermore, let $y^t_{ij,r}$ denote outcome y of an entity with RS status r, and for workers of type t(or accross both types when the superscript t is absent, i.e.: $y_{ij,r} = \sum_{t=l,h} y^t_{ij,r}$). When $i = H$, $y^t_{ij,r}$refers to a home firm producing for destination market $j = H, F, M$ (respectively: Home, exports to Foreign, or production of inputs for MNE subsidiaries) and $y^t_{i,r} = \sum_{j=H,F,M} y^t_{ij,r}$sums outcomes across all production lines. When $i = M$, $y^t_{M,r}$ refers to the production of MNE subsidiaries at Home.[9] Capital letters denote aggregates. In that case, the subscript r can be absent, if the outcome is computed summing across firms of all status $r = R, N$,that is:$Y^t_{ij} = \sum_{r=R,N} Y^t_{ij,r}$.

[8] Results would be qualitatively similar with a model extended to allow for an effect on foreign investment or foreign employees.

[9] Notations are symmetric for Foreign, although less combinations of subscripts are involved since there is no labor used in Foreign for multinational production and Foreign firms do not produce intermediate inputs.

Consider the suppliers of an MNE x^R that puts in place an RS policy. There are two types of responses to the policy: reponses on the extensive margin and on the intensive margin. On the extensive margin, pre-existing suppliers to the MNE may refuse to engage in the policy and drop out of the intermediate input market. Still, these firms keep on supplying the final goods market, without adopting the RS policy.[10] On the intensive margin, those who accept the conditions of the policy see their sales impacted by the increased labor costs, both on the intermediate input market and the final good markets. To measure these two margins, we consider the impact of RS on two groups of firms: *compliers*, and *exposed* firms. Complying firms are part of the exposed firms' group but continue to sell to MNE x^R after the RS policy is put in place. The comparative statics that pertain to compliers capture, therefore, the intensive margin effect of the policy. Exposed firms include compliers as well as pre-existing suppliers of MNE x^R that drop out of the sales relationship once the RS policy is put in place. The comparative statics that pertain to exposed firms capture, therefore, both the intensive and the extensive margins effects of the policy.

Impact on compliers Given the CES labor aggregate in (4), the labor cost of production of Home firms whose RS status is $r = \{R, N\}$ is summarized by the wage index $W_{H,r}$:

$$W_{H,r} = \left[\left(\alpha_H^l\right)^{\rho} \left(w_{H,r}^l\right)^{1-\rho} + \left(\alpha_H^h\right)^{\rho} \left(w_{H,r}^h\right)^{1-\rho} \right]^{\frac{1}{1-\rho}}. \tag{13}$$

Log-differencing (A.2), the relative impact of RS on the labor cost index faced by complying firms at home is $\hat{W}_{H,R} - \hat{W}_{H,N} = \chi_H^l \hat{\tau}_R^l$, where $\chi_H^l = \frac{\alpha_H^t \left(w_{H,N}^t\right)^{1-\rho}}{W_{H,N}^{1-\rho}}$ is the share of low-wage types on firm's wage bill before the RS roll-out. On all markets $j = H, F, M$, firms price at a markup $\mu_{Hj,r}$ over marginal cost:

$$p_{Hj,r} = \mu_{Hj,r} \frac{\varrho_{Hj} W_{H,r}}{z} \tag{14}$$

where $\varrho_{Hj} = \varrho$ if $j = F$ and $\varrho_{Hj} = 1$ otherwise. On the final goods market, given demand (1) and monopolistic competition, markups are constant, that is:$\mu_{Hj,r} = \frac{\sigma}{\sigma - 1}$ and $\hat{\mu}_{Hj,r} = 0$ for $j = H, F$ and $r = R, N$. On the MNE input market, if a firm's markup without a RS rollout is $\mu_{Hj,N} = \frac{\sigma}{\sigma-1}$, recall that we allow for only part β of the labor cost increase associated with RS to be passed-through to the MNE, that is, we define:

$$\beta = \frac{\partial \log p_{HM,R}}{\partial \chi_H^l \log \tau_R^l} \text{so that } \hat{\mu}_{HM,R} = (\beta - 1)\, \chi_H^l \hat{\tau}_R^l.$$

Therefore, the relative impact of RS on firms' output prices is:

$$\hat{p}_{Hj,R} - \hat{p}_{Hj,N} = \chi_H^l \hat{\tau}_R^l, \quad \text{for } j = H, F,$$

[10]This is the case because serving an MNE and serving the domestic or export markets are ordered hierarchically: fixed costs of producing on the domestic or export markets are low enough that there exists a measure of firms supplying the domestic or export markets but not the MNE market.

$$\text{and } \hat{p}_{HM,R} - \hat{p}_{HM,N} = \beta \chi_H^l \hat{\tau}_R^l.$$

Given CES demand, firm sales on destination market $j = H, F, M$ for a firm with RS status $r = R$ or N are given by:

$$y_{Hj,r} = p_{Hj,r}^{1-\sigma} D_{j,r}, \tag{15}$$

where $D_{j,r}$ corresponds to the aggregate demand shifter on market j for firms with status $r = R, N$, that is:

$$D_{j,r} = P_j^{\sigma-1} X_j \quad \text{for } j = H, F. \tag{16}$$

$$\text{and } D_{M,r} = N_r R_r^{\sigma} M_r. \tag{17}$$

where the demand shifter on the MNE input market can be computed from MNE output demand. Given CES final demand (1), MNE sales in $j = F, H$ are $p_{Mj,r} q_{Mj,r} = d_r \left(\frac{\sigma}{\sigma-1} \varrho_{Mj} c_r \right)^{1-\sigma} D_{j,r}$, so that one can express total MNE subsidiary output for an MNE of type r as:

$$M_r = d_r \left(\frac{\sigma}{\sigma - 1} \right)^{-\sigma} \varrho^{1-\sigma} R_r^{-\sigma} \sum_j \varrho_{Mj}^{-\sigma} D_{j,r}. \tag{18}$$

Given (A.4), (16),(17) and (A.9), comparing a given complying supplier of MNE x^R to a supplier of MNE x^N with the same productivity yields the following differential sales response on each market $j = H, F, M$:

$$\hat{y}_{Hj,R} - \hat{y}_{Hj,N} = (1 - \sigma) \chi_H^l \hat{\tau}_R^l < 0, \quad \text{for} j = H, F. \tag{19}$$

$$\hat{y}_{HM,R} - \hat{y}_{HM,N} = (1 - \sigma) \beta \chi_H^l \hat{\tau}_R^l + \hat{d}_R, \tag{20}$$

Equations (19) and (20) show that the RS-cost shock $\chi_H^l \hat{\tau}_R$ is passed-through to domestic and export sales of compliers with an elasticity of $1 - \sigma$, while it is passed-through with an elasticity $(1 - \sigma) \beta$ to MNE sales. In addition, sales to MNEs inherit from the positive demand shock $\hat{d}_R$ associated with RS (if any). In Section 5, we leverage the fact that comparing the compliers response on the MNE and the final goods market gives information on β,the pass-through of the policy to MNE's, and $\hat{d}_R$, the potential demand shock associated with the policy.

In addition to the effect of RS on sales, we are also interested in the effect of RS on labor compensation, for two reasons. First, they will be informative on the extent to which RS costs are directly reflected in the wage paid to workers - they are in the model, but of course in reality, direct increase in labor compensation is only a partial measure of RS policies, as some of them will be indirect (e.g., increase in working amenities, better labor conditions, increased sick or maternity leaves which could leave annual pay unchanged). Second, we aim to detect potential labor productivity gains associated with the RS policy, denoted by $\hat{T}_R$. Labor productivity gains

$\hat{T_R}$ are paid to the workers so that they are neutral in terms of sales for the firms, but they impact labor payments. To that end, we measure the impact of the policy on workers' compensation, noted $\tilde{w}^t_{H,r}$ in the model for $t = l, h$ and $r = N, R$. We leverage the fact that high-wage workers are only impacted by the productivity gain, not by the net increase in labor costs of the RS policy. Define the average wage of workers of type $t = l, h$ across firms of type $r = R, N$:

$$\bar{w}^t_{H,r} = \frac{\left(\int_{z^*_{HM,r}}^{\infty} \tilde{w}^t_{H,r}\, \ell^t_{H,r}(z)\, dG_H(z)\right)}{\left(\int_{z^*_{HM,r}}^{\infty} \ell^t_{H,r}(z)\, dG_H(z)\right)}. \tag{21}$$

We then simply have:

$$\begin{aligned} \hat{\bar{w}}^l_{H,R} - \hat{\bar{w}}^l_{H,N} &= \hat{T}_R + \hat{\tau}^l_R, \\ \hat{\bar{w}}^h_{H,R} - \hat{\bar{w}}^h_{H,N} &= \hat{T}_R. \end{aligned}$$

In particular, the relative impact of the policy on the average wage of high-wage workers at RS firms identifies labor productivity gains induced by RS.

Impact on exposed firms Next, we consider the impact of the policy on *exposed* firms. To that end, we examine the sales of all pre-existing suppliers of RS-MNEs on a market j, for $j = M, H, F$. On each market destination market, profits $\frac{1}{\sigma} y_{Hj,r} - f_{Hj} W_{H,r}$ are increasing in firm productivity z, so that only firms above a given productivity cutoff enter the market. Specifically, the selection cutoff corresponding to zero profit on market j for firms with RS status r is:

$$z^*_{Hj,r} = \frac{\sigma^{\frac{\sigma}{\sigma-1}}}{\sigma - 1} f_{Hj}^{\frac{1}{\sigma-1}} \varrho_{Hj} W_{H,r}{}^{\frac{\sigma}{\sigma-1}} / D_{j,r}^{\frac{1}{\sigma-1}}. \tag{22}$$

In turn, the sales of all exposed firms on a market j are $Y_{Hj,r} = \int_{z^*_{Hj,r}}^{\infty} y_{Hj,r}(z)\, dG_H(z)$. Formally, given that firm productivity z is Pareto distributed (equation (5)), we have:

$$Y_{Hj,r} = \left(\frac{\theta}{\theta - \sigma + 1}\right) (\mu_{Hj,r} \varrho_{Hj} W_{H,r})^{1-\sigma} D_{j,r} \left(z^*_{Hj,r}\right)^{\sigma-1-\theta}, \quad \text{for} j = M, H, F. \tag{23}$$

These total sales are impacted both by intensive and extensive margin responses to the policy. The intensive margin response has been derived above, where we have seen that responses are typically differs on the MNE market versus the final goods markets. Likewise, the extensive margin response to an RS policy differs between the MNE market and the final goods markets. This is because firms may drop out of the MNE market as they refuse to engage in RS, but in this case they will still serve the final goods market at non-RS labor costs.[11] Combining extensive and

[11]Specifically, the relative change in the productivity cutoff for serving the MNE market is: $\hat{z}^*_{HM,R} - \hat{z}^*_{HM,N} = \frac{\sigma}{\sigma-1} \chi^l_H \hat{\tau}^l_R - \frac{1}{\sigma-1} \hat{d}_R$ (using (22)) . However, on the final goods market, $\hat{z}^*_{Hj,R} - \hat{z}^*_{Hj,N} = 0$ for $j = H, F$, because only infra-marginal firms are impacted by RS among firms serving the final goods market, as firms serving MNE are selected among firms serving the final goods market.

intensive margin responses to derive the total effect of RS policies on the sales of the pre-existing suppliers of the MNE x^R , we get:

$$\hat{Y}_{Hj,R} - \hat{Y}_{Hj,N} = (1-\sigma)\ \chi^l_H \hat{\tau}^l_R < 0, \quad \text{for} j = H, F. \tag{24}$$

$$\hat{Y}_{HM,R} - \hat{Y}_{HM,N} = \left[\underbrace{\beta\,(1-\sigma)}_{\text{intensive}<0} + \underbrace{\sigma\frac{\sigma-1-\theta}{\sigma-1}}_{\text{extensive}<0}\right] \chi^l_H \hat{\tau}^l_R + \underbrace{\frac{\theta}{\sigma-1}}_{\text{int+ext}>0} \hat{d}_R, \tag{25}$$

Summing those up across markets, the relative effect of the policy on the total firm sales of exposed firms, $Y_{Htot} = Y_{HM} + Y_{HH} + Y_{HF}$ tends to be negative because of the cost shock $\hat{\tau}^l_R$, but positive because of the demand shock $\hat{d}_R$, specifically:

$$\hat{Y}_{Htot,R} - \hat{Y}_{Htot,N} = \underbrace{\left[1-\sigma-\zeta\sigma\frac{\theta-\sigma+1}{\sigma-1} + (1-\beta)\,\zeta\,(\sigma-1)\right]}_{<0} \chi^l_H \hat{\tau}_R + \underbrace{\zeta\frac{\theta}{\sigma-1}\hat{d}_R}_{>0}, \tag{26}$$

where $\zeta \equiv \frac{Y_{HM}}{Y_{Htot}}$ is the share of firm sales corresponding to the MNE market. Overall, the comparative statics on exposed firms bring in information on the extensive margin response of firms to the policy. In the model, these extensive margin responses are governed by the Pareto shape parameter θ of firm's productivity distribution, as is visible from (23). Therefore, bringing in moments of the response of exposed firms in addition to moments of complier firms will intuitively help identify the parameter θ.

Impact on MNE subsidiary Finally, we also derive the relative impact of RS on the total sales of MNE subsidiaries to its headquarter, $R_r M_r$ for an MNE of type r. MNE sales are negatively impacted by RS through the cost shock $\hat{\tau}^l_R$, but positively through the demand shock $\hat{d}_R$. Intuitively, bringing in this sales moment will shed light on the relative size of the negative vs positive RS shock, i.e. help pin down $\hat{d}_R$ versus $\hat{\tau}^l_R$. Log-differentiating (A.9), we get:

$$\widehat{R_R M_R} - \widehat{R_N M_N} = \left[\underbrace{\beta\,(1-\sigma)}_{\text{int.supp}<0} \underbrace{-\frac{\sigma\,(\theta-\sigma+1)}{\sigma-1}}_{\text{ext.supp}<0}\right] \varXi \chi^l_H \hat{\tau}_R + \left[\underbrace{1}_{\text{direct}} + \underbrace{\varXi\frac{\theta-\sigma+1}{\sigma-1}}_{\text{ext.suppliers}>0}\right] \hat{d}_R \tag{27}$$

where $\varXi$ is the cost share of intermediate inputs for MNE subsidiaries ($\varXi = \frac{\int_{\Omega_x} p_{HM}(\omega(x))^{1-\sigma}}{R^{1-\sigma}}$) before a RS roll-out. Again here, the direct effect of the increase in supplier cost is negative (first term) but the demand shock can make it positive (second term). The demand shock associated with RS benefits directly the MNE subsidiary, while the negative effects of RS coming from higher labor costs are dampened by two effects: (i) the partial pass-through of the policy β, and (ii) RS impacts the part of inputs that is produced by intermediate firms, but not workers employed by the MNE- who already benefit from higher labor standards, before the RS roll-out.

2.4 Welfare Implications of RS

Finally, we use the structure of the model to compute the welfare incidence of RS in CR, in general equilibrium. We assume that a fraction $\gamma$of MNE's put in place a small RS policy $\left(\hat{\tau}_R, \hat{T}_R, \hat{d}_R, \beta\right)$, and are interested in the first order welfare impact of this policy. To derive intuition as to the forces that drive these welfare effects, we consider here a simplified version of the model in which the welfare implications of RS can be derived in closed form. This will be illuminating to understand the key parameters and mechanisms at play. We also derive the equations that govern the welfare impact of the policy in the full general model considered above. These equations are reported in detail in the Appendix. In section 6, we quantify these GE welfare effects given the calibration of our model described in Section 5, and also present additional counterfactual results to conduct sensitivity analysis across alternative assumptions and parameter values.

2.4.1 Simplified setup

We simplify the setup presented above to get at the heart of the mechanism by assuming, first, simple trade patterns. Home exports to Foreign only through the MNE subsidiaries and their use of Home intermediate inputs. That is, final varieties produced by Home firms are not demanded abroad. Conversely, MNEs do not re-export their final variety to Home. That is, Foreign exports to Home only through the export of final varieties by Foreign (non-MNE) firms. Second, we assume here that multinationals in CR only use local inputs, but no local labor i.e. $\Xi = 1$. Third, we examine a simple case where the Melitz-type selection channel is shut off, while firm heterogeneity is kept. This is done by taking the limit $\theta \to \sigma - 1$, as shown by Burstein and Vogel (2017). Finally, we assume that all MNE's implement RS.

2.4.2 Average welfare

As above, we use hat notations $\hat{y} = d \log y$ to denote log changes in variable y following the implementation of RS. For a worker type $t = l, h$, welfare per capita is:

$$U_H^t = \frac{1}{L_H^t} \frac{X_H^t}{P_H}$$

where X_H^t is the total expenditure of type t workers and P_H is the ideal price index, common to both types, derived from utility (1). We first analyze the average utilitarian welfare impact of the RS policy on all Home workers, $U_H = \sum_{t=l,h} \frac{L_H^t}{L_H} U_H^t$, for which:

$$\hat{U}_H = \hat{X}_H - \hat{P}_H,$$

where $X_H = \sum_{t=l,h} X_H^t$ is the total expenditure of country H. We then move on to examining the distributional impact on the policy $\left(\hat{U}_H^l, \hat{U}_H^h\right)$ on low- vs. high-wage workers.

To report the results, we first introduce some notations. The Appendix provides more detailed steps in the derivation of the expressions below. Let $\lambda_{kk'}$ denote trade shares as is standard in the literature in international trade (with λ_{kk} denoting the share of trade with country k itself).[12] Second, let Λ denote the share of total expenditure on the Home-produced goods that is spent on goods produced by RS-compliant firms.[13] Λ thus measures the degree of "leakage" of RS policies into the domestic price index. And as before, the cost share of low-wage workers is χ_H^l. Then, the welfare impact of RS policies by Foreign MNEs at Home can be expressed as:

$$\hat{U}_H = (\beta - \Lambda)\, W^{tax} \chi_H^l \hat{\tau}_R^l \;+\; (\lambda_{FH} + \Lambda\lambda_{HH})\, W^{prod} \hat{T}_R \;+\; W^d \hat{d}_R, \tag{28}$$

where

$$\begin{aligned} W^{tax} &= \frac{\sigma\lambda_{HH}\lambda_{FH}}{1+(\sigma-1)(\lambda_{FF}+\lambda_{HH})} \geq 0, \\ W^{prod} &= \frac{(\sigma-1)\lambda_{FF}+\sigma\lambda_{HH}}{1+(\sigma-1)(\lambda_{FF}+\lambda_{HH})} \geq 0, \\ \text{and } W^d &= \frac{\lambda_{FH}}{1+(\lambda_{FF}+\lambda_{HH})(\sigma-1)} \geq 0. \end{aligned}$$

Readers familiar with the trade policy literature will have recognized that the sufficient statistics W^{tax} measures the first order effect of imposing an export tax on all Home exports, while the sufficient statistics W^{prod}measures the first order effect of a pervasive increase in labor productivity at home. What does this expression tell us ?

Let us first focus on the first term of expression 28, and suppose for a moment that $\Lambda = 0$. A first takeaway from this expression is that a key driver of the welfare effect of the policy is the parameter β, which captures who holds market power in the relationship between input suppliers and MNE's. To the extent that Home suppliers hold this power (hence $\beta = 1$, so that the cost of the policy is fully passed-through to the MNE), RS leads to positive welfare effects, akin to the ones of an export tax. In this case, the welfare impact of the net increase in the labor cost of Home suppliers to the MNE is simply $W^{tax}\hat{\tau}$, scaled by χ^l (as the policy does not impact all workers but only a fraction χ^l of labor costs). From the point of view of Home, the RS policy increases the

[12] Specifically, we define:

$$\lambda_{HH} = \frac{\int_{\Omega_{HH}} \left(\frac{\sigma}{\sigma-1}\frac{W_H}{z}\right)^{1-\sigma} dG_H(z)}{\int_{\Omega_{HH}} \left(\frac{\sigma}{\sigma-1}\frac{W_H}{z}\right)^{1-\sigma} dG_H(z) + \int_{\Omega_{FH}} \left(\frac{\sigma}{\sigma-1}\frac{\zeta W_F}{z}\right)^{1-\sigma} dG_F(z)}\;;\; \lambda_{FH} = 1 - \lambda_{HH},$$

and

$$\lambda_{FF} = \frac{\int_{\Omega_{FF}} \left(\frac{\sigma}{\sigma-1}\frac{W_F}{z}\right)^{1-\sigma} dG_F(z)}{\int_{\Omega_{FF}} \left(\frac{\sigma}{\sigma-1}\frac{W_F}{z}\right)^{1-\sigma} dG_F(z) + N^M\left(\frac{\sigma}{\sigma-1}R_x\right)^{1-\sigma}}.$$

where $\Omega_{kk'}$ is the set of varieties produced in k and marketed in k'.

[13] Formally, $\Lambda = \frac{\int_{\Omega_{HRS}} \left(\frac{\sigma}{\sigma-1}\frac{W_H}{z}\right)^{1-\sigma} dG_H(z)}{\int_{\Omega_{HRS}} \left(\frac{\sigma}{\sigma-1}\frac{W_H}{z}\right)^{1-\sigma} dG_H(z) + \int_{\Omega_{HN}} \left(\frac{\sigma}{\sigma-1}\frac{W_H}{z}\right)^{1-\sigma} dG_H(z)}$, where Ω_{HRS} denotes the final varieties produced by firms impacted by RS and Ω_{HN} those produced by firms not impacted by RS.

price of exported goods compared to imported consumption, leading to higher welfare through classic terms-of-trade effects. This positive effect can only emerge if home suppliers hold some market power over foreign MNEs. In contrast, when MNEs hold all the power and the cost of RS are fully borne by the suppliers ($\beta = 0$), RS does not impact terms-of-trade and does not lead to corresponding welfare gains.

Let us now turn to the role of Λ, which measures the leakage of the policy to the domestic market. The higher this leakage, the more domestic firms' cost of production increase following RS, hence the lower the benefits of the policy: the potential export tax effect is now coupled with what is akin to a distortive production tax on domestic production. The price of consumption for Home workers increases as a result, dampening the possibly positive welfare effect of the export tax. Overall, at the limit where $\beta = 0$, the welfare effect of the increase in net labor costs that the RS policy entails leads to an unambiguously negative welfare effect for Home workers, for any $\Lambda > 0$: the policy is then only distortive. Similarly, when the policy "leaks" to all domestic production ($\Lambda = 1$), the welfare effect of the policy is unambiguously negative, for any $\beta > 0$, as the policy becomes a distortive production tax on domestic production. The formula reveals a knife-edge case, when $\beta = \Lambda$. At this point, an RS policy is exactly welfare neutral for Home workers.

Finally, the second term in (28) captures the effect of an increase in labor productivity due to RS, which is unambiguously positive. The term $W^{prod}\hat{T}$ captures what would be the welfare effect of a productivity increase of $\hat{T}$ for all workers at Home. As the RS policy only applies to a fraction of workers (those at RS-compliant producers), the welfare effect of a productivity increase is scaled by the fraction $\lambda_{FH} + \Lambda\lambda_{HH}$. Likewise, the third term in (28) is unambiguously positive as it captures the effect of a positive demand shock to the production done by intermediate input suppliers, ultimately exported to Foreign by the MNE, associated with RS. It is scaled by λ_{FH} which captures the share of CR production dedicated to MNE production, in this simplified setup.

2.4.3 Distributional Implications

The model also allows us to zoom in on the heterogeneous effects of the policy across workers. First, one can show that low and high wage workers benefit on average from the exact same welfare gains in this simple setup:

$$\hat{U}_H^l = \hat{U}_H^h.$$

Some low wage workers are directly paid at a premium thanks to the policy, while other see their baseline wage go down to restore labor market clearing on the low-wage labor market. On net, there is no differential real income gains of a type versus another.

It is then informative to decompose these welfare effects into the effect among exposed and non-exposed workers within each group. Similar to our definition of exposed firms, exposed low- or high-wage workers are defined as those who were working at RS-MNE suppliers before the policy was rolled out. Defining $\hat{U}_H^{t,E}$ the per-capita welfare gains of exposed workers of type t, and

$\hat{U}_H^{t,NE}$ the per-capita welfare gains of non-exposed workers, it is easy to see that:

$$\hat{U}_H^{t,E} - \hat{U}_H^{t,NE} = \hat{\tau}_{H,R}^t + \hat{T}_R$$

This difference between the welfare gains of exposed workers and that of welfare of non-exposed workers measures the direct benefits of the policy on exposed workers, who directly benefit from RS-related labor payment increase, $\hat{\tau}_{H,R}^t + \hat{T}_R$ (for high-wage workers, it is simply $\hat{T}_R$). While directly impacted workers may benefit overall from RS, despite limited pass-through β and some leakage to the local price index Λ, the overall labor market consequences of RS is typically negative for non-exposed workers due to GE effects on wages (e.g., due to reduced aggregate demand for low-skilled workers) and price index effects (due to leakage into the domestic price index). Specifically, we find:

$$\hat{U}_H^{t,NE} = \underbrace{\left[(\beta - \Lambda) W^{tax} \chi_H^l - \lambda_{FH} + \Lambda \lambda_{HH}\right]}_{<0} \hat{\tau}_R^l + \underbrace{(\lambda_{FH} + \Lambda \lambda_{HH}) \left(W^{prod} - 1\right)}_{<0} \hat{T}_R + W^d \hat{d}_R$$

where the net effect of both the RS-labor cost wedge and the productivity term on non-exposed workers can be signed to be unambiguously negative, for any small policy $\left(\hat{\tau}_R^l, \hat{T}_R, \hat{d}_R, \beta\right)$. The only source of welfare gains for non-exposed workers is the demand shock which, through general equilibrium effects, impacts wages favorably for all Home workers. In our quantification below, we will report welfare results across both groups of workers and exposed vs. non-exposed workers within those groups.

2.4.4 Robustness: if the economy features unemployment

In our baseline model, all workers are fully employed. We explore here the robustness of our welfare results when RS hits an economy featuring unemployment. Workers can choose to work or remain unemployed. They decide to work in expectation over the two types of jobs $r = R.N$. If they work, they get indirect utility $\frac{a\bar{w}_H^t}{P_H}$, where $\bar{w}_H^t = \frac{\sum_r L_{H,r}^t w_{H,r}^t}{\bar{L}_H^t}$ and a captures the facts that firms profits are redistributed to workers, proportional to wages. This indirect utility of working is the same as in the baseline model. Alternatively, workers can remain unemployed in which case they get a fixed utility u_0. Each worker ω has idiosyncratic preferences for the two options $\{\epsilon_w(\omega), \epsilon_u(\omega)\}$ that are assumed to be distributed Frechet, mean 1 and shape κ. Formally,

$$U^t(\omega) = \max_{w,u} \left\{ \frac{a\bar{w}_H^t}{P_H} \epsilon_w(\omega), u_0 \epsilon_u(\omega) \right\}.$$

We take as a measure of welfare for type t the expected value of this indirect utility over the distribution of shocks $U_H^t = \mathbb{E}\left(U^t(\omega)\right)$, and compute (see Appendix) how the average welfare in this economy $U_H = \sum_{t=l,h} \frac{L_H^t}{L_H} U_H^t$ reponds to RS. Using that the share of unemployment in this economy is:

$$\lambda^U = \frac{u_0^\kappa}{u_0^\kappa + \frac{\bar{w}}{P_H}^\kappa},$$

we find that:

$$\hat{U}_H = \left(1-\Lambda^U\right)\left\{(\beta-\Lambda)\,W^{tax}\chi_H^l\hat{\tau}_R^l \;+\; (\lambda_{FH}+\Lambda\lambda_{HH})\,W^{prod}\hat{T}_R \;+\; W^d\hat{d}_R\right\}. \tag{29}$$

$$1-\Lambda^U \equiv \frac{1-\lambda^U}{1+\frac{\lambda_{FH}\kappa\lambda^U}{1+(\lambda_{FF}+\lambda_{HH})(\sigma-1)}} \tag{30}$$

Comparing this result to the case without unemployment (equation 28) is illuminating: the welfare effect of RS in the case of unemployment is simply a dampened version of the welfare effect of RS in the baseline case, where the dampening coefficient $1-\Lambda^U$ that decreases with the extent of unemployment in the economy. (Potential) gains from RS are muted in an economy with unemployment. In the quantification as part of Section 6 we take these expressions to the data and discuss their implications.

2.5 Welfare implications in the full model

In the full quantitative model described above, additional margins enter in the welfare computation of RS, as trade patterns are more complex – for instance, intermediate inputs produced at Home can be ultimately re-exported to Home to be consumed by Home workers embedded into the MNE final good, which dampen the potential welfare gains from RS; in addition MNE subsidiary directly employ workers in the Home country, which changes the scope of the impact or RS and its leakage. Although the main intuitions described above remain at play, they are complicated by these additional considerations which require a numerical analysis. We report in the Appendix the full set of equations that determines the welfare impact of RS in this general case, and use them for quantification in Section 6.

3 Data and Context

In this section, we briefly describe the data used in this paper, the analysis sample and our empirical context. First, we bring together several administrative datasets that encompass firm-to-firm transaction data, matched employer-employee data, corporate tax returns, customs data and foreign ownership data. The construction of these datasets is also described in more detail in Alfaro-Ureña et al. (2022) and Alfaro-Ureña et al. (2021). We combine these administrative data with a novel dataset on RS policy rollouts by MNEs. We also link this database to information on the global outcomes of MNEs from the Orbis database and a dataset detailing annual NGO campaigns directed at MNE production practices over the same period. After describing the datasets, we provide descriptive statistics for the analysis sample of RS policy rollouts, MNEs whose policy rollouts we study, and their suppliers. Last, we also provide contextual information about labor market institutions in CR and the enforcement of RS policies by MNEs.

3.1 Administrative Data from CR

Firm-to-Firm Transaction Data This dataset tracks the near-universe of formal firm-to-firm relationships in CR between 2008 and 2019. This information is collected by the Ministry of Finance through the D-151 tax form. Firms must report the tax identifier of all their suppliers and buyers with whom they generate at least 2.5 million Costa Rican colones (around 4,200 U.S. dollars) in transactions that year, in addition to the total amount transacted. We use this data to identify the domestic firms affected by a new RS policy of an MNE affiliate in CR.

Corporate Income Tax Returns We then add the yearly corporate income tax returns from the Ministry of Finance of CR for the same 2008 to 2019 time period. These returns cover the universe of formal firms in the country and contain typical balance sheet variables (e.g., total sales, net assets, input costs, etc.). The data also records the primary 4-digit industry of each firm (out of a total of 375 4-digit industries observed in CR).

Matched Employer-Employee Data Based on data from the Costa Rica Social Security Administration, we construct a panel of employment records for all formal workers in CR between 2006 and 2019. We observe (at least once) 1.9 million unique person identifiers (PIDs). For each PID, this data records demographic characteristics (such as the date of birth, nationality, and sex) and the monthly labor earnings and occupation at each employer.

Foreign Ownership Data We use a comprehensive dataset on the foreign ownership of firms in CR. We combine information from: (i) three annual surveys conducted by BCCR, (ii) the reporting of firms that are active under the Free Trade Zone regime, (iii) the records of the investment promotion agency of Costa Rica (CINDE), and (iv) Orbis. Jointly, these records allow us to confirm which foreign firms in the country are part of an MNE group. For each MNE affiliate, we identify the MNE group it belongs to and link the affiliate to the RS policies put in place at the group level.

3.2 Global Data on MNE Groups

To enrich our empirical analysis with outcomes at the MNE group level, we identify the MNE groups with a subsidiary in CR in two datasets with global coverage.

First, we use historical records of Orbis (Bureau van Dijk) to track MNEs' global sales. More precisely, we take as an MNE's global sales the consolidated turnover of the global ultimate owner (according to the ownership module of Orbis) of the MNE subsidiary in CR. Thanks to Orbis, we are able to track the historical global sales of 204 of the 481 MNEs of interest. We use this data to study potential pre-RS trends in global sales and the net effect of RS on subsequent global sales.

Second, we leverage Sigwatch NGO campaign data (notably used in Hatte and Koenig, 2020).[14] The European consultancy firm Sigwatch collects detailed information on international consumer-facing NGO campaigns against MNE production practices (including their sourcing practices). Between 2010 and 2020, Sigwatch records, on average more than 10,000 public NGO campaigns per year. After searching the MNEs both by their name and ISIN identifier, 191 of the 481 MNEs of interest register NGO campaigns. We use this data to investigate whether negative NGO campaigns against MNEs tend to precede their RS rollouts.

3.3 Responsible Sourcing (RS) Policies

Data Construction We construct a new database that tracks the RS policies rolled out by MNEs with an affiliate in CR. We use "RS policy" to describe the introduction of new MNE requirements concerning their suppliers. While there is no unique definition of RS, the International Chamber of Commerce defines RS as a "commitment by companies to take into account social and environmental considerations when managing their relationships with suppliers". The introduction of a suppliers' code of conduct is an example of an RS policy (and, as we document below, by far the most frequent type of RS policy in our context).

The first step in building the database is to identify the MNEs with on-the-ground supplier relationships in CR. To do so, we identify 481 MNEs with an affiliate in CR whose total average yearly input purchases exceed 1 million U.S. dollars (where the average is computed across all years of operation of that affiliate in CR). As appendix Table A.1 shows, these 481 affiliates account for 80% of the local input purchases, 85% of the total sales, 86% of the employment, 87% of the imports, and 95% of the exports of all foreign firms in CR.

The second step is to conduct a comprehensive search for RS policy rollouts by these 481 MNEs (both locally or beyond CR). To do so, we implemented a double-blind search process executed by two independent teams (whose output we then cross-check and combine into one final database). For each MNE, we searched all company reports, press releases, corporate filings, and publications available online (including company websites) containing information about corporate social responsibility and supplier requirements. In addition, for each MNE, we conducted online searches in both local (CR) and international media outlets to gather additional information on rollouts. For each RS policy, we recorded the year of implementation, whether the policy was MNE-wide (introduced by the MNE headquarters for suppliers to affiliates worldwide) or specific to CR (or Central America), and a number of additional details we describe below.

More Details on RS Policies on Working Conditions In this paper, we focus on RS policies targeted at improving working conditions (also referred to as "fair and humane working conditions" in the policy literature on RS). In Section 3.4, we argue that requirements on working conditions are plausibly binding in CR. In contrast, requirements over environmental practices (which also tend to be included in supplier codes of conduct) are unlikely to be binding in CR (e.g., 99% of the

[14] Special thanks to Pamina Koenig for making the most recent version of these data available to us.

electrical energy used in CR is derived from renewable energy sources). Similarly, concerns over major human rights violations (e.g., using forced or child labor) are not common in CR. Hence new provisions against such violations are unlikely to alter supplier or worker outcomes in CR.

Moreover and more importantly, requirements on working conditions tend to be the main component of RS policies. A survey conducted by “The Economist Intelligence Unit" among 800 executives from MNEs shows that workplace safety, working hour limits, living wages, compensation for injury/sickness are the areas most frequently addressed by the MNEs through their RS policies.[15] Working conditions are also at the center of the RS policies in our analysis sample, based on the ample space and detail devoted to working conditions among all conditions imposed on suppliers. More systematically, we find that the top five most common words used in the documentation of the RS policies (after removing neutral expressions such as "the," "a," etc.) are "suppliers," "safety," "rights," "code" and "labor." "Wages" are mentioned as frequently as "workers," both words being among the top 50 most frequent words in RS policy documents.

For example, one of the typical RS events in our analysis sample is the publication of Panasonic’s 2016 “Supply Chain CSR Promotion Guideline," which applied to all suppliers of Panasonic globally.[16] Panasonic’s Guideline document describes in detail what are the responsibilities that Panasonic’s suppliers are expected to fulfill vis-a-vis their workers. The list of responsibilities is exhaustive, covering working hours (e.g., workers must be allowed to take at least one day off per seven working days), decent wages (e.g., suppliers shall comply with minimum wage laws and pay workers without any delay), freedom of participation (e.g., workers can organize and join a labor union), occupational safety and training, emergency preparedness and training, work-related injuries and illness, and industrial hygiene, etc.

RS Policies Analysis Sample We focus on MNEs that had at least one rollout between 2009 and 2019 of an RS policy concerning the working conditions at their suppliers. We hone in on the 2009 to 2019 period given the coverage of the administrative data above (that start in 2008).[17]

This analysis sample consists of 165 RS policy rollouts by 135 distinct MNEs. Of these 135 MNEs, 84% of MNEs have only one RS policy rollout in the 2009 to 2019 period of interest, 12% MNEs have two rollouts, 3% of MNEs have three rollouts, and 1% has five rollouts. The RS policy rollouts are fairly equally distributed across time, with both the median and average year having 15 rollouts. Of the 165 RS policies in the analysis sample, 94% involve a new supplier code of conduct or a substantive change to an existing supplier code.[18]

The primary source of information for 92% of these policies is the website of the parent of the MNE (or a report found elsewhere but characterizing the entire MNE group). The remaining 8% RS policies were found on the website of the CR affiliate of the MNE. This breakdown of the data

[15] To read “The Economist Intelligence Unit" report, see here.

[16] To read Panasonic’s Supply Chain CSR Promotion Guideline, see here.

[17] In addition, we restrict attention to MNEs that did not have an RS policy rollout between 2005 and 2008.

[18] Among the remaining 6%, six RS policies involve a recurrent workshop (training course or consultancy) offered to supplier firms, three involve a recurrent networking event or awards ceremony for supplier firms, and one involves a one-off workshop (training course or consultancy) offered to supplier firms.

source is in line with the fact that 85% of these policies apply to the entire MNE group (not only to the CR affiliate). MNE-wide policies have the advantage of a more plausible exogeneity of the introduction of the RS policy to the sourcing conditions of the MNE in CR.

92% of the RS policies apply to all the direct suppliers of their affiliates (as opposed to policies relevant only to specific suppliers, such as those operating in the mining sector). While 41% of the policies apply not only to the direct suppliers but also to the entire value chain (e.g., suppliers of the suppliers), for now, we only study the effects on the direct suppliers.

MNEs With RS Policies The analysis sample includes 135 MNEs with at least one RS policy rollout meeting the conditions described above. On average, across years of activity in CR, the MNEs with an RS policy in our analysis sample employ 700 workers and sell 95 million U.S dollars. In contrast, MNEs without RS rollouts during the analysis period employ 470 workers and sell 53 million U.S dollars. 39% of the MNEs implementing an RS policy are from the United States, 24% from Europe, and the other 37% from Latin America or Asia. 37% operate in manufacturing, 46% in services, 16% in retail (including repair and maintenance), and 1% in agriculture. In comparison, the sample of MNEs without an RS policy rollout is less skewed towards the United States or Europe (46% together) and manufacturing (32%). For details, see appendix Table A.2.

Suppliers Exposed to RS Policies In line with our empirical strategy described below, we characterize the domestic firms supplying to each MNE in the analysis sample in the year *before* the RS policy rollout of that MNE. On average, these suppliers employ 33 workers (median is 8) and sell 3.1 million U.S dollars annually (median is 608 thousand USD). Only 14% operate in a manufacturing sector, 52% in services, 29% in retail (including repair and maintenance), and 4% in agriculture. For details, see appendix Table A.3.

3.4 Additional Empirical Context

CR Labor Regulations and their Enforcement Some context over CR labor regulations and their enforcement is helpful to build an intuition over why RS policies implemented by MNEs are plausibly binding in CR. First, it is worthwhile noting that local labor laws are the main benchmark in RS policies, as what is required from responsible suppliers involves compliance with either local labor laws or the policy of the MNE (whichever is stricter).[19] If local labor laws were already providing very strong protection for workers and compliance with such laws was high in CR, then RS policies imposed by MNEs might prove redundant in CR.

CR relies on a statutory multi-tiered minimum wage system to protect workers against the risk of in-work poverty. Of the 24 minimum wages in CR (varying by occupation and skill level), those for low-skilled workers are particularly high, amounting to about 70% of the median wage, higher than in all OECD countries (OECD, 2017). Moreover, at 36.5% of gross salaries, CR's Social

[19]For instance, Panasonic's 2016 "Supply Chain CSR Promotion Guideline" states "a workweek shall not exceed 60 hours per week, including overtime work, except in emergency or unusual situations. Any local law or regulation shall apply if it is stricter than this provision" (see here). Alternatively-phrased, Microsoft's 2011 "Vendor Code of Conduct imposes a "limit of 60 hours of work per week, even if local law allows more" (see here)

Security contributions (covering old-age pensions, health and maternity, survivors' benefits and disability) are significantly higher than the OECD average (27.2%). Employer contributions are notably high (26.3%) – the OECD average is 17.7% (OECD, 2016).

CR enforces its labor laws via inspectors whose job is to investigate potential violations of minimum wages, Social Security payments, payroll records, occupational risk insurance payments, mandated maternity leave, holidays, overtime pay, working-time regulations, and health and safety regulations. However, a lack of resources hampers the work of labor inspectors. In 2015, there were 92 labor inspectors in CR (or 0.4 inspectors per 10,000 employees, less than a third of what the ILO recommends for industrializing economies). Moreover, inspectors report lacking basic resources, such as maps with the exact firm location, cars (forcing inspectors to travel by public transportation), and access to IT support (leading to an over-reliance on paper-based records) (Gindling et al., 2015). According to the Ministry of Labor, their staffing levels are insufficient to cover even 10% of firms for inspections (LaNación, 2009). Hence, inspectors focus on larger firms and firms in easily-identifiable and accessible locations (such as commercial centers). An additional proxy for the strength of labor laws enforcement is the size of penalties when caught with an irregularity. For violations against minimum wages, fines can range between 1 and 24 months of workers' salary (OECD, 2017). However, the average penalty is less than five months (Piszk, 2011). Such low fines reduce incentives to comply with the minimum wage laws.

Overall, this low enforcement environment leads to a high degree of non-compliance with labor protection legislation. This issue is not specific to CR but is widespread in developing economies (Harrison et al., 2003). For instance, in CR, there is evidence that 25% of workers in the formal private sector and 60% of those in the informal sector earn less than the lowest minimum wage (OECD, 2017). Overall, we take this evidence to suggest that RS policies – that at the very least enforce local labor laws – are likely to affect suppliers and their workers in CR.

On the Enforcement of RS Policies RS policies are binding for suppliers to the extent that the policies are actually enforced. According to "The Economist Intelligence Unit" MNE survey, to ensure suppliers comply with the MNEs' responsible supply chain standards, MNEs conduct regular on-site inspections/audits with quantified indicators of supplier performance, write the requirements into contracts, publish supplier names and requirements to enable third-party monitoring, provide training (direct or third-party), or punish suppliers who fail to show improvements in compliance. The motivation behind the efforts of MNEs to ensure compliance with their RS standards is plausibly a combination of their intention to uphold their declared values as a company and external pressures from consumers, NGOs, and governments.[20]

Specifically for the MNEs with RS policies in our analysis sample, "compliance" appears in the top 15 most common words in their supplier codes of conduct. MNEs mention in the supplier codes of conduct that they use recurrent audits to identify whether or not suppliers comply with

[20]For instance, since 2017, France has required large employers to comply with the "Corporate Duty of Vigilance Law," according to which firms must identify and prevent adverse human rights impacts resulting from their activities and of their suppliers and subcontractors. For more details, see here.

their codes of conduct. Suppliers are often offered support programs or corrective action plans to help improve their performance and resolve issues found in the audit (as opposed to being immediately dismissed as a supplier), but ultimate compliance with the RS policy is compulsory.

Some MNEs (such as Smurfit Kappa, an MNE with an RS rollout in our analysis sample) do not only carry out their own comprehensive audits to ensure that suppliers deliver in conformity with their RS policy but also request their suppliers to register with recognized independent auditors such as the "The Supplier Ethical Data Exchange" (SEDEX). Other MNEs (such as Walmart, another MNE with an RS rollout in our sample) place all the responsibility and costs to submit an acceptable audit report onto suppliers.[21] While we do not directly observe enforcement efforts and compliance with the RS policies, the supplier-specific monitoring suggests that RS policies are plausibly shifting working conditions in suppliers selling to MNEs introducing RS policies.

4 Evidence

4.1 Empirical Strategy

In this section, we use the database described above to provide evidence on the effects of RS rollouts by MNEs on outcomes at the level of suppliers (firms), workers, firm-to-firm transactions and the MNEs. In Section 5 we then confront these estimates to the corresponding model's comparative statics from Section 2.3 to rationalize the evidence through the lens of the theory and to calibrate the model for counterfactual analysis.

Firm-Level Specifications

Using the database, we run event-study specifications of the following form:

$$y_{ist} = \alpha_i + \gamma_{st} + \sum_{\eta=k_l}^{\eta=k_u} \beta_\eta I(\text{Years since RS}_{it} = \eta) + \epsilon_{ist} \ , \tag{31}$$

where y_{ist} is an outcome (e.g., log firm sales or log employment) of firm i from the sample of firms who are suppliers to MNE affiliates in CR at some point over the sample period 2008-2019. s indexes one of the 375 4-digit sectors in CR and t indexes years. α_i are firm fixed effects and γ_{st} are sector-by-year fixed effects. The term $\sum_{\eta=k_l}^{\eta=k_u} \beta_\eta I(\text{Years since RS}_{it} = \eta)$ captures the event-study design: $I(\cdot)$ is an indicator function and η indexes the number of years before or after the rollout of the RS policy by the MNE that is linked to the firm.[22] Following the theory, we define exposure

[21]According to Walmart's "Audit and Assessment Policy and Guidance," this includes "choosing an appropriate third party audit program from the list of Walmart-approved programs, contacting the audit program chosen, arranging for the audit, paying for the audit, having an audit conducted by an APSCA-registered auditor, cooperating with the audit firm and/or program to complete the audit, sending the results to Walmart within the specified timelines, and working with the audit program and facility to remediate non-compliances and to resolve issues." For more details, see here.

[22]We include all periods η observed in the sample (i.e., $k_l = -11$ and $k_u = 10$) except the omitted period at $\eta = -1$, and we report estimates for $\eta \geq -4$ and $\eta \leq 4$ in the figures and tables.

to a given RS rollout (RS_{it}) for domestic firms that were selling to the MNE in question in the year before the rollout (at $\eta = -1$). For suppliers that were exposed more than once during our sample, we focus on the effects of first-time exposure to an RS rollout. To adjust for autocorrelation across years for the same producer, we cluster the standard errors (ϵ_{isrt}) at the level of firms i. In the results below, we estimate and report the event studies both before and after pooling the point estimate at $\eta \geq 4$ side-by-side (i.e. showing the point estimate for $\eta = 4$ in a specification without pooling and for $\eta \geq 4$ with pooling longer-run effects).

The main identification concern for estimating the β_η coefficients is that RS rollouts could have been targeted by the MNE during periods when CR suppliers experienced other contemporaneous shocks (e.g., to their productivity). We investigate and address such endogeneity concerns in several ways. First, to limit concerns of different time trends across different types of firms, we restrict the estimation sample to only CR firms that have been suppliers to MNE subsidiaries in CR at some point during the estimation sample 2008-2019.

Second, we assess the presence of confounding shocks that may have preceded the MNE's RS rollout decision using the event-study design (documenting the β_η both before and after the rollout). To do so convincingly, we build on recent advances in the applied econometrics literature on DiD estimation with multi-period ("staggered") treatment events. Several recent papers have shown that estimating specification (31) with two-way fixed effects regressions can fail to recover average treatment effects even if the treatment events were as good as randomly assigned (Borusyak et al., 2021, De Chaisemartin and d'Haultfoeuille, 2020, Goodman-Bacon, 2018, Sun and Abraham, 2020, Baker et al., 2021, Roth and Sant'Anna, 2021). This can be the case when treatment effects are dynamic (evolving over time) as already-treated units enter the control group in a given period. Moreover, two-way fixed effects estimation produces variance-weighted averages of potentially heterogeneous treatment effects, complicating their interpretation and link to economic theory.

To address these concerns, we build on recent work by Sun and Abraham (2020) who explicitly focus on event-study designs with leads and lags of treatment indicators (instead of the more standard DiD case with a single binary treatment indicator that has been the focus of the bulk of the recent literature above). As, e.g., Goodman-Bacon (2018) and Sun and Abraham (2020) show, event-study designs already address several of the estimation concerns that are present in the pooled DiD with staggered treatments and dynamic effects. One concern that remains in specifications of the form in (31) above is that different cohorts of treated firms over time may be subject to *different* dynamic paths of treatment effects. So, in our context, the concern would be that those firms exposed to RS in earlier periods of our sample (e.g., around 2010) may experience systematically different time paths of treatment effects compared to those firms exposed in later years (e.g., 2015-2019). The estimation method developed by Sun and Abraham (2020) addresses such concerns by estimating the dynamic effect for each treatment cohort separately (i.e., for units treated in the same calendar year) and then calculating the weighted average of these cohort-specific effects, with weights equal to each cohort's sample size. We thus report estimation results for (31) both using standard two-way fixed effects event studies and using the estimation procedure developed by Sun and Abraham (2020).

Third, we present the event study both before and after using only RS rollouts in other MNE affiliate countries (due to global RS rollouts) as instruments for rollouts among CR suppliers. Using RS rollout decisions that were made at the MNE headquarters, covering all supplier relationships worldwide, as an IV aims to address the concern that RS rollouts could have still been targeted at the precise point in time during which CR suppliers started to experience contemporaneous shocks (without showing up in pre-trends). To the extent that MNEs may implement other organizational changes at the same time as RS rollouts, also note that our theory in Section 2 and quantitative analysis in Sections 5 and 6 allow us to incorporate and disentangle any such contemporaneous effects on MNE output (and thus their input demand from suppliers), or potential transfers of technology affecting supplier productivity.

To further investigate the MNE-level context of RS rollout decisions, we also estimate event studies with MNE outcomes in y_{ist}, where MNE i is the CR subsidiary firm of the RS-implementing MNE and the event study timeline $I(\text{Years since RS}_{it} = \eta)$ traces MNE subsidiary changes in the years before and after a given RS rollout by the MNE.[23] We also match the 481 MNEs in our sample to panel data on their global (group-level) outcomes in the Orbis database. This allows us to check if local CR subsidiary sales responded differently from group-level output (suggesting substitution across sourcing origin countries). Furthermore, we can use the matched Sigwatch database described above to test whether RS rollouts by MNEs in our sample may have responded to negative publicity campaigns in the years prior to the RS rollout decision – and whether those campaigns had an impact on MNE global outcomes in Orbis.

Fourth, our definition of rollout exposure in RS_{it} can also give rise to a somewhat mechanical bias in the event-study coefficients β_η when estimating effects on exposed suppliers: given that supplier sales to MNEs can be subject to annual fluctuations for many other reasons, defining exposure to RS in terms of a positive MNE sales event in year $\eta = -1$ may pick up particularly successful periods among the exposed group of suppliers (i.e., picking lucky or successful firm-by-year combinations in which a supplier happened to sell to an MNE). This lumpy nature of sales events could give rise to positive pre-trends and negative post-trends even in the absence of any actual impacts of RS. To address this concern, we estimate specification (31) both before and after including an additional set of event-study indicators, $\sum_{\eta=-4}^{\eta=4} \delta_\eta I(\text{Years since MNE}_{it} = \eta)$, where the η years are identical to the RS event-study years and MNE_{it} switches on to unity for all CR suppliers that had active sales relationships to any MNE in CR at the event year $\eta = -1$ (one year before the RS policy was rolled out). When including these additional event-study terms in (31), we thus estimate the event study of RS rollouts among exposed CR suppliers after controlling for the full timeline of potential effects that may stem from having had a positive sales relationship to any MNE (regardless of RS rollouts) at the event time $\eta = -1$.

[23] In case of multiple rollouts during our sample period by the same MNE we focus on first-time events, as above.

Worker-Level Specifications

In addition to the firm-level effects above, we also estimate the effects of RS rollouts at the level of individual workers using the matched employer-employee database. We use the same identification strategy as outlined above but include a richer set of fixed effects reflecting the difference in the dimensionality of the worker-level panel data. In particular, we estimate event-study specifications of the following form:

$$y_{ijst} = \alpha_{ij} + \gamma_{st} + \sum_{\eta=k_l}^{\eta=k_u} \beta_\eta I(\text{Years since RS}_{jt} = \eta) + \epsilon_{ijst} \; , \tag{32}$$

where α_{ij} are now fixed effects for worker (i)-by-firm (j) pairs, and γ_{st} and $\sum_{\eta=k_l}^{\eta=k_u} \beta_\eta I($Years since RS$_{jt} = \eta)$ are the same as above (i.e., the firm's sector-by-year fixed effects and the firm (j)-level RS event-study terms). As above, we estimate this specification before and after including the full timeline of effects for having sold to any MNE (to address any mechanical biases discussed above), before and after using the IV specification and before and after using the recent estimation method by Sun and Abraham (2020). And again, we cluster the standard errors at the level of the treatments (at the level of firms j here).

Specification 32 thus estimates the effect of RS rollouts by MNEs on the outcomes y_{ijst} of workers who are employed by exposed suppliers (compared to outcome changes at suppliers to MNEs who did not roll out RS requirements over the same period), conditional on worker-by-firm fixed effects (α_{ij}). We focus on the log annual earnings of workers, divided by the number of months of employment of the worker during the year. Through the lens of the model, we interpret the effects in terms of wage changes.[24]

Transaction-Level Specifications

To estimate the effect on the intensive margin of sales to the RS-MNE by RS-compliant suppliers in the exposed group, we estimate event-study specifications at the level of firm-to-firm transactions. In particular, we create an estimation sample that only includes firm-to-firm sales where any MNE affiliate in CR is the buyer (i.e., only sales transactions with MNE buyers in all years).

With these data, we estimate the same specification as in (32) above, where y_{ijst} are log transaction amounts (sales) between CR supplying firms i selling to MNE buyers indexed by j. α_{ij} are thus buyer-by-seller fixed effects. Here, the event-study terms are defined at the level of the MNE buyers j instead of their exposed suppliers, so that η indexes the number of years before or after the MNE j rolls out the RS policy. The identification strategy is the same as discussed above, except for the fact that at the MNE level, we no longer require additional controls for potential

[24]While we do not separately observe the number of hours worked per month, we take within-worker changes in the earnings per month of work as a meaningful measure of changes in compensation. We also exclude workers for whom we know the employment was not full-time during a given month.

mechanical effects among exposed suppliers (for having sold to any MNE at year $\eta = -1$). Given the bilateral nature of the transaction data, we include both suppliers' (i) sector-by-year and MNE (j) sector-by-year fixed effects.

The transaction-level version of specification (32) thus estimates the timeline of the effects of RS rollouts by MNEs j on the average transaction sales amount among their continuing suppliers, after conditioning on supplier-by-MNE fixed effects (α_{ij}). As above, we report estimation results across the standard two-way fixed effects estimator, using the IV (global rollouts) and using the recent estimation method by Sun and Abraham (2020). In addition to the intensive margin, we also use the transaction database to estimate the effect on total sales to RS-active MNEs (intensive plus extensive margins). To this end, we estimate specification (31) using PPML with total sales to RS-active MNEs as the outcome.

4.2 Estimation Results

Panels A and B of Table 2 report results on log supplier total sales and log total employment. For each panel, column 1 presents the two-way fixed effect specification with firm and sector-by-year fixed effects. Column 2 adds the additional controls for having sold to any MNE at event period $\eta = -1$ as discussed above. Column 3 presents the same specification as in column 2, but estimated using the procedure by Sun and Abraham (2020). Column 4 presents the same specification as in column 2, but after instrumenting for the treatment event dummies using only RS rollouts that were global in nature (affecting all MNE suppliers worldwide). Each specification (column) reports the baseline event study point estimates without pooling effects at $\eta \geq 4$ and, in addition, reports the point estimate for $\eta \geq 4$ from a separate specification where we pool the longer-run effects for a side-by-side comparison to the estimate at $eta = 4$. Panels A and B of Figure 1 then graph the point estimates of the IV specification in column 4 for both the effect on firm sales and employment.

According to the IV specification, log total sales of exposed suppliers decrease by, on average, -6.5 percent 4 years after the first exposure to an RS rollout and by on average -9.8 percent when pooling 4 years or more after the event. This is accompanied by a decline in total firm employment of -6 percent 4 years after and 8.6 percent after 4 years or more. For both outcomes, the two-way fixed effect, Abraham-and-Sun and IV specifications in columns 2-4 yield very similar point estimates, suggesting that heterogeneity in dynamic adjustments across cohorts of exposed suppliers or MNE targeting at contemporaneous shocks to their CR suppliers are unlikely discernable confounders in our empirical setting. The concern of mechanical positive pre-trends and negative post-trends is apparent in columns 1, where we do not control for having sold to any MNE at event year $\eta = -1$. After we include the parallel event timeline for having sold to any MNE at $\eta = -1$, pre-trends disappear as we see in the figures and table columns 2-4.

To further explore these effects, we also break up the average sales impact among exposed suppliers into different groups for supplier types or by MNE types. In appendix Figure A.1 we find that the negative impact on supplier sales is driven by relatively small firms that are operating in less regulated sectors (services) of the economy. In appendix Figure A.2 we find that the effects are driven by RS events when implemented by MNEs with headquarters in countries with more stringent labor regulations and countries with higher average firm management scores.

Panels A and B of Figure 2 present the worker-level results from specification 32 above. As above, the Figure plots the event-study coefficients from the IV specification. Appendix Table A.4 presents the point estimates across the same specifications as in the columns of Table 2 discussed above.[25] Panel A of Figure 2 presents the results including all workers who have at some point worked at a supplier to an MNE during the sample. Panel B then breaks up the average effect on all workers into three different groups: workers in the bottom quarter of monthly salaries, in the top quarter of monthly salaries and the group in the middle between the two. To classify workers, we use their average monthly salaries in the first year that we observe each worker in the data (starting in 2006) to assign them to low, high or middle salary groups.[26]

We find that on average the earnings of all workers increase post-RS rollout, by 1.5 percent 4 years after the rollout and 1.6 percent four years or more post-rollout. In Panel B of the figure, we then interact the treatment timeline with the worker type dummies to break up this average effect. We find that the effect is concentrated among the initially low-wage workers, who see their monthly earnings increase by on average 4.4 percent 4 years after the rollout and by 4.6 percent four years or more post-rollout. We find an insignificant and close to zero point estimate of the effect on the initially high-wage workers and a weaker effect on workers for the middle group. As discussed under specification (32) above, all regressions include worker-by-firm as well as sector-by-year fixed effects, and as above we control for the potentially confounding effect of having sold to any MNE at event year $\eta = -1$.

In line with these relative earnings effects among initially low-wage workers, we find that the relative employment share of workers in the bottom quarter of initial earnings relative to workers in the top quarter of initial earnings significantly declines. Panels C of Figure 1 and Table 2 shows these supplier-level event study estimates. Given the possibility of employing zero workers classified in the low-wage group, we add an additional column in Panel C of Table 2 where we use PPML for consistent estimation including zeros. The figure displays these point estimates (column 5 in Table 2). We find that the relative employment of initially low vs high-wage workers decreases by 12.5 percent 4 years after the rollout and by roughly 15 percent four years or more post-rollout.

Panel A of Figure 3 presents the results from the transaction-level version of the specification (32) above. As above, the Figure plots the event-study coefficients from the IV specification (also shown in column 3 of appendix Table A.5). We find that intensive margin sales of RS-compliant exposed firms to the RS-MNE decline by 5.8% four years post-rollout and by 6.9 percent four years or more post-rollout. As discussed under specification (32) above, all regressions include

[25]For space reasons we render the additional event study tables to the Appendix and focus on the graphs using the IV specification.

[26]If we observe a worker for the first time after 2006, then we inflation-adjust their first-time monthly earnings using the annual CR CPI.

buyer-by-seller as well as MNE sector-by-year fixed effects. In Panel B of the figure, we include the extensive margin as well. To this end, we estimate the effect on supplier sales to RS-active MNEs using PPML (also reported in Panel B, column 2 of appendix Table A.5). We find that total sales among exposed suppliers decrease by 24 percent 4 years after the RS rollout and 27 percent four years or more post-rollout.

Panel C of Figure 3 (and Panel C of appendix Table A.5) uses the transaction data to estimate the effect of RS exposure on supplier sales to other (non-RS) buyers of the suppliers. In addition the above results on total supplier sales and sales to the RS-MNE, we find that sales to other non-RS buyers are negatively affected among exposed suppliers. Four years after exposure those sales have decreased by 5.1 percent and they decrease by on average 8.9 percent four years or more post-rollout.

Panels A and B of Figure 4 present the MNE-level event study of the effect on MNE CR subsidiary log sales (Panel A) and its relative size to the global sales of the MNE in the Orbis data (Panel B). As above, the graph depicts point estimates of the IV specification, and appendix Table A.6 provides point estimates for this and other specifications. We find no discernable effect on either the total sales of the CR MNE subsidiary or its sales relative to global group-level MNE sales. Both point estimates are statistically insignificant and close to zero.

Additional Results To provide additional context and assess potential alternative interpretations, we document a number of additional results in appendix Figure A.3 and Table A.7. A.7 investigates whether some of the negative effects on exposed supplier sales and employment could be driven by splitting up economic entities – from previously single firms into distinct units with only a fraction of the previous production now dedicated to serving MNE buyers under the new requirements. To this end, we utilize the matched employer-employee database and check whether or not the propensity for linked worker transfers to new firms increases as a function of being exposed to RS codes of conduct. In particular, we check whether different percentage thresholds of workers previously employed together are more likely to move together to a new entity in the wake of RS exposure. We estimate the same event study specification as for supplier outcomes above and present the results in appendix Table A.7. Regardless of the percentage threshold that we chose, we find no evidence pointing to strategic firm splitting behavior and point estimates are close to zero.

Turning to the MNE decision to roll out RS codes of conduct, we investigate whether such decisions are on average more likely to happen after significant negative news events related to production practices. That is, even though the timeline of event study estimates above does not suggest evidence of significant pre-trends for MNE-level outcomes, it could be the case that RS rollouts coincide with negative demand shocks – driven e.g. by adverse media coverage. To this end, we make use of the Sigwatch database described above, providing a comprehensive coverage of NGO-led campaigns against MNE production practices. In Panels A and B of Figure A.3 we assess whether or not i) negative NGO campaings about production practices have a discernible adverse effect on global MNE sales, and ii) whether such campaigns increase the likelihood that RS codes of conduct are being rolled out. To do so, we implement MNE-level event studies with NGO campaigns in the event timeline on the right-hand side (including firm and sector-by-year fixed effects as above). We find suggestive evidence in support of i) and no evidence supporting ii), suggesting that RS codes of conduct likely follow longer-term MNE objectives related to supply chain management.

5 Calibration

The evidence presented in the previous section suggests that MNE rollouts of RS codes of conduct are, on average, not just 'hot air'. In this and the next section, we pursue two main additional objectives. First, while the effects on supplier sales, employment and worker-level salaries seem broadly (qualitatively) consistent with an RS-induced increase in labor-related costs at exposed suppliers that is concentrated among initially low-wage workers, our first objective is to rationalize the observed effects through the lens of the model's comparative statics in Section 2.3 above. Second, the estimated effects, by design, are only able to capture partial equilibrium adjustments: comparing relative changes in firm or worker outcomes among exposed vs. non-exposed MNE suppliers in the wake of individual MNE RS rollout events, while keeping overall labor market outcomes or output markets unchanged.

Such partial equilibrium comparisons, while interesting in their own right, would be insufficient to evaluate the incidence on firms and workers to the extent that MNE RS policies affect labor and output markets more broadly. As we document in Section 3 above, this seems to be the case in our empirical setting as the share of domestic production in CR that is produced by firms under an active RS code of conduct rose from below 20 percent at the beginning of the sample in 2009 to roughly 40 percent by the end of our sample in 2019.

In this section, we address the first objective by confronting the estimated effects from the previous section with the comparative statitics from the theory in Section 2.3. These results, in turn, allow us to estimate the key parameters for model calibration and the counterfactual analysis that follows in Section 6.

We start with an assessment of the qualitative predictions of different model variants derived in Section 2.3 that we summarize in Table 1. The evidence of the previous section does not support the notion that RS in CR is targeted to address significant pre-existing labor market monopsony power and wage markdowns by CR suppliers. In particular, labor market monopsony power by CR suppliers would imply the opposite sign (+) of the estimated effects (-) on exposed supplier sales to non-RS buyers as well as on the intensive margin among compliers to the RS-MNE. These findings are also consistent with the descriptive statistics we presented as part of Section 3: exposed suppliers are relatively small establishments (median employment of just 8 workers) and operate mainly in services sectors serving MNE subsidiaries. Guided by this initial evidence, we now proceed to estimate the most general version of the model in Section 2 that is supported (at least qualitatively) by the estimated effects. This model variant includes all hypotheses summarized in columns 1-4 in Table 1 – potential effects on MNE output demand in the wake of announcing RS, productivity gains due to RS among suppliers and imperfect pass-through to MNE input prices.

5.1 Parameter Estimation

We require estimates of the size of the RS-induced cost increase ($\hat{\tau}$), the size of any contemporaneous increases in labor productivity ($\hat{T}$), the elasticity of substitution that firms face in their output demand (σ), the shape parameter of the CR firm productivity distribution (θ), the extent to which intermediate costs are passed through to the MNE (β), the elasticity of substitution in production between worker types (ρ), and the size of the RS-induced change in MNE output demand by their consumers ($\hat{d}$). Table 3 presents the parameter estimates and the moments used for estimation that we describe in detail below.[27]

Using Matched Employer-Employee Data to Estimate $\hat{T}$

Following expression 21 in Section 2, we can use the change after the RS rollout in the earnings of initially high-wage workers at exposed firms compared to those at otherwise identical MNE suppliers to estimate the accompanying direct productivity effect of new supplier codes of conduct of MNEs.

$$\hat{\bar{w}}^{h,RS} - \hat{\bar{w}}^{h,N} = \hat{T}$$
$$\text{and } \hat{\bar{w}}^{l,RS} - \hat{\bar{w}}^{l,N} = \hat{\tau} + \hat{T}$$

Using this insight, we calibrate $\hat{T}$ using the point estimate of the effect on monthly earnings of intially high-wage workers (defined as the top quarter) four years or more after RS rollout ($\eta \geq 4$) that we display in Panel B of Figure 2 above. This estimate is close to zero (0.003) and statistically insignificant (s.e. 0.004). Through the lens of the model, we do not find evidence suggesting meaningful increases in broad-based labor productivity at exposed suppliers ($\hat{T} = 0$). We revisit this baseline calibration as part of the sensitivity analysis in the counterfactuals below.

Using Sales Effects to Estimate $\hat{\tau}$, θ, β and $\hat{d}$

Armed with an estimate of $\hat{T}$, we proceed to estimate the size of the RS cost shock $\hat{\tau}$ in addition to θ, β and $\hat{d}$. In principle, there are two natural approaches to this. The first one follows the second comparative static on earnings just above: we could use the observed effect on low-wage worker earnings (i.e., 4.6% in Panel B of Figure 2) to estimate $\hat{\tau}$ (i.e., $0.046 - \hat{T} = 0.046$), then use the estimated $\hat{T}$ and $\hat{\tau}$ to pin down σ, θ, β and $\hat{d}$ using the comparative statics on intensive-margin supplier sales to the RS-MNE (equation (19)), supplier sales to other (non-RS) buyers (equation

[27] Note that our parameter estimates and the welfare quantification in the next section do not currently have standard errors. In future versions of this draft, we plan to bootstrap the estimation procedure.

(24)), total supplier sales (equation (26)) and sales of the RS-MNE subsidiary (equation (27)). Alternatively, the second approach is to use an existing estimate of the elasticity of substitution faced by firms in CR (e.g., from Alfaro-Ureña et al., 2022, who estimate σ in a way consistent with our model and using the same firm-level microdata), and then use knowledge of σ and $\hat{T}$ from above in combination with the four comparative statics on sales above to pin down the unknown cost shock $\hat{\tau}$ as well as θ, β and $\hat{d}$.

In our preferred approach, we use the latter option above. While there are arguably many studies estimating σ using firm-level panel data in similar contexts (including in CR) – we are unaware of any empirical estimate of the magnitude of the unobserved cost shock brought about by RS rollouts on suppliers. As we discuss in Section 3, supplier codes of conduct impose a number of different requirements that often include mandatory wage floors (that we can observe in the earnings data) but also other worker benefits, such as paid leave, health benefits, etc. (which we would not be able to observe from worker compensation). In addition, it could be that our estimation using the employer-employee microdata fails to capture other parts of the costs imposed on suppliers, as all workers are formal in this data. To the extent that we are missing costly switches from informal to formal contracts for suppliers (which would not be reflected in our wage regressions with worker-by-firm fixed effects), we would be under-estimating the true cost increase from employing initially low-wage workers (who could have formerly had informal work arrangements).

In this context, we judge the assumption that the full cost shock must be pinned down from the earnings effect (estimated among low-wage workers in the official data) to be somewhat stronger than the assumption that we have a credible estimate of the elasticity of demand that firms in CR are facing on average. Furthermore, the $\sigma = 5.03$ that Alfaro-Ureña et al. (2022) estimate from the firm-level microdata falls squarely at the center of a large number of existing estimates from similar empirical settings to CR (see, e.g., Hottman et al., 2016, for a discussion of existing estimates). And of course, we can always cross-check the magnitude of the implied $\hat{\tau}$ with that obtained from only using worker-level data on nominal compensation (i.e., $0.046 - \hat{T} = 0.046$).

To proceed, we use the four comparative static equations discussed above ((19), (24), (26) and (27)) in combination with knowledge of $\hat{T} = 0$ and $\sigma = 5.03$ in order to estimate $\hat{\tau}$, θ, β and $\hat{d}$.[28] The empirical estimates that solve this system of four equations in four unknowns are presented in Panel A of Figure 1 for supplier sales (-0.098, s.e. 0.022) at $\eta \geq 4$, in Panel A of Figure 3 for intensive-margin sales to the RS-MNE among compliers (-0.069, s.e. 0.031), in Panel C of Figure 3 for supplier sales to non-RS buyers (-0.088, s.e. 0.027), and in Panel A of Figure 4 for sales of the RS-MNE subsidiary (-0.017, s.e. 0.098).

The last moment above that we use for parameter estimation is not precisely estimated. How can it be that we find sizable and statistically significant negative effects among exposed suppliers, but much more muted and insignificant effects on sales of the RS-MNE subsidiary (or its global

[28]We also need to calibrate the cost-share of low-wage workers ($\chi^l = 0.19$), the average sales share to the RS-MNE by exposed firms at event period $\eta = -1$ ($\xi = 0.25$) and the average cost share of CR-sourced inputs in MNE subsidiary production ($\chi^x = 0.14$).

sales in Orbis as the CR subsidiary share is not affected)? In our theory, there are two potential answers to this question. The first and most direct is that MNE subsidiaries, to a first order, are only explosed to the RS cost shock in proportion to their cost share spent on CR suppliers (χ^x). As noted above, this share is on average 14% in the CR transaction database. So while supplier sales respond in full exposure to the cost shock, the sales effect on MNE subsidiaries, ceteris paribus, should be muted. The second and third potential mechanisms are related to the alternative hypotheses about RS that our model allows for. The extent to which labor cost increases are not fully passed through to the MNE buyers ($\beta < 1$) could reinforce the above attenuation of the MNE sales response. In addition, positive output demand effects due to RS for the MNE ($\hat{d}$) would also affect the relative sales effect between exposed suppliers and the MNE. Solving the system of four comparative static equations in four unknowns allows us to disentangle these channels.

Solving this system of comparative static equations, we find that the estimated size of the cost shock for employing low-wage workers is $\hat{\tau} = 11.5\%$ on average among exposed suppliers. This parameter directly follows from the observed sales decline among exposed suppliers to non-RS buyers following the RS event (conditional on the demand responsiveness these sellers face domestically, σ). Comparing the $\hat{\tau} = 0.115$ estimate to the estimate of the increase in monthly earnings of low-wage workers (4.6% in Panel B of Figure 2) suggests that, indeed, not all of the RS-induced increases in labor costs at suppliers may be captured directly by workers (or at least not in their nominal earnings). We revisit this question as part of the quantitative analysis in Section 6 below.

In turn, the ratio of the supplier sales effect to other (non-RS) buyers relative to the sales effect among compliers on the intensive margin of sales to the RS-MNE is informative about the extent of cost pass-through to the MNE as well as the potential shift in MNE output demand due to RS. We find that cost pass-through is not complete, but also not extremely low ($\beta = 0.795$). In turn, we find little evidence of a significant positive demand shift for MNE output ($\hat{d} = 0.001$). At on average 14% cost share spent on CR inputs among MNE subsidiaries in CR, the slightly negative point estimate on MNE sales we find (-1.7%) essentially does not require much of an extra output demand change to be rationalized. Finally, we estimate the shape parameter of the domestic productivity distribution, $\theta = 6.21$ using two moments that clearly involve an extensive margin response (across sellers of inputs): the total sales of exposed suppliers and the sales of the RS-MNE subsidiary. This estimate lies roughly in the middle of previous estimates in the trade and macro literatures. All these parameter estimates and the moments they are based on are reported in Table 3.

Using the Effect on Relative Employment to Estimate ρ

The final parameter in Table 3 is the elasticity of substitution between low- and high-wage workers, that we estimate from the RS effect on the relative employment of high- vs. low-wage workers. Formally, the differential impact of the policy on high- vs. low-wage employment at exposed firms compared to non-exposed firms is:

$$d \log \frac{\ell^l_{x^{RS}} + \ell^l_{H^{RS}}}{\ell^h_{x^{RS}} + \ell^h_{H^{RS}}} - d \log \frac{\ell^l_{x^N} + \ell^l_{H^N}}{\ell^h_{x^N} + \ell^h_{H^N}} = -\rho\hat{\tau},$$

To estimate ρ, we again group workers into earnings groups that are likely to be affected by RS rollouts on working conditions (i.e., workers in the bottom quarter of all worker monthly earnings, based on the earnings of the worker when first observed in our data) and those that are unlikely to be affected by such RS rollouts (i.e., workers in the top quarter of monthly earnings, again based on their first-time appearance in the data). For parameter estimation, we use the point estimate at $\eta \geq 4$ in Panel C of Figure 1 (-0.149, s.e. 0.031). Coupled with our estimate for $\hat{\tau} = 0.115$, this yields an estimate of $\rho = 1.295$.

6 Counterfactual Analysis

In this final section, we present the counterfactual analysis of the welfare incidence of RS in CR. We use the parameter estimates from the previous section in combination with a number of additional moments in the CR data to proceed to the quantification of the model and the welfare consequences of RS in CR. In the final part, we present additional counterfactual results to conduct sensitivity analysis across alternative parameter values and model assumptions, and to assess how the incidence of RS may change in different empirical contexts.

6.1 Counterfactual Analysis

Perimeter of the Policy Analysis

We aim to quantify the welfare incidence of moving from an initial equilibrium without RS in CR to one in which the extent of RS policies we observe at the end of our sample in CR in 2019 has been implemented. We quantify counterfactuals in two distinct RS scenarios. In our baseline counterfactuals, we assume that MNE subsidiaries in CR had already implemented RS-type changes in working conditions for their own in-house workers as part of the baseline equilibrium. In other words, we assume that "CRS 1.0" had already happened and that RS represented "CRS 2.0", where such conditions were extended to direct suppliers to the MNEs. In an alternative second scenario, we instead assume that neither MNEs nor domestic firms were subject to above-market CRS policies on worker compensation and working conditions. In this second scenario, we thus quantify the impact of MNE subsidiaries rolling out RS policies ($\hat{\tau}$ targeted at low-wage workers both at the MNE production and their suppliers in parallel. Finally, while the welfare expressions discussed above pertain to a simplied model and first-order approximations, our quantitative analysis below solves for counterfactual equilibria in the full model that we detail in the Appendix.

Additional Data Moments

In addition to parameters we estimate in the previous section, the system of counterfactual model equations that we outline in the Appendix for the full model requires three additional moments. The first is the share of domestic CR firm production that is sold by firms who also sell to MNE subsidiaries (regardless of the MNE's RS status). In the transactions database, we measure this in 2019 to be 55%. Second, we require the share of CR exports that is done by firms who are also selling to MNE subsidiaries in CR. In 2019, we measure this to be 62%. Finally, we measure the share of total MNE subsidiary production in CR that is done by MNEs with active RS policies in 2019 according to our database. We find this to be 47% in 2019.

The Welfare Incidence of RS in CR

We proceed to quantify the welfare implications in a counterfactual that compares a no-RS equilibrium to one in which the extent of RS was implemented in CR as of the end of our sample in 2019. Those RS requirements have the same features ($\hat{\tau}$, $\hat{T}$, etc.) as those estimated in the data in Section 5 and shown in Table 3. As noted above, we estimate these counterfactuals across two scenarios: one in which RS only affects suppliers (and had been implemented within MNE subsidiaries at baseline), and one in which RS conditions for workers were rolled out both for suppliers and within MNE production at the same time.

Figure 5 presents the welfare incidence of RS on four different types of workers as well as in the aggregate. We find that RS in CR has had positive but minor aggregate implications on welfare, both for initially low-wage and high-wage workers (+0.2%). These aggregate effects, however, mask significant heterogeneity within worker types: we find that the 21% of low-wage workers employed at exposed MNE suppliers *ex ante* experience significant welfare gains (+9.1%), while the remaining majority of low-wage workers at non-exposed firms in the economy experience significant real income losses (-2.2%) due to adverse GE effects on their wages and leakage into the domestic price index. These counterfactuals isolate the incidence of RS policies targeted outside the MNEs' own production (at their suppliers), assuming MNEs had already implemented the same policies among their own workers in the initial equilibrium. Alternatively, we quantify welfare changes when RS policies are implemented both within MNE subsidiaries and imposed on suppliers, and find the fraction of exposed low-wage workers increases to roughly one third, with welfare gains of 7.9% for the exposed and losses of 3.5% among the non-exposed.

6.2 Additional Results

We assess the sensitivity of our baseline counterfactuals above across a number of alternative considerations. These results also serve to assess how the impacts of RS may differ across alternative empirical contexts.

Allowing for Unemployment Figure 6 uses our database to quantify the unemployment multiplier that applies (to a first order) in our model extension after allowing for upward-sloping labor supply and unemployment. The base rate of unemployment at the beginning of our sample is roughly 7% in CR. Using this statistic in combination with the other moments, Figure 6 plots the welfare multiplier across a wide range of labor supply elasticities (κ). For commonly used values of this elasticity, we find that the attenuation of the welfare effect of RS in CR due to the unemployment margin is close to unity in all cases (0.925-0.93).

Alternative Parameter Values Figures 7-13 present the counterfactual welfare incidence in aggregate and by worker type for alternative parameter values of, respecitvely, σ, θ, ρ, β, γ, $\hat{\tau}$ and $\hat{}$.

Fraction of $\hat{\tau}$ Captured by Workers Figure 14 plots the welfare incidence for low-wage workers (nationwide) as a function of the fraction of $\hat{\tau}$ that is captured by low-wage workers' real wages. The model's baseline assumption is that all RS-induced cost increases are captured in the real compensation of initially low-wage workers (including nominal earnings, but also potentially including benefits, sick leave, etc.).

7 Conclusion

Despite widespread growth in the adoption of RS policies by MNEs vis-a-vis their global suppliers, there has been relatively little theoretical work or empirical evidence on the economic consequences in sourcing origin markets. We first develop a theory to study the incidence of RS requirements that nests alternative hypotheses about the motivation behind RS by the MNE and the economic environment in which RS is being implemented. We then build a unique database in the context of CR to provide new evidence of the impact of RS on exposed firms and workers, and to confront the model's comparative statics with the data. In the final step, we use the theory to derive counterfactual expressions of the welfare incidence in general equilibrium, and use the data and estimated effects to calibrate the model for counterfactual analysis.

We document several insights. In the theory, we show that the welfare effect of RS in origin countries is a priori ambiguous. RS can lead to adverse consequences in environments where the cost pass-through to MNE buyers is incomplete and where affected suppliers also produce a significant share of output destined for domestic consumers. Underlying this, we document the interplay of an export tax effect due to RS (that increases domestic welfare due to a classical terms-of-trade effect) and a labor market distortion that arises as the RS requirements "leak" into domestic production (and the domestic price index). Additional gains arise to the extent that RS is on average accompanied by direct effects on the labor productivity or by positive shifts in demand for MNE output due to implementing RS.

Empirically, we find that RS is not just "hot air": sales and employment of exposed suppliers decline in the years post-RS rollout, and the monthly earnings of workers increase, especially so among the initially low-wage workers. On its own, the reduced-form evidence would, however, be insufficient to evaluate the welfare consequences of RS in origin countries. To this end, we interpret the evidence through the lens of the model, estimate several key parameters and use the richness of the data to compute additional important moments for the model's calibration. We find that the effective cost increase of RS for low-wage workers is about 11% on average and that the cost pass-through to MNEs does not appear to be complete. We do not find compelling evidence that RS rollouts affect worker productivity (based on zero effects on the earnings of initially higher-wage workers). We also document that the percentage of domestic production affected by RS in CR is both increasing over time and significant: increasing from below 20% in 2009 to 38% in 2019. Using these estimates, we find that on net RS has led to positive but minor aggregate welfare changes (+0.2%). These aggregate implications, however, mask substantial heterogeneity even within worker types: Low-wage workers employed at exposed suppliers before the rollout experience a roughly 9 percent increase in welfare, whereas low-wage workers in the rest of the economy experience a 2.2 percent decline due to adverse indirect effects on their wages and the domestic price index.

Finally, it is important to note that we are able to study the impacts of RS in the context of a middle-income country, where RS is mainly aimed at improving the wages and conditions of initially low-wage workers. The counterfactual would be a very different one in theory if we were instead to study the effects of, e.g., child labor bans in a low-income country context. Banning a type of employment is a distinct proposition from requiring a wage floor, and caution is in order when extrapolating our findings to very different economic contexts or RS policies. There are also many important questions related to RS that this paper does not answer, as for example potential environmental provisions of RS, which we leave for an exciting agenda for future research on these topics.

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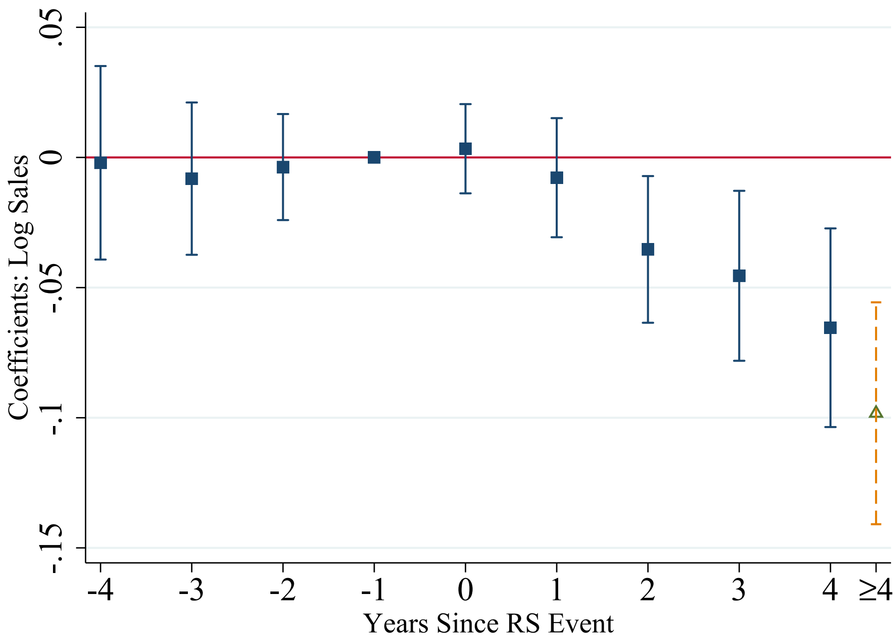
8 Figures and Tables

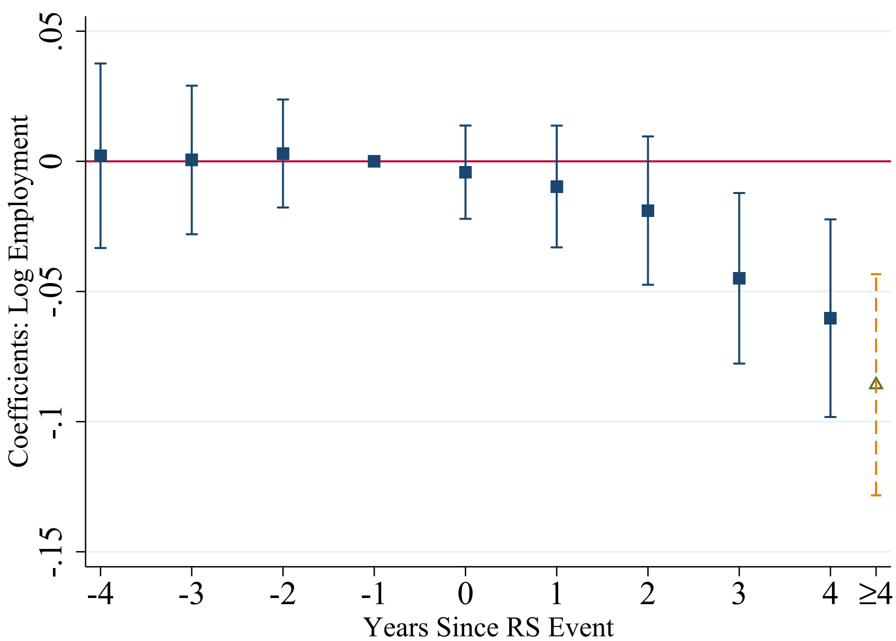
Figures

Figure 1: Supplier-Level Event Study

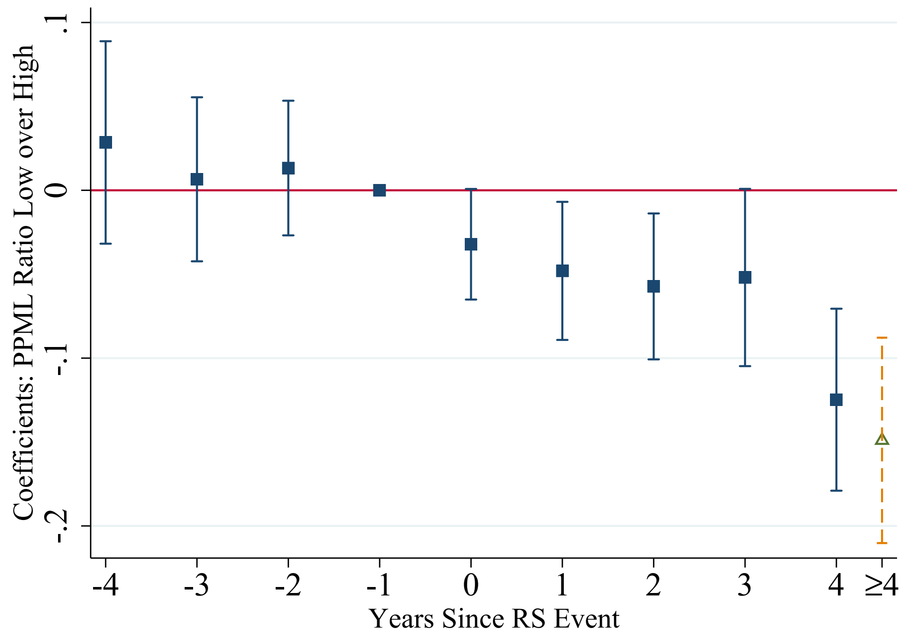
Panel A: Supplier Annual Sales



Panel B: Supplier Employment

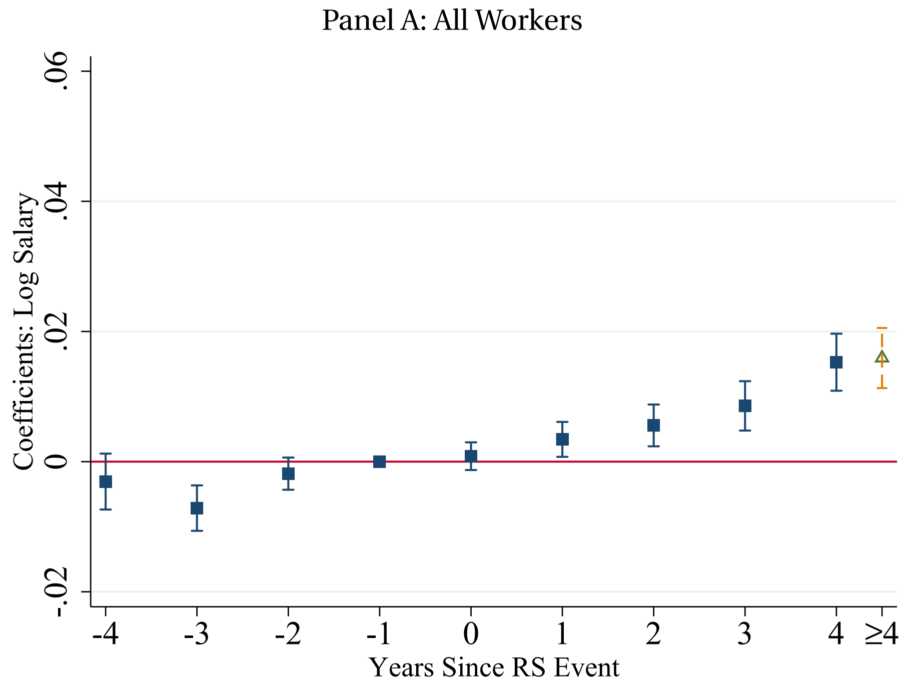


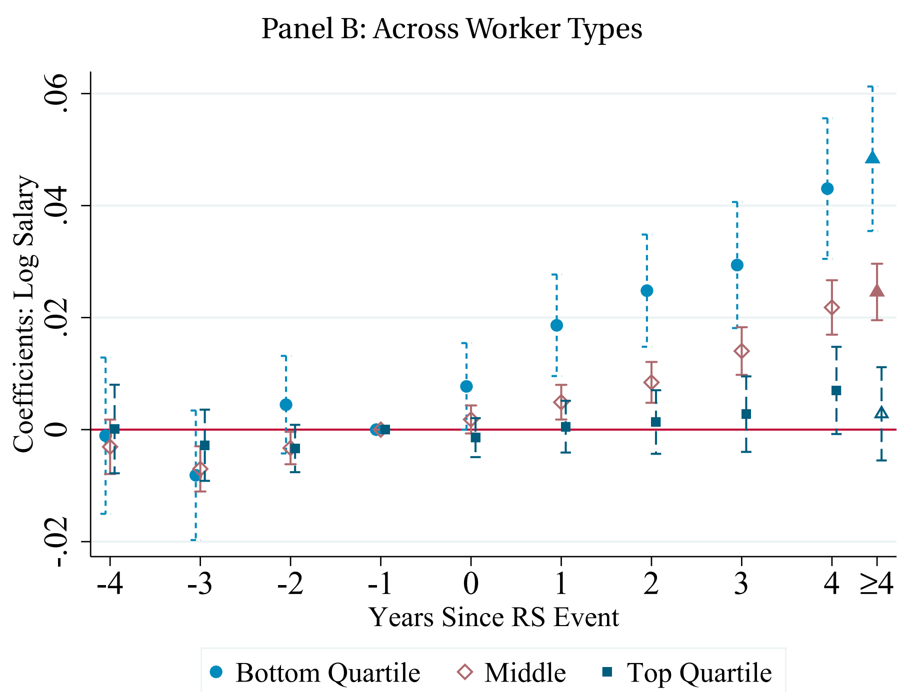
Panel C: Employment Ratio of Low vs High-Wage Workers



Notes: Panels A and B plot estimates from the event study specification in column 4 of Panels A and B in Table 2. Panel C plots estimates from column 5 in Panel C of Table 2. The outcome in Panel A is the log of total annual firm sales. The outcome in Panel B is the log of total annual worker-months (number of months worked summed across all workers) at the firm. The outcome in Panel C is the log employment ratio of the top and bottom quarter of workers in terms of monthly earnings. 95 percent confidence intervals are based on standard errors clustered at the level of firms. See Section 4 for discussion.

Figure 2: Worker-Level Event Study

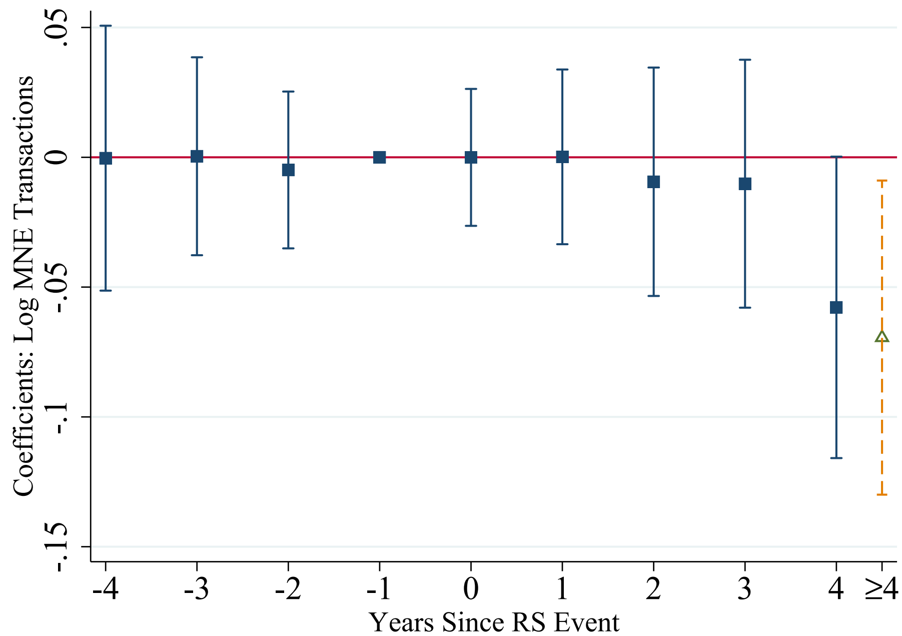




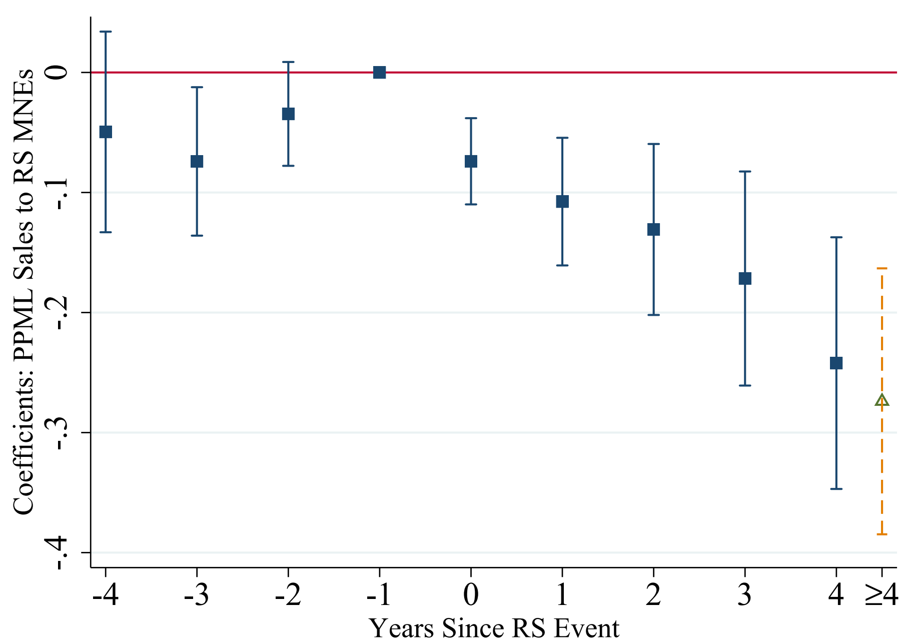
Notes: The figure plots estimates from the event study specification in column 4 of Panels A and B in Table A.4. The outcome is the log of worker annual earnings divided by the number of months of employment. In Panel B, low-wage workers are defined as the bottom 25% of all workers in the data, measured in terms of monthly earnings in the first year we observe each worker since 2006, and relative to the (inflation(CPI)-adjusted) first-time monthly earnings of other workers in the data. 95 percent confidence intervals are based on standard errors clustered at the level of firms. See Section 4 for discussion.

Figure 3: Transaction-Level Event Study

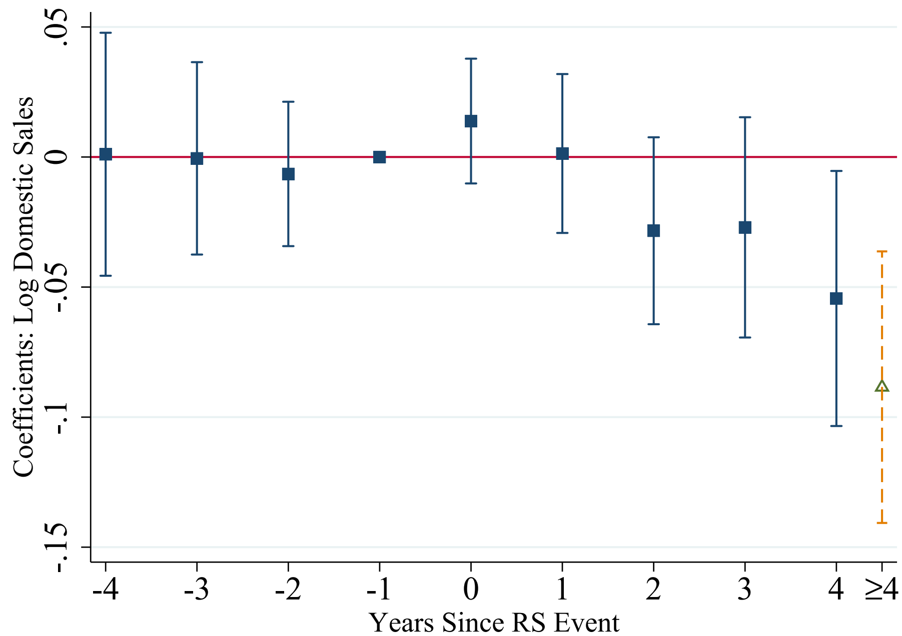
Panel A: Intensive Margin among Complying Suppliers



Panel B: Total Sales to RS-Active MNEs (Intensive + Extensive Margin)



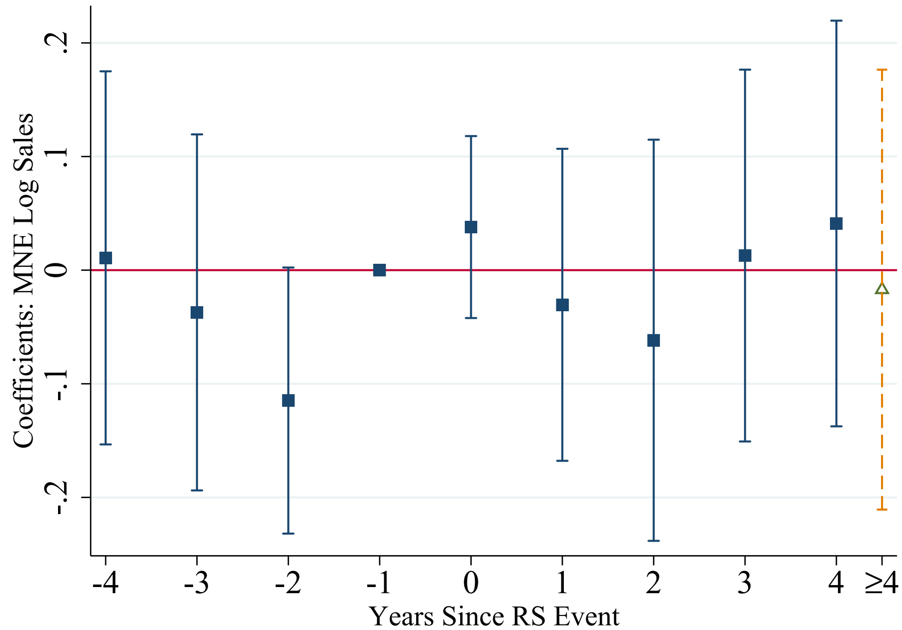
Panel C: Supplier Sales to Non-RS Buyers



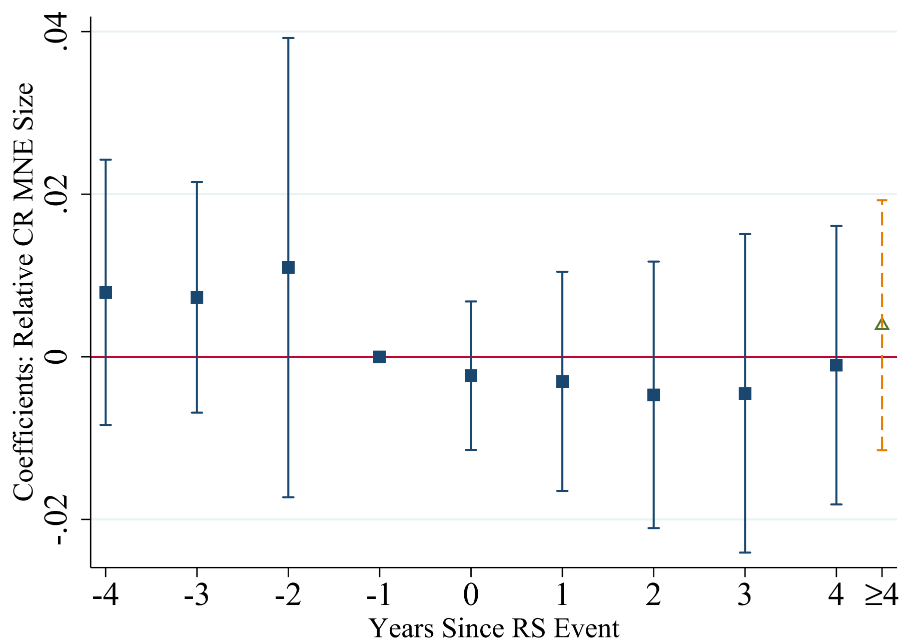
Notes: The figure plots estimates from Panels A, B and C in Table A.5. 95 percent confidence intervals are based on standard errors clustered at the level of firms. See Section 4 for discussion.

Figure 4: Effect on MNE CR Subsidiary Sales and Relative Size

Panel A: CR Subsidiary Total Sales

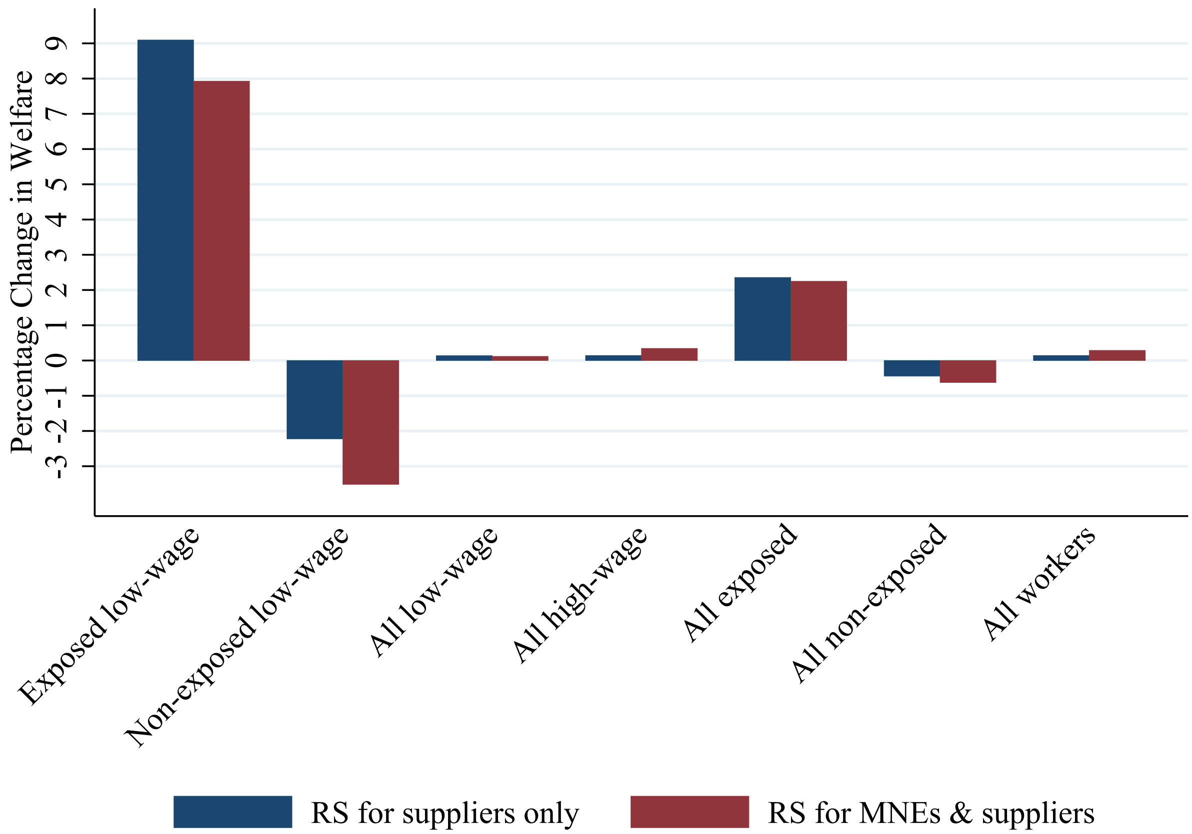


Panel B: Ratio of CR Subsidiary vs. Global MNE Sales



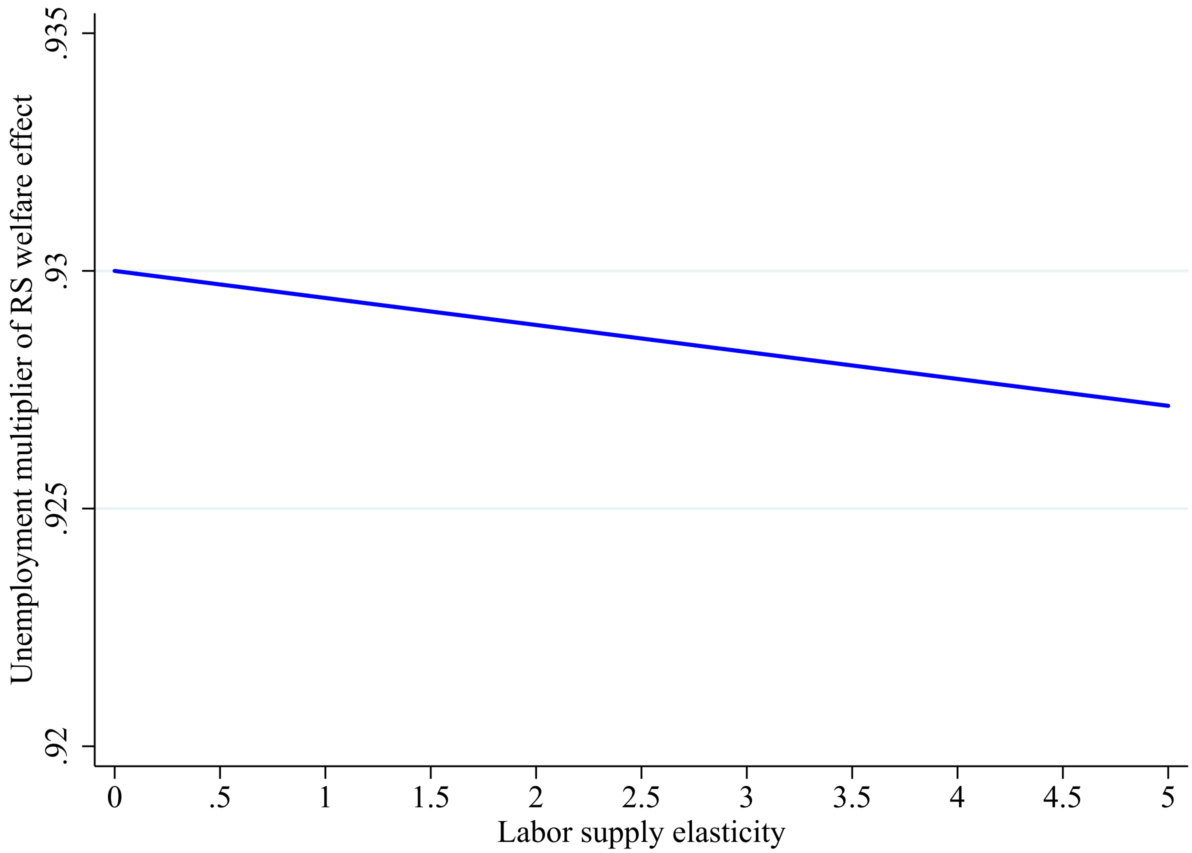
Notes: The figure plots estimates from columns 3 and 6 in Table A.6. 95 percent confidence intervals are based on standard errors clustered at the level of firms. See Section 4 for discussion.

Figure 5: Welfare Incidence of RS in CR



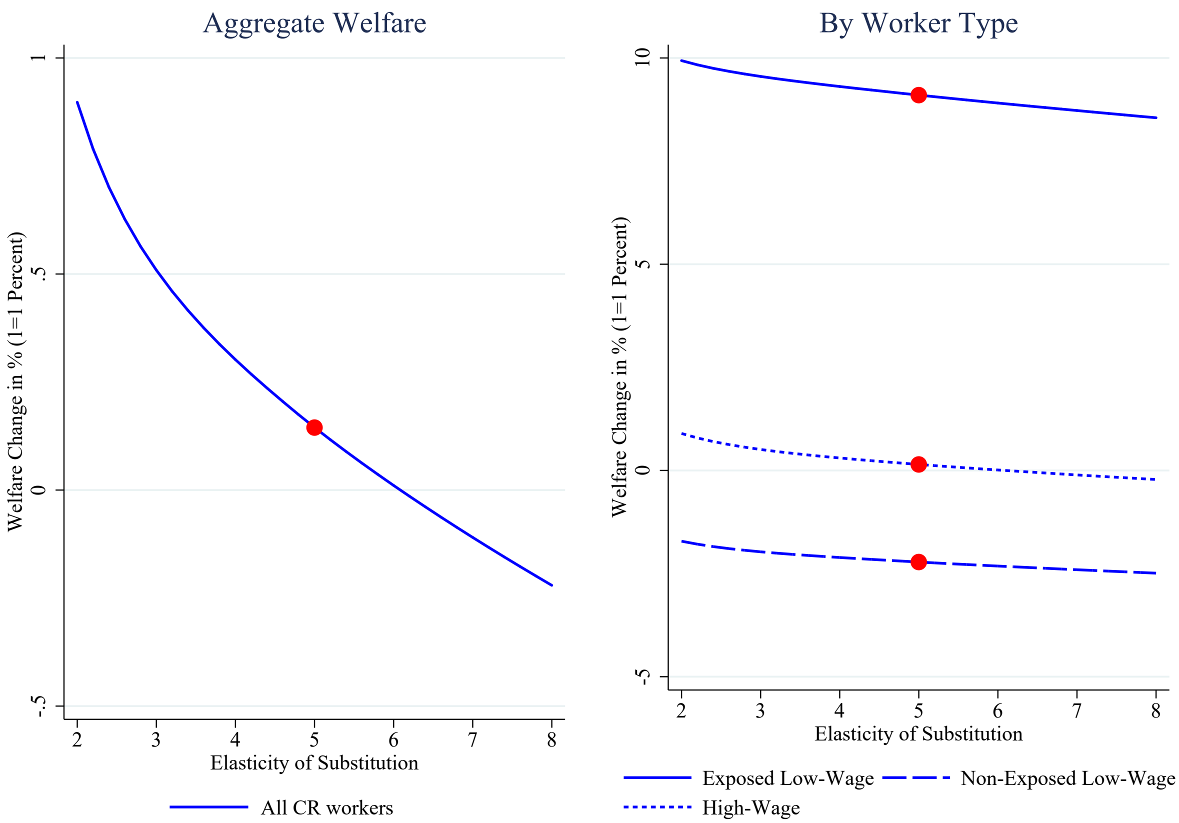
Notes: See Section 6 for discussion.

Figure 6: Allowing for Unemployment



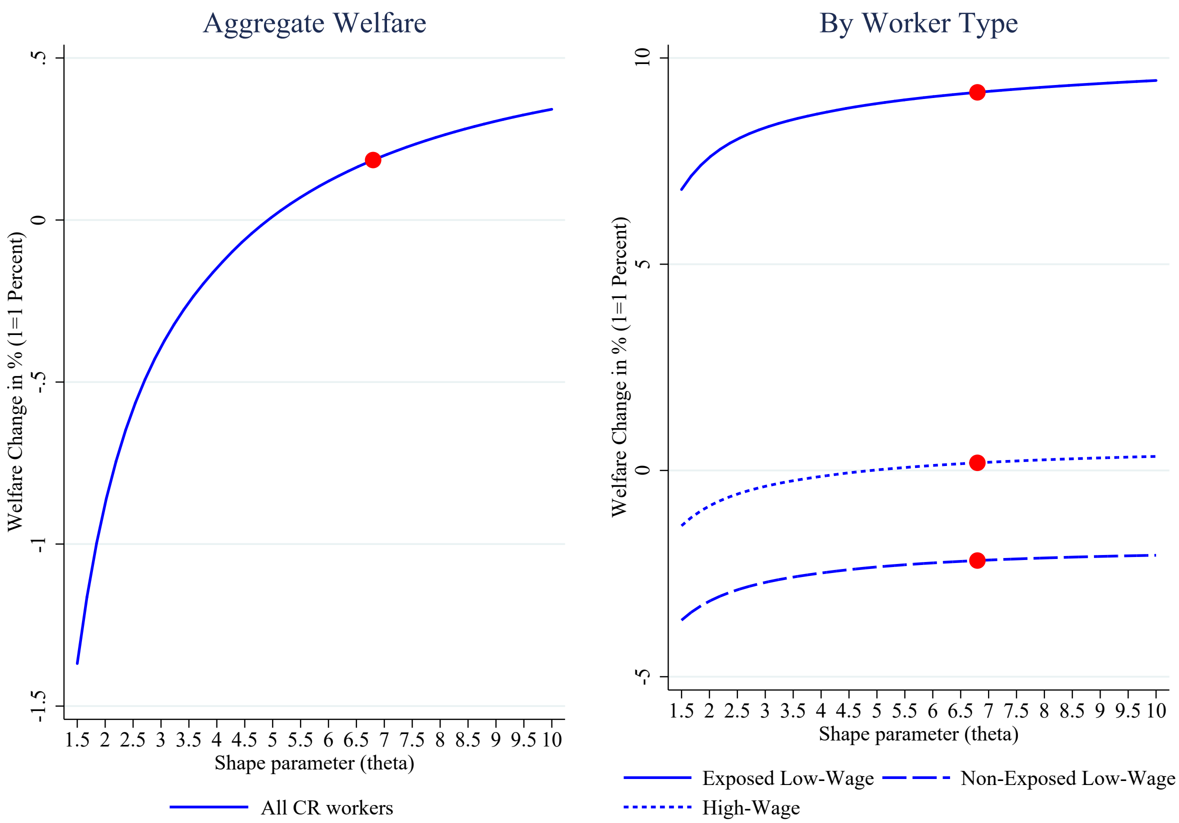
Notes: See Section 6 for discussion.

Figure 7: Sensitivity to Alternative σs



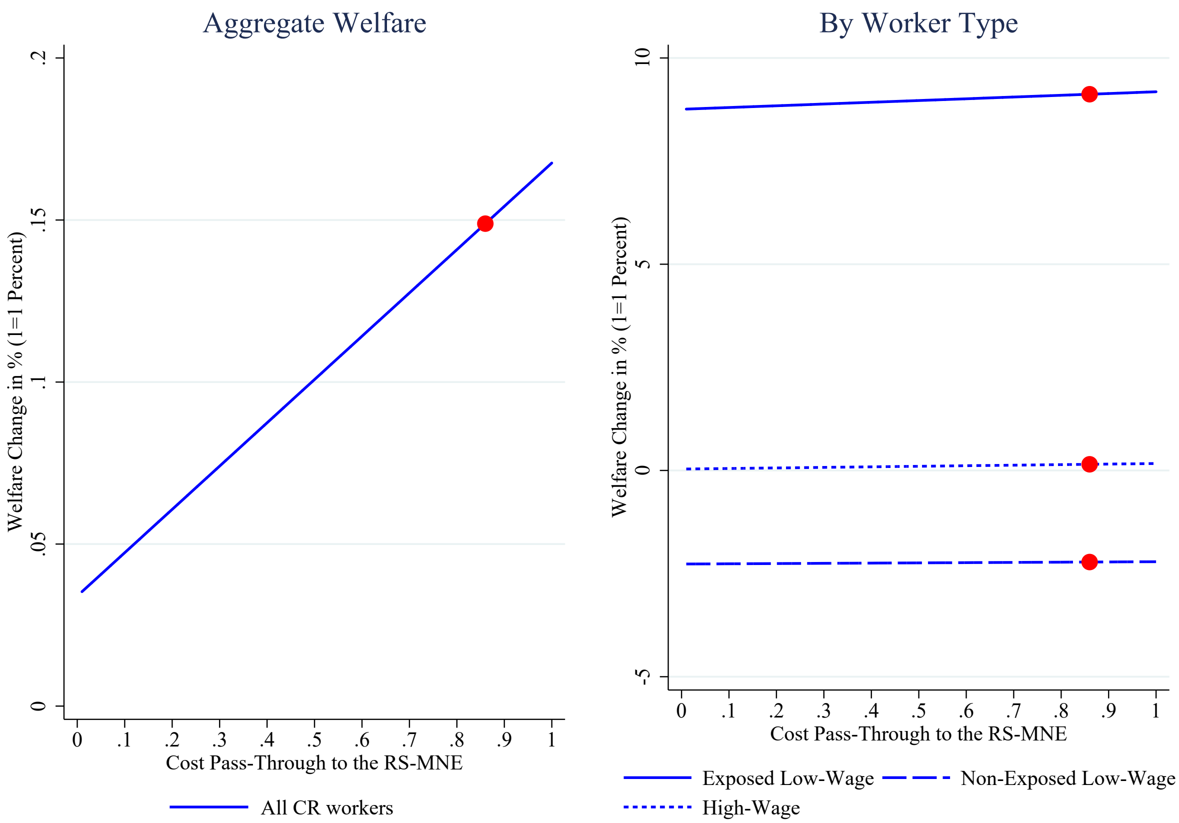
Notes: See Section 6 for discussion.

Figure 8: Sensitivity to Alternative θs



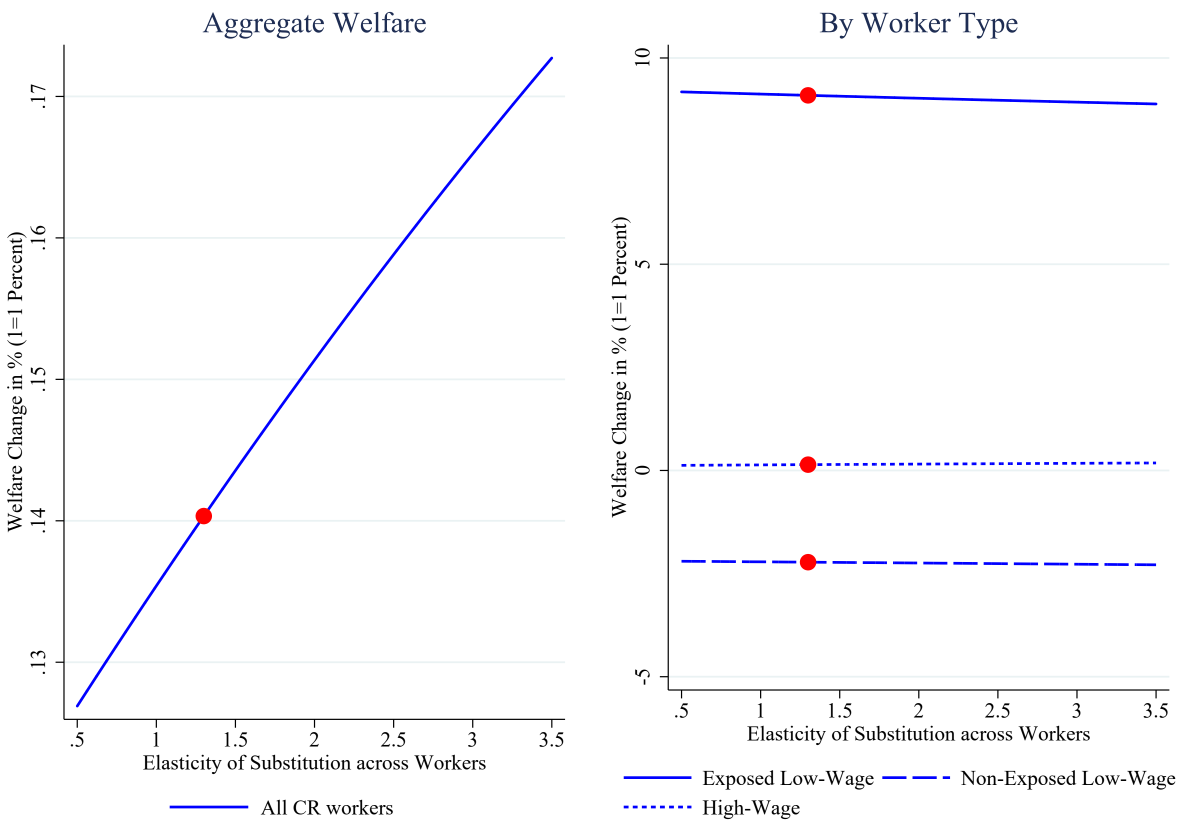
Notes: See Section 6 for discussion.

Figure 9: Sensitivity to Alternative βs



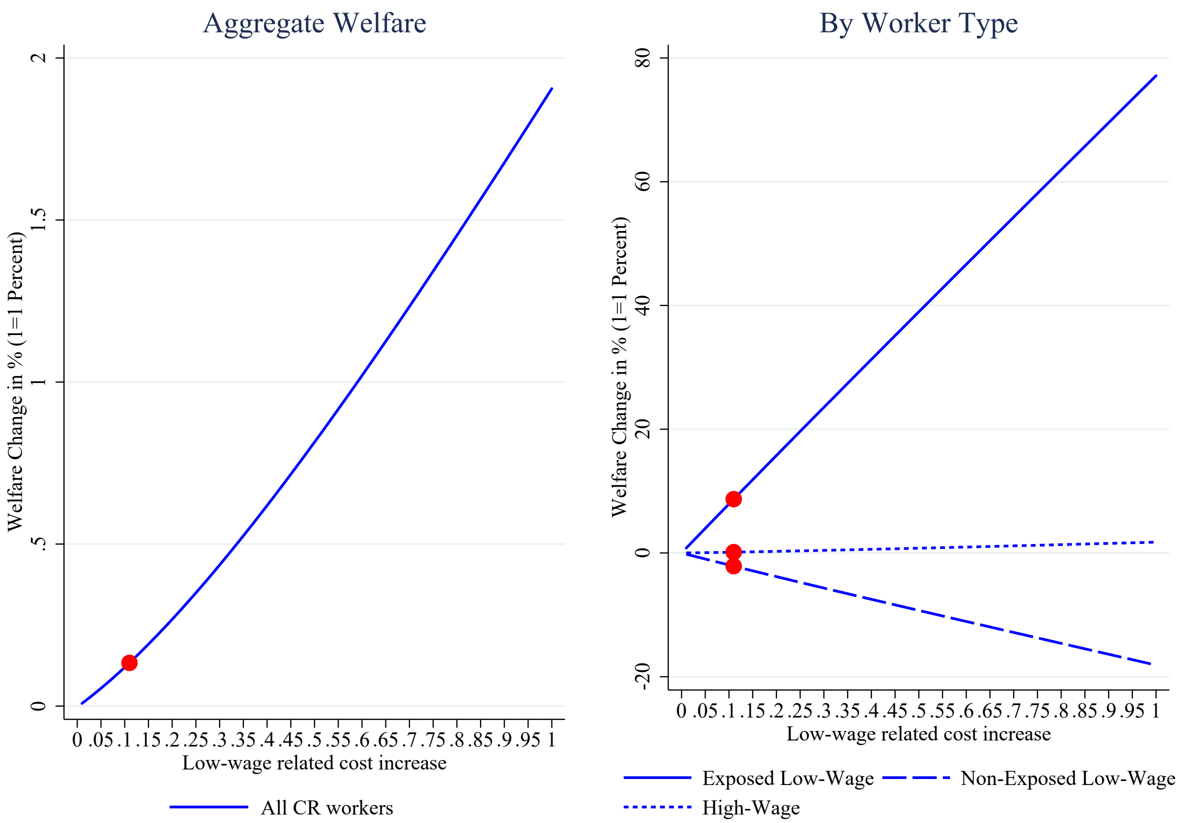
Notes: See Section 6 for discussion.

Figure 10: Sensitivity to Alternative ρs



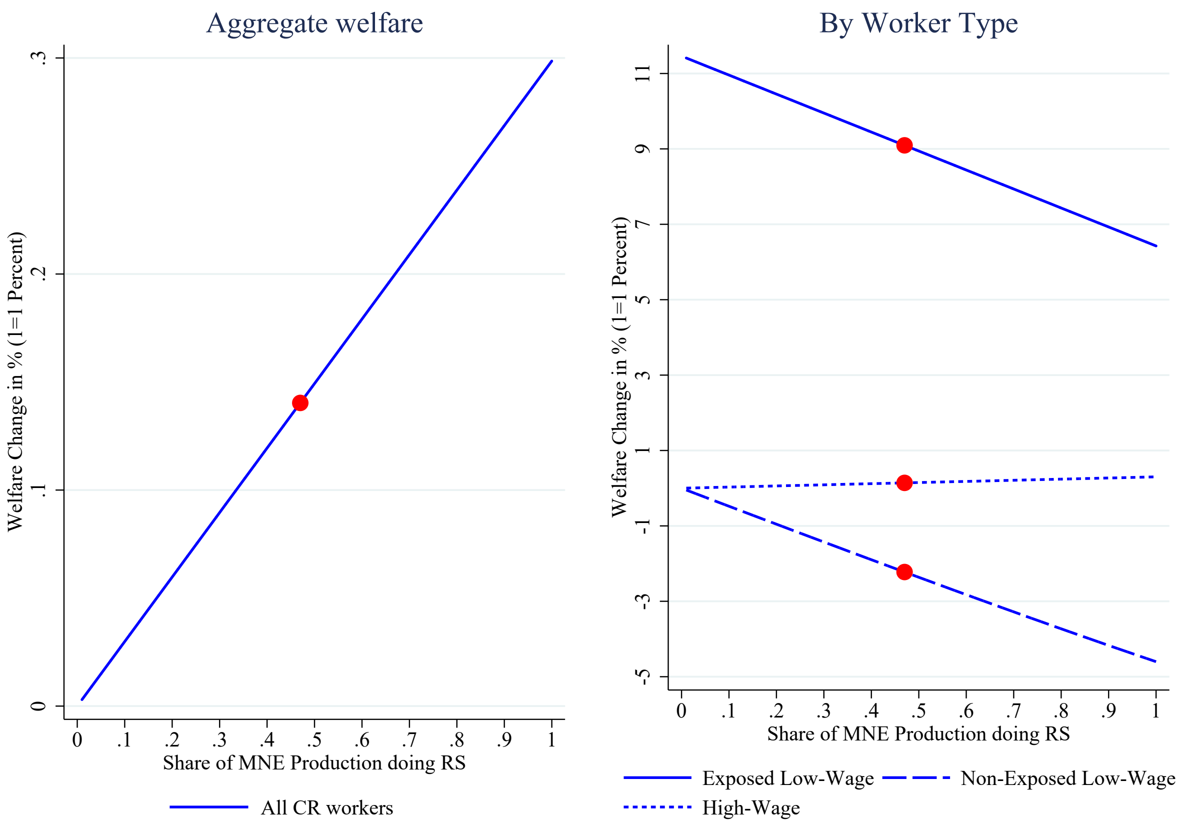
Notes: See Section 6 for discussion.

Figure 11: Sensitivity to Alternative $\hat{\tau}$s



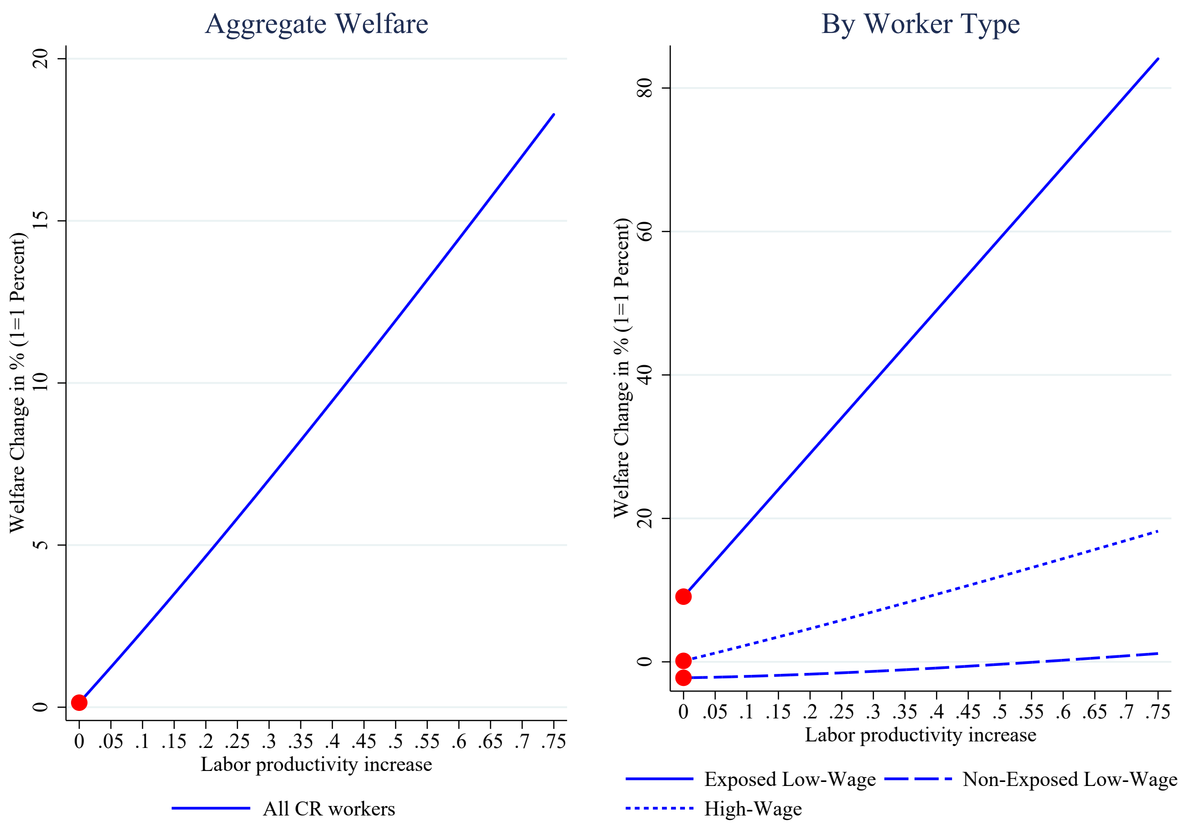
Notes: See Section 6 for discussion.

Figure 12: Sensitivity to Alternative Fraction of MNEs Doing RS



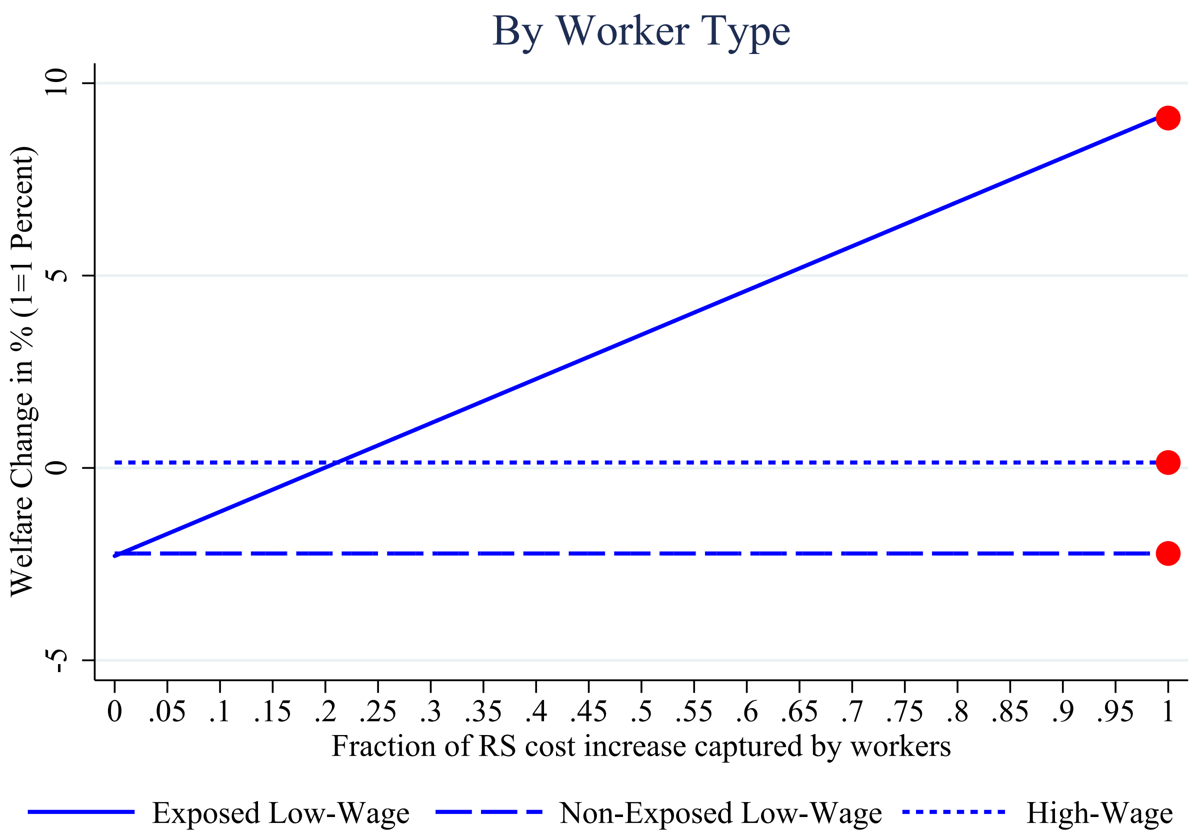
Notes: See Section 6 for discussion.

Figure 13: Sensitivity to Alternative $\hat{T}$s



Notes: See Section 6 for discussion.

Figure 14: Sensitivity to Fraction of $\hat{\tau}$ Captured by Workers



Notes: See Section 6 for discussion.

Tables

Table 1: Summary of Comparative Statics

Hypotheses:	Baseline	Prod. Gains	Imp. Passthru	Demand Shock	Labor Monopsony
Outcomes					
Exposed firms (ext. + int. margin)					
Sales to MNE	-	-	-	+/-	+/-
Sales to other buyers	-	-	-	-	+
Total Sales	-	-	-	+/-	+/-
Compliers (intensive margin)					
Sales to MNE	-	-	-	+/-	+

Notes: See Section 2.3 for discussion.

Table 2: Supplier-Level Event Study

Panel A: Effects on Log Supplier Annual Sales

	(1) TWFE	(2) TWFE	(3) SA	(4) IV
$\eta = -4$	-0.133***	-0.004	0.029	-0.002
	(0.018)	(0.018)	(0.018)	(0.019)
$\eta = -3$	-0.094***	-0.013	0.017	-0.008
	(0.015)	(0.014)	(0.014)	(0.015)
$\eta = -2$	-0.053***	-0.008	0.010	-0.004
	(0.010)	(0.010)	(0.009)	(0.010)
$\eta = -1$	0	0	0	0
	(0)	(0)	(0)	(0)
$\eta = 0$	0.015*	0.004	-0.002	0.003
	(0.008)	(0.008)	(0.008)	(0.009)
$\eta = 1$	-0.004	-0.002	-0.011	-0.008
	(0.011)	(0.011)	(0.011)	(0.012)
$\eta = 2$	-0.045***	-0.026**	-0.035***	-0.035**
	(0.013)	(0.013)	(0.013)	(0.014)
$\eta = 3$	-0.068***	-0.037**	-0.047***	-0.046***
	(0.015)	(0.015)	(0.015)	(0.017)
$\eta = 4$	-0.114***	-0.053***	-0.065***	-0.065***
	(0.018)	(0.018)	(0.018)	(0.019)
$\eta \geq 4$	-0.182***	-0.081***	-0.128***	-0.098***
	(0.019)	(0.019)	(0.021)	(0.022)
Firm FE	Yes	Yes	Yes	Yes
Year-Sect FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Adjusted R^2	0.81	0.82	0.83	–
# Observations	173624	173624	173624	173624
# Firms	20769	20769	20769	20769
# Sector-Year Bins	2923	2923	2923	2923

Panel B: Effects on Log Supplier Employment

	(1) TWFE	(2) TWFE	(3) SA	(4) IV
$\eta = -4$	-0.091***	-0.007	0.021	0.002
	(0.017)	(0.017)	(0.017)	(0.018)
$\eta = -3$	-0.049***	-0.002	0.022	0.001
	(0.014)	(0.014)	(0.014)	(0.015)
$\eta = -2$	-0.020**	0.002	0.018*	0.003
	(0.010)	(0.010)	(0.010)	(0.011)
$\eta = -1$	0	0	0	0
	(0)	(0)	(0)	(0)
$\eta = 0$	0.012	-0.003	-0.007	-0.004
	(0.008)	(0.008)	(0.008)	(0.009)
$\eta = 1$	0.018*	-0.001	-0.007	-0.010
	(0.011)	(0.011)	(0.011)	(0.012)
$\eta = 2$	0.009	-0.009	-0.014	-0.019
	(0.013)	(0.013)	(0.013)	(0.015)
$\eta = 3$	-0.005	-0.027*	-0.033**	-0.045***
	(0.015)	(0.015)	(0.015)	(0.017)
$\eta = 4$	-0.027	-0.043**	-0.051***	-0.060***
	(0.017)	(0.018)	(0.018)	(0.019)
$\eta \geq 4$	-0.069***	-0.069***	-0.109***	-0.086***
	(0.018)	(0.019)	(0.021)	(0.022)
Firm FE	Yes	Yes	Yes	Yes
Year-Sect FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Adjusted R^2	0.80	0.81	0.81	–
# Observations	163845	163845	163845	163845
# Firms	20271	20271	20271	20271
# Sector-Year Bins	2915	2915	2915	2915

Panel C: Effects on Supplier's Relative Employment of Low vs High Wage Workers

	(1)	(2)	(3)	(4)	(5)
	TWFE	TWFE	SA	IV	PPML
$\eta = -4$	-0.011	0.015	0.017	0.017	0.029
	(0.017)	(0.017)	(0.018)	(0.019)	(0.031)
$\eta = -3$	-0.026*	-0.011	-0.010	-0.008	0.007
	(0.014)	(0.015)	(0.015)	(0.016)	(0.025)
$\eta = -2$	-0.010	-0.003	0.005	0.007	0.013
	(0.011)	(0.011)	(0.011)	(0.012)	(0.020)
$\eta = -1$	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)
$\eta = 0$	-0.021**	-0.028***	-0.028***	-0.031***	-0.032*
	(0.010)	(0.010)	(0.010)	(0.011)	(0.017)
$\eta = 1$	-0.025**	-0.036***	-0.038***	-0.047***	-0.048**
	(0.012)	(0.012)	(0.012)	(0.014)	(0.021)
$\eta = 2$	-0.005	-0.015	-0.017	-0.027*	-0.057***
	(0.014)	(0.014)	(0.014)	(0.016)	(0.022)
$\eta = 3$	-0.032**	-0.045***	-0.048***	-0.060***	-0.052*
	(0.015)	(0.016)	(0.016)	(0.018)	(0.027)
$\eta = 4$	-0.046***	-0.063***	-0.069***	-0.079***	-0.125***
	(0.017)	(0.018)	(0.018)	(0.020)	(0.028)
$\eta \geq 4$	-0.031*	-0.056***	-0.063***	-0.079***	-0.149***
	(0.017)	(0.018)	(0.021)	(0.021)	(0.031)
Firm FE	Yes	Yes	Yes	Yes	Yes
Year-Sect FE	Yes	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes	Yes
Adjusted R^2					
# Observations	173636	173636	173636	173636	173636
# Firms	20770	20770	20770	20770	20770
# Sector-Year Bins	2923	2923	2923	2923	2923

Notes: See Section 4 for discussion. Panels A, B, and C present estimates for specification 31. The first-stage F-statistic for the final IV column exceeds 50 in all cases. Standard errors clustered at the level of firms. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3: Parameter Estimates

Model parameter:	σ	T_hat	τ_hat	β	θ	d_hat	ρ
Our estimate	5.03	0	0.115	0.795	6.21	0.001	1.295
Moments used in estimation	Alfaro-Urena et al. (2021)	Panel B of Figure 2	--Panel A Figure 1, Panels A+C Figure 3, Panel A Figure 4--				Panel C of Figure 1

Notes: See Section 5 for discussion.

Appendix - Not for Publication

8.1 Model Equilibrium

We lay out here the main equilibrium equations for the model. We detail first firm-level outcomes given general equilibrium quantities, then the complete general equilibrium solution of the model.

Notations We use the notation $y^t_{ij,r}$ denote outcome y of an entity with RS status r, and for workers of type t(or accross both types when the superscript t is absent, i.e.: $y_{ij,r} = \sum_{t=l,h} y^t_{ij,r}$). When $i = H$, $y^t_{ij,r}$refers to a home firm producing for destination market $j = H, F, M$ (respectively: Home, exports to Foreign, or production of inputs for MNE subsidiaries) and $y^t_{i,r} = \sum_{j=H,F,M} y^t_{ij,r}$sums outcomes across all production lines. When $i = M$, $y^t_{M,r}$ refers to the production of MNE subsidiaries at Home.[1] Capital letters denote aggregates. In that case, the subscript r can be absent, if the outcome is computed summing across firms of all status $r = R, N$,that is:$Y^t_{ij} = \sum_{r=R,N} Y^t_{ij,r}$.

Labor use Given the labor aggregators (4) and (7), a firm or an MNE subsidiary facing wages $\left\{w^t_{i,r}\right\}$ chooses relative employment of low- and high-wage workers as follows:

$$\chi^t_{i,r} = \frac{w^t_{i,r}\ell^t_{i,r}}{W_{i,r}\ell_{i,r}} = \frac{\alpha^t\left(w^t_{i,r}\right)^{1-\rho}}{W^{1-\rho}_{i,r}}, \tag{A.1}$$

where $\ell_{i,r}$ is the labor aggregate in (4) or (7) and $W_{i,r}$ is the corresponding labor cost index of the firm:

$$W_{i,r} = \left[\left(\alpha^l_i\right)^\rho\left(w^l_{i,r}\right)^{1-\rho} + \left(\alpha^h_i\right)^\rho\left(w^h_{i,r}\right)^{1-\rho}\right]^{\frac{1}{1-\rho}}, \text{ for } i = H, M, F. \tag{A.2}$$

In the baseline equilibrium without RS, we denote simply χ^t_H (resp. χ^t_M) the share of $t-$workers in the wage bill of Home firms (resp. MNE subsidiaries).

Non-MNE firms All firms with the same productivity make the same choices such that firm-level expressions are given as a function of their productivity z. On all markets $j = H, F, M$, firms are monopolistically competitive and therefore price at constant markup over marginal cost, given demand (1):

$$p_{ij,r} = \frac{\sigma}{\sigma-1}\frac{\varrho_{ij}W_{i,r}}{z} \tag{A.3}$$

where $\varrho_{ij} = \rho$ if $ij = \{HF, FH\}$ and $\varrho_{ij} = 1$ otherwise. Given CES demand and firms' linear production costs (2), firm sales $y_{ij,r}$ employment $\ell^t_{ij,r}$ and profits $\pi_{ij,r}$ (conditional on choosing to produce) are, respectively:

$$y_{ij,r} = \left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma} z^{\sigma-1}\varrho_{ij}^{1-\sigma} {W_{i,r}}^{1-\sigma} D_{j,r}, \tag{A.4}$$

[1] Notations are symmetric for Foreign, although less combinations of subscripts are involved since there is no labor used in Foreign for multinational production and Foreign firms do not produce intermediate inputs.

$$\ell_{ij,r}^{t} = \left(\alpha^{t}\right)^{\rho}\left(\frac{\sigma}{\sigma-1}\right)^{-\sigma} z^{\sigma-1}{\varrho_{ij}}^{1-\sigma}\left(w_{i,r}^{t}\right)^{-\rho}{W_{i,r}}^{\rho-\sigma}D_{j,r} + f_{ij}\left(\alpha^{t}\right)^{\rho}\left(\frac{w_{i,r}^{t}}{W_{i,r}}\right)^{-\rho}, \quad t\in\{l,h\} \tag{A.5}$$

$$\pi_{ij,r} = \frac{\sigma^{-\sigma}}{(\sigma-1)^{1-\sigma}} z^{\sigma-1}{\varrho_{ij}}^{1-\sigma}{W_{i,r}}^{1-\sigma}D_{j,r} - W_{i,r}f_{ij} \tag{A.6}$$

where $D_{j,r}$ corresponds to the aggregate demand shifter on market j for firms with status $r = R, N$:

$$D_{i,r} = P_i^{\sigma-1}X_i \quad \text{for} i = H, F$$
$$D_{M,r} = R_r^{\sigma}M_r.$$

In these expressions, we have used X_i to denote total expenditure in country $i = \{H, F\}$ and P_i to denote the ideal price index for consumption in i which is, given demand (1):

$$P_i = \left(\int_{\Omega_i} {p_w}^{1-\sigma}\, d\omega\right)^{\frac{1}{1-\sigma}}. \tag{A.7}$$

On the market for intermediate inputs sold to MNEs, R_r is the input cost index for an MNE subsidiary with RS policy r, which is, given production function (6):

$$R_r = \left(\int_{\Omega_x} p_{HM,r}\left(\omega_x\right)^{1-\sigma} d\omega_x + \xi^{\sigma}W_{M,r}^{1-\sigma}\right)^{\frac{1}{1-\sigma}}, \tag{A.8}$$

and M_r is subsidiary output given in (6),

Profits on each market destination market $j = H, M, F$ are increasing in productivity, so that only firms above a given productivity cutoff enter the market. Given the expression for profits in (A.6), the selection cutoff corresponding to zero profit on market j for firms with RS status r is:

$$z_{ij,r}^{*} = \frac{\sigma^{\frac{\sigma}{\sigma-1}}}{\sigma-1}\frac{f_{ij}^{\frac{1}{\sigma-1}}\varrho_{ij}{W_{i,r}}^{\frac{\sigma}{\sigma-1}}}{D_{j,r}^{\frac{1}{\sigma-1}}}.$$

The total sales of firms on destination market $j = H, M, F$ are then given by $Y_{ij,r} = \int_{z_{ij,r}^{*}}^{\infty} y_{ij,r}\left(z\right)dG_i\left(z\right),$ or, given the assumption that productivity is Pareto distributed:

$$Y_{ij,r} = \left(\frac{\theta}{\theta-\sigma+1}\right)\left(\mu_{ij,r}\varrho_{ij}W_{i,r}\right)^{1-\sigma}D_{j,r}\left(z_{ij,r}^{*}\right)^{\sigma-1-\theta}$$

MNEs headquarter and subsidiary We turn to describing the choices of the MNE headquarter and subsidiary. We have already defined above the cost index R_r of an MNE subsidiary with RS status r (see equation (A.8)). The MNE headquarter in Foreign imports the good produced by its subsidiary at Home, at cost, subject to iceberg transport costs, so that marginal cost of the MNE headquarter of type r is: $c_r = \varrho R_r$. The final goods markets in Foreign and at Home are monopolistically competitive, hence the MNE (headquarter) sells to final consumers in market $j = F, H$ at price:

$$p_{Mj,r} = \frac{\sigma}{\sigma-1}\varrho_{Mj}c_r,$$

where $\varrho_{Mj} = 1$ if $j = F$, and$\varrho_{Mj} = \varrho$ if $j = H$. Given CES final demand (1), MNE sales in $j = F, H$ are:

$$p_{Mj,r}q_{Mj,r} = d_r \left(\frac{\sigma}{\sigma - 1} \varrho_{Mj} c_r \right)^{1-\sigma} D_{j,r}.$$

In turn, one can express total MNE subsidiary output for an MNE of type r as:

$$M_r = d_r \left(\frac{\sigma}{\sigma - 1} \right)^{-\sigma} \varrho^{1-\sigma} R_r^{-\sigma} \sum_j \varrho_{Mj}^{-\sigma} D_{j,r}. \tag{A.9}$$

Finally, total sales of all MNE's across both markets H and F are:

$$Y_M = \frac{\sigma}{\sigma - 1} \varrho \sum_{r=N,R} N_{M,r} R_r \sum_{j=H,F} \varrho_{Mj} M_{j,r}$$

To close the model and solve for general equilibrium quantities, we write down income in each country, labor market clearing and trade balance. These steps are detailed next.

8.1.1 General Equilibrium

In this section, we close the model in general equilibrium. Denote $L^t_{Hj,r}$ the total number of type t workers at Home working for firms of type r producing for market $j = H, F, M$,and $L^t_{M,r}$ total labor directly employed at MNE subsidiaries of type r at Home. Labor market clearing at Home yields:

$$\bar{L^t_H} = \sum_{r=R,N} \left\{ \sum_{j=H,M,F} L^t_{Hj,r} + L^t_{M,r} \right\}. \tag{A.10}$$

Let denote X^t_j the income of type t workers in country j. Workers derive income from their labor, as well as their share in local firms (non-MNE) profits. Total income of workers of type t at Home are:

$$X^t_H = \sum_{r=R,N} \left\{ \sum_{j=H,M,F} \tilde{w}^t_{H,r} L^t_{Hj,r} + \tilde{w}^t_{M,r} L^t_{M,r} \right\} + \sum_{r=R,N} \sum_{j=H,M,F} \Pi^t_{Hj,r}, \tag{A.11}$$

where $\Pi^t_{Hj,r}$ is the share of Home firm profits generated on market j for firms of type r that are apportionned (proportionally to labor income) to type $t$workers. Given the CES-Pareto setup, profits are a constant fraction of sales and wage bill, in particular one can write:

$$\Pi^t_{Hj,r} = (a - 1)\, \tilde{w}^t_{H,r} L^t_{Hj,r}, \tag{A.12}$$

where we have defined $a \equiv \frac{\theta\sigma}{\theta\sigma - (\sigma - 1)}$. Total income in H is finally:

$$X_H = \sum_{t=l,h} X^t_H$$

In Foreign, total income is made of labor income, Foreign firm profits and profits made by multinationals (which are a constant fraction of their sales $Y_M = X_{MF} + X_{MH}$):

$$X_F = a_F W_F L_F + \frac{1}{\sigma - 1}\left(X_{MF} + X_{MH}\right).$$

In both countries, income equals expenditures: $X_j = \sum_{i=H,F,M} X_{ij}$. Equivalently, trade balance is given by :

$$X_{FH} + X_{MH} = \frac{\sigma - 1}{\sigma}\left(X_{MF} + X_{MH}\right) + X_{HF},$$

where X_{ij} denotes expenditure of country $j = H, F$ on final goods produced by firms in country $i = H, F$ or final goods sold by MNE's headquarters in Foreign when $i = M$. This expression accounts for the fact that MNE subsdiary production is imported from H to F at cost and then sold by the MNE headquarters with a constant markup $\frac{\sigma}{\sigma-1}$ to end consumers in $j = H, F$

An equilibrium of this economy is a set of wages $\left\{w^t_{j,N}\right\}_{j,t}$ and labor allocations $\left\{L^t_{ij,r}\right\}_{ij,r,t}$ such that (i) consumers maximize utility and (ii) firms make profit-maximizing decisions, as summarized in the main text; (iii) labor markets clear in both countries and (iv) trade is balanced as described above.

8.1.2 Derivations of welfare effects in the full model

We consider the first order effect of a small RS policy $\left(\hat{\tau}_R, \hat{T}_R, \hat{d}_R\right)$ applied by a fraction $\gamma$of MNEs, that are otherwise identical to other MNEs. Recall also that we assume that the policy is characterized by a potentially partial pass-through to the MNE input price $\beta = \frac{\partial \log p_{HM,R}}{\partial \chi^t_H \log \tau_R} \in [0,1]$. We take the foreign wage index as the numeraire so that $\hat{W}_F = 0$.

On aggregate at Home, the share of output and wage bill impacted by RS corresponding to each destination market is $\gamma \phi_{Hj,R} X_{Hj}$,where $\phi_{Hj,R}$ is the share of output in market j done by firms that also serve an MNE, and γ is the fraction of MNEs implementing RS.

We are interested in change in Welfare for workers of type t,

$$\hat{U}^t_H = \hat{X}^t_H - \hat{P}_H. \tag{A.13}$$

Taking log-differentials of equation A.11 yields:

$$\hat{X}^t_H = \Phi^t\left(\hat{w}^t_{H,N} + \phi^t_{H,R}\left(\hat{\tau}^t_R + \hat{T}_R\right) + \phi^t_M \hat{L}^t_M\right) + \left(1 - \Phi^t\right)\left[\hat{w}^t_{H,N} + \hat{L}^t_H + \varphi_{H,R}\left(\hat{\tau}^t_R + \hat{T}_R\right) + \varphi_{HM,R}\hat{a}\frac{a}{a-1}\right], \tag{A.14}$$

where Φ^t is the share of the labor income in income of type $t$in the initial equilibrium:

$$\Phi^t \equiv \frac{\sum_{j=H,M,F} \chi^t_H X_{Hj}/a + \chi^t_M W_M L_M}{\sum_{j=H,M,F} \chi^t_H X_{Hj} + \chi^t_M W_M L_M},$$

$\phi^t_{H,R}$ is the share of total Home wage bill for type $t$corresponding to firms that will implement RS:

$$\phi^t_{H,R} \equiv \frac{\sum_{j=H,M,F} \gamma \phi_{Hj,R} X_{Hj}/a}{\sum_{j=H,M,F} X_{Hj}/a + \chi^t_M W L_M},$$

ϕ_M^t is the share of total Home wage bill for type t corresponding to MNE subsidiaries M:

$$\phi_M^t \equiv \frac{\chi_M^t W L_M}{\sum_{j=H,M,F} X_{Hj}/a + \chi_M^t W L_M},$$

$\varphi_{H,R}$ is the share total Home firm profits corresponding firms that will implement RS, and finally

$$\varphi_{H,R} \equiv \frac{\sum_{j=H,M,F} \gamma \phi_{Hj,R} X_{Hj}}{\sum_{j=H,M,F} X_{Hj}},$$

$\varphi_{HM,R}$ is the share home firm profits corresponding to sales to MNE subsidiaries that will implement RS:

$$\varphi_{HM,R} \equiv \frac{\gamma X_{HM}}{\sum_{j=H,M,F} X_{Hj}}.$$

These profits will be differentially affected since RS can be accompanied by a reduction in supplier's markup, through the imperfect pass-through β of the policy. Specifically,

$$\hat{a} = (\beta - 1)\, \chi_H^l \hat{\tau}_R^l. \tag{A.15}$$

Summing up over both types, change in aggregate total income is

$$\hat{X}_H = \sum_t \frac{X_H^t}{X_H} \hat{X}_H^t. \tag{A.16}$$

Denote X_{ij} the expenditure of country $j = H, F$ on final goods produced by firms in country $i = H, F$ or final goods sold by MNE's headquarters in Foreign when $i = M$, and let P_{ij} denote the corresponding price index. Given CES demand 1, changes in expenditure are given by:

$$\hat{X}_{ij} = (1-\sigma)\left(\hat{P}_{ij} - \hat{P}_j\right) + \hat{X}_j \qquad \text{for } i, j = H, F \tag{A.17}$$

$$\hat{X}_{Mj} = \gamma \hat{d}_R + (1-\sigma)\left(\hat{P}_{Mj} - \hat{P}_j\right) + \hat{X}_j \qquad \text{for } j = H, F \tag{A.18}$$

$$\hat{X}_{HM,r} = (1-\sigma)\left(\hat{P}_{M,r} - \hat{R}_r\right) + \widehat{R_r M_r} \qquad \text{for } r = N, R \tag{A.19}$$

$$\widehat{R_r M_r} = \hat{d}_r + \sum_{j=H,F} \frac{X_{Mj}}{X_{MH} + X_{MF}} \left[(1-\sigma)\left(\hat{R}_r - \hat{P}_j\right) + \hat{X}_j\right] \tag{A.20}$$

$$\hat{Y_M} = \gamma \widehat{R_R M_R} + (1-\gamma)\, \widehat{R_N M_N} \tag{A.21}$$

Price index changes are given by:

$$\hat{P}_j = \sum_{i=H,F,M} \lambda_{ij} \hat{P}_{ij} \qquad \text{for } i, j = H, F \tag{A.22}$$

$$\hat{P}_{ij} = \hat{W}_{i,N} + \gamma \phi_{ij} \chi_i^l \hat{\tau}_{i,T}^l + \frac{\theta - (\sigma - 1)}{\sigma - 1} \hat{z}_{ij} \qquad \text{for } i, j = H, F \tag{A.23}$$

$$\hat{P}_{HM,r} = \hat{W}_{i,N} + \beta \chi_H^l \hat{\tau}_{H,r}^l + \frac{\theta - (\sigma - 1)}{\sigma - 1} \hat{z}_{HM,r} \qquad \text{for } r = N, R \tag{A.24}$$

$$\hat{R}_r = \mathit{\Xi} \hat{P}_{HM,r} + (1 - \mathit{\Xi})\, \hat{W}_{M,r} \qquad \text{for } r = N, R \tag{A.25}$$

$$\hat{P}_{Mj} = (1-\gamma)\, \hat{R}_N + \gamma \hat{R}_R \qquad \text{for } j = H, F \tag{A.26}$$

where we have used the usual notation for trade shares, $\lambda_{ij} = \frac{X_{ij}}{X_j}$, while threshold changes are:

$$\hat{z}_{ij} = \frac{\sigma}{\sigma-1}\hat{W}_{i,N} - \hat{P}_j - \frac{1}{\sigma-1}\hat{X}_j \qquad \text{for } i = H; j = H, F \tag{A.27}$$

$$\hat{z}_{Fj} = 0 \tag{A.28}$$

$$\hat{z}_{HM,r} = \frac{\sigma}{\sigma-1}\hat{W}_{H,r} - \frac{1}{\sigma-1}\hat{d}_r - \sum_{j=H,F}\frac{X_{Mj}}{X_{MH}+X_{MF}}\left[\hat{P}_j + \frac{1}{\sigma-1}\hat{X}_j\right] \qquad \text{for } r = N, R \tag{A.29}$$

Log-differentiating Foreign income and the trade balanced yields:

$$\hat{X}_F = \frac{w_F L_F}{w_F L_F + \frac{1}{\sigma-1}E_x}\hat{W}_F + \frac{\frac{1}{\sigma-1}Y_M}{w_F L_F + \frac{1}{\sigma-1}Y_M}\hat{Y}_M \tag{A.30}$$

$$\frac{X_{FH}}{X_{FH}+\frac{1}{\sigma}X_{MH}}\hat{X}_{FH} + \frac{\frac{1}{\sigma}X_{MH}}{X_{FH}+\frac{1}{\sigma}X_{MH}}\hat{X}_{MH} = \frac{\frac{\sigma-1}{\sigma}X_{MF}}{X_{HF}+\frac{\sigma-1}{\sigma}X_{MF}}\hat{X}_{MF} + \frac{X_{HF}}{X_{HF}+\frac{\sigma-1}{\sigma}X_{MF}}\hat{X}_{HF} \tag{A.31}$$

Changes in wage indexes are given by:

$$\hat{W}_{H,R} - \hat{W}_{H,N} = \chi_H^l \hat{\tau}_R^l, \tag{A.32}$$

$$\hat{W}_{M,R} - \hat{W}_{M,N} = 0. \tag{A.33}$$

as workers directly working at MNEs are not impacted by the RS shock - they are already subjected to better labor conditions before the MNE implements RS.

Changes in labor allocations $\hat{L}_H^t$ and $\hat{L}_M^t$ needed in equation A.14 are given by noting that $\hat{L}_H^t = -\hat{L}_M^t \frac{L_M^t}{L_H^t}$, and by using MNE's change in labor demand, given CES combination of high- and low wage workers:

$$\hat{WL}_{M,r} = (1-\sigma)\left(\hat{W}_{M,r} - \hat{W}_{H,r}\right) + \hat{X}_{M,r} \tag{A.34}$$

$$\hat{wL}_{M,r}^t = (1-\rho)\left(\hat{w}_H^t - \hat{W}_M\right) + \hat{WL}_{M,r} \tag{A.35}$$

$$\hat{wL}_M^t = (1-\rho)\left(\hat{w}_H^t - \hat{W}_M\right) + \gamma(1-\sigma)\left(\hat{W}_M - \hat{W}_{H,R}\right) + (1-\gamma)\,1-\sigma)\left(\hat{W}_M - \hat{W}_{H,N}\right) + \gamma\hat{X}_{M,R} + (1-\gamma)\,\hat{X}_M \tag{A.36}$$

so that overall:

$$\hat{L}_M^t = (1-\gamma)\,\hat{wL}_{M,N}^t + \gamma\hat{wL}_{M,R}^t - \hat{w}_{H,N}^t \text{ for } t = l, h. \tag{A.37}$$

Finally, log-differentiating labor market clearing leads to:

$$\hat{w}_{H,N}^h - \hat{w}_{H,N}^l = \frac{\varphi_{H,R}\Phi_{labor}^h\hat{\tau}_{H,R} + \frac{1}{\rho}\left(1-\tau_M^{-\rho}\right)\left(1-\Phi_{labor}^h\right)\hat{L_M^h}}{1-\left(1-\tau_M^{-\rho}\right)\left(1-\Phi_{labor}^h\right)} \tag{A.38}$$

where Φ^t_{labor} is the share of workers of type t hired by firms, rather than by MNE subsidiaries.

$$\Phi^t_{labor} \equiv \frac{\sum_{j=H,M,F} X_{Hj}/a}{\sum_{j=H,M,F} X_{Hj}/a + \frac{\chi^t_M}{\chi^t_H}\frac{W_M L_M}{T_M}}.$$

Change in welfare for Home worker of type t is given by the solution of the system of equations A.13-A.38.

8.2 Derivations in the simple model

8.2.1 Derivations of welfare effects in the simple model

Under the simplifying assumptions made in Section 2.4.1, we have: $X_{HF} = X_{MH} = 0$, $\varXi = 1$, $\sigma - 1 \to \theta$, $\gamma = 1$so that $X_{HM} = X_{HM,R}$ and MNEs are owned by absentee capitalists so that $\hat{X}_F = \hat{W}_F$ .The system of equations leading to welfare change above simplifies as follows. Changes in incomes are given by:

$$\hat{X}_H = \hat{W}_{H,N} + \Lambda\lambda_{HH}\chi^l_H\hat{\tau}^l_{H,R} + \lambda_{FH}\beta\chi^l_H\hat{\tau}^l_{H,r} + (\Lambda\lambda_{HH} + \lambda_{FH})\,\hat{T}_R$$
$$\hat{X}_F = 0.$$

The change in the home price index is simply:

$$\hat{P}_H = \lambda_{HH}\left(\hat{W}_{H,N} + \Lambda\chi^l_H\hat{\tau}^l_{H,R}\right) \tag{A.39}$$

so that change in aggregate welfare is:

$$\hat{U_H} = (1 - \lambda_{HH})\,\hat{W}_{H,N} + \beta\lambda_{FH}\chi^l_H\hat{\tau}^l_{H,R} + (\Lambda\lambda_{HH} + \lambda_{FH})\,\hat{T}_R.$$

Trade balance finally pins down change in the home wage index. Given simple trade patterns,

$$\hat{\lambda}_{FH} + \hat{X}_H = \hat{\lambda}_{MF},$$

where the relevant changes in on expenditures are given through CES demand by:

$$\hat{\lambda}_{MF} = \hat{d}_R + \lambda_{FF}\,(1-\sigma)\left(\hat{W}_{H,N} + \beta\chi^l_H\hat{\tau}^l_{H,R}\right), \text{and}$$
$$\hat{\lambda}_{FH} = (\sigma - 1)\,\lambda_{HH}\left(\hat{W}_{H,N} + \Lambda\chi^l_H\hat{\tau}^l_{H,R}\right).$$

Solving out for the home price index yields:

$$\hat{W}_{H,N} = -\frac{(\lambda_{FF}\,(\sigma-1)\,\beta + \sigma\lambda_{HH}\Lambda + \lambda_{FH}\beta)\,\chi^l_H\hat{\tau}^l_{H,R} + (\Lambda\lambda_{HH} + \lambda_{FH})\,\hat{T}_R - \hat{d}_R}{1 + (\lambda_{FF} + \lambda_{HH})\,(\sigma - 1)},$$

so that finally, change in aggregate welfare is:

$$\hat{U_H} = (\beta - \Lambda)\underbrace{\frac{\lambda_{HH}\lambda_{FH}\sigma}{1 + (\lambda_{FF} + \lambda_{HH})\,(\sigma-1)}}_{\equiv W_{tax}}\chi^l_H\hat{\tau}^l_{H,R} + (\Lambda\lambda_{HH} + \lambda_{FH})\underbrace{\frac{(\sigma\lambda_{HH} + \lambda_{FF}\,(\sigma-1))}{1 + (\lambda_{FF} + \lambda_{HH})\,(\sigma-1)}}_{\equiv W_{prod}}\hat{T}_R + \lambda_{FH}\underbrace{\frac{1}{1 + (\lambda_{FF} + \lambda}}_{\equiv W_d} \tag{A.40}$$

8.2.2 Derivations of the distributional implications of the simple model

Distributional effects, low vs high skill : To disentangle the effect of the policy on high and low skill workers, note that labor market clearing yields

$$\hat{w}^{l}_{H,N}-\hat{w}^{h}_{H,N}=-\left(\Lambda\lambda_{HH}+\lambda_{FH}\right)\hat{\tau}^{l}_{H,R}$$

while change in income for skill type t is given by

$$\hat{X}^{t}_{H}=\hat{w}^{t}_{H,N}+\left(\Lambda\lambda_{HH}+\lambda_{FH}\right)\left(\hat{T}_{R}+\hat{\tau}^{t}_{H,R}\right)+\lambda_{FH}\left(\beta-1\right)\chi^{l}_{H}\hat{\tau}^{l}_{H,r}, \tag{A.41}$$

as profits are apportionned to the wage bill. Overall,

$$\hat{U_H}^{l}-\hat{U_H}^{h}=\hat{X}^{l}_{H}-\hat{X}^{h}_{H}=\left(\hat{w}^{l}_{H,N}-\hat{w}^{h}_{H,N}\right)+\left(\Lambda\lambda_{HH}+\lambda_{FH}\right)\left(\hat{\tau}^{l}_{H,R}\right)=0,$$

so that low and high skill benefit on average from the exact same welfare gains:

$$\hat{U_H}^{l}=\hat{U_H}^{h}=\hat{U_H} \tag{A.42}$$

Distributional effects, exposed vs non exposed Exposed low- or high-wage workers are defined as those who were working at RS-MNE suppliers before the policy was rolled out. The exposed group is index by superscript E. We have:

$$X_H=X_{HH}+X_{HM}$$
$$X^{E}_{H}=\Lambda X_{HH}+X_{HM}$$

where X^{E}_{H} is exposed income (and for type t: $X_H=\chi^{t}_{H}X_H$, $X_H=\chi^{t,E}_{H}X^{E}_{H}$). Using derivations similar to the ones in the main model, we have:

$$\hat{X}^{t,E}_{H}=\hat{w}^{t}_{H,N}+\hat{T}_{R}+\hat{\tau}^{t}_{H,R}+\phi^{t}_{Ra}\hat{a}$$

while

$$\hat{X}^{t,NE}_{H}=\hat{w}^{t}_{H,N}+\phi^{t}_{Ra}\hat{a}$$

where $\phi^{t}_{Ra}\hat{a}$ is the change in per capita profit, redistributed to all workers irrespective to whether they are exposed or not. Since both groups face the same change in price index (given by (A.39)), we have, in relative terms:

$$\Delta\hat{U}^{t}_{H}\equiv\hat{U_H}^{t,E}-\hat{U_H}^{t,NE}=\hat{X}^{t,E}_{H}-\hat{X}^{t,NE}_{H}=\hat{T}_{R}+\hat{\tau}^{t}_{H,R},$$

which is different for high vs low skill become of the term $\hat{\tau}^{t}_{H,R}$. Using that $\Gamma^{E}\hat{U}^{t,E}_{H}+\left(1-\Gamma^{E}\right)\hat{U}^{t,NE}_{H}=\hat{U}^{t}_{H}$ where $\hat{U}^{t}_{H}$ is given by (A.42) and $\Gamma^{t,E}\equiv\frac{X^{t,E}_{H}}{X^{t}_{H}}$, we find:

$$\hat{U}^{t,E}_{H}=\hat{U}_{H}+\lambda_{HH}\left(1-\Lambda\right)\Delta\hat{U}^{t}_{H}$$
$$\hat{U}^{t,NE}_{H}=\hat{U}_{H}-\left(\Lambda\lambda_{HH}+\lambda_{FH}\right)\Delta\hat{U}^{t}_{H}.$$

That is, using (A.40):

$$\hat{U}_H^{t,NE} = \left[(\beta - \Lambda) W^{tax} \chi_H^l - (\lambda_{FH} + \Lambda \lambda_{HH}) \right] \hat{\tau}_R^l \; + \; (\lambda_{FH} + \Lambda \lambda_{HH}) \left(W^{prod} - 1 \right) \hat{T}_R + W_d \hat{d}_R,$$

It is immediately clear that $W_{prod} - 1 = \frac{-1+\lambda_{HH}}{1+(\lambda_{FF}+\lambda_{HH})(\sigma-1)} < 0$ so that the second term is negative. One can also show that, for $\beta \leq 1$, $(\beta - \Lambda) W^{tax} < (\lambda_{FH} + \Lambda \lambda_{HH}) W^{prod}$. To that end, note that

$$\lambda_{HH} \lambda_{FH} < \lambda_{FH} \left[\lambda_{HH} + \lambda_{FF} \left(\frac{\sigma - 1}{\sigma} \right) \right]$$

therefore for any $\Lambda \geq 0$, the following is also true:

$$\lambda_{HH} \lambda_{FH} (1 - \Lambda) < (\Lambda \lambda_{HH} + \lambda_{FH}) \left[\lambda_{HH} + \lambda_{FF} \left(\frac{\sigma - 1}{\sigma} \right) \right]$$

hence

$$\lambda_{HH} \lambda_{FH} \sigma (1 - \Lambda) < (\Lambda \lambda_{HH} + \lambda_{FH}) \left[\sigma \lambda_{HH} + \lambda_{FF} (\sigma - 1) \right]$$

which means that

$$(1 - \Lambda) W^{tax} < (\lambda_{FH} + \Lambda \lambda_{HH}) W^{prod}$$

and in turn, for any $\beta \leq 1$ and $\chi_H^l \leq 1$:

$$(\beta - \Lambda) W^{tax} \chi_H^l < (\lambda_{FH} + \Lambda \lambda_{HH}) W^{prod}$$

Therefore,

$$(\beta - \Lambda) W^{tax} \chi_H^l - (\lambda_{FH} + \Lambda \lambda_{HH}) < (\lambda_{FH} + \Lambda \lambda_{HH}) W^{prod} - (\lambda_{FH} + \Lambda \lambda_{HH}) < 0$$

Hence, the first term in $\hat{U}_H^{t,NE}$ is unambiguously negative. Only the last term is positive.

8.3 Alternative model: Labor Market Power

8.3.1 Setup

A natural question is whether RS policies are implemented in a context where wages are too low in the first place. In the baseline model presented in the main text, wages are those that clear the market–they are not too low from an efficiency perspective, and raising them introduces, a priori, a distortion. Alternatively, it could be that wages are set too low compared to an efficient benchmark. Capturing this possibility requires Home firms to exert labor market power on the Home labor market. We now extend the model to feature an upward-sloping labor supply curve that Home firms are facing in order to entertain this possibility (of pre-existing wage markdowns), summarized as follows. To generate this feature in the most tractable way, we assume that, in addition to their preferences over a CES consumption bundle, workers have heterogeneous preferences for jobs. Utility of worker h working on production line ω is:

$$U^h = C \varepsilon^h (\omega) \, ,$$

where $C = \left(\int_{\Omega^k} d_\omega q_\omega^{\frac{\sigma-1}{\sigma}} d\omega \right)^{\frac{\sigma}{\sigma-1}}$ as above, and idiosyncratic preferences $\varepsilon^h (\omega)$ are drawn i.i.d across workers and production lines, according to a FrÈchet distribution with shape parameter κ. Workers are therefore ex-ante homogeneous but ex-post heterogeneous. Production of firms and MNEs are otherwise unchanged, with, for simplicity, only one ex-ante worker type, whose exogenous aggregate supply is L_k in country k. That is, workers are perfect substitutes in production and ℓ_ω is the number of workers hired on production line ω. With this setup, firms face an upward-sloping labor supply curve when hiring on their production line ω :

$$\frac{\ell_\omega}{L_H} = \left(\frac{w_\omega}{\Phi}\right)^\kappa ; \text{with } \Phi = \left(\int_{\Omega_H \cup \Omega_x} {w_\omega}^\kappa d\omega\right)^{\frac{1}{\kappa}} \tag{A.43}$$

Notice that when $\kappa \to \infty$, the model collapses to a familiar setup in which all workers are identical and firms face a perfectly elastic labor supply, as in our baseline model with one type of worker (nested in the main one). Importantly, we assume here that firms set wages according to monopsonistic competition. Because they face a firm-specific upward-sloping labor supply curve, firms restrict hiring to keep the wages of all their workers low. Formally, taking the first-order condition for profit maximization of the supplier leads to the following wage profile across heterogeneous firms and across production lines:

$$w_{Hj,r} = \frac{\sigma - 1}{\sigma} \frac{\kappa}{\kappa + 1} z p_{Hj,r}.$$

Firms optimally set wages at a markdown $\frac{\kappa}{\kappa+1}$ over their marginal revenue product of labor. Using the product market clearing on the output markets pins down the scale of production of each firm on each production line, given this wage-price schedule. In equilibrium, a firm with productivity z on production line $j \in \{H, F, M\}$ optimally offers wages:

$$w^*_{Hj,r} = z^{\frac{\sigma-1}{\kappa+\sigma}} \Phi^{\frac{\kappa}{\kappa+\sigma}} D_{j,r}^{\frac{1}{\kappa+\sigma}} L_H^{-\frac{1}{\kappa+\sigma}} \left(\frac{\sigma - 1}{\sigma} \frac{\kappa}{\kappa + 1}\right)^{\frac{\sigma}{\kappa+\sigma}}, \tag{A.44}$$

where the demand shifters $D_{j,r}$ on market j are defined in (17)-(16) When wages are optimally chosen, the sales of a firm with productivity z on market j are given by:

$$y_{Hj,r} = z^{\frac{(\sigma-1)(\kappa+1)}{\kappa+\sigma}} \Phi^{\frac{\kappa(1-\sigma)}{\kappa+\sigma}} (D_{j,r})^{\frac{1+\kappa}{\kappa+\sigma}} L_H^{\frac{\sigma-1}{\kappa+\sigma}} \left(\frac{\sigma - 1}{\sigma} \frac{\kappa}{\kappa + 1}\right)^{\frac{\kappa(\sigma-1)}{\kappa+\sigma}}.$$

Note that if a wage $\underline{w}$ is imposed to the firm through RS, rather than being chosen optimally by the firm, firm sales depend on whether hiring is determined by the labor supply curve (which is the case when labor supply $\leq$ labor demand), or whether it is determined by the labor demand curve (when labor supply $\geq$ labor demand). In the former case, we have:

$$y_{Hj,R} = \frac{\sigma}{\sigma - 1} \underline{w}^\kappa \Phi^{1-\kappa} \Gamma \left(1 - \frac{1}{\kappa}\right) L_H, \tag{A.45}$$

where Γ is the gamma function. In the latter case, we have:

$$y_{Hj,R} = \left(\frac{\sigma}{\sigma - 1}\right)^{1-\sigma} z^{\sigma-1} \underline{w}^{1-\sigma} D_{j,r}. \tag{A.46}$$

8.3.2 Comparative statics

Next, we examine how RS impacts firm sales under the hypothesis that labor markets are monopsonistic. Our strategy is still to compare firms with similar productivity, some being exposed to RS, and others not. Given that the RS policy $\underline{w}$ is binding only for firms at which wages are low, several cases arise, depending on where the firm wage, pre-RS, lies compared to the wage floor $\underline{w}$ imposed by the RS policy. To that end, we denote $w_k^*(z)$ the monopsony wage level of a firm with productivity z on production line $k = H, F, M$. Three main cases arise.

First, if $w_k^*(z) \geq \underline{w}$, that is, given (A.44), when firm productivity is high enough, RS is not binding. There is no relative effect of RS on suppliers that adopt it, versus those with equivalent productivity that do not.

Second, when $w_k^*(z) < \underline{w} \leq \frac{\kappa+1}{\kappa} w_k^*(z)$ RS is now binding and corresponds to a wage increase from $w_k^*(z)$ to $\underline{w}$ for impacted firms. In this case, the sales of compliers go up, both on the final goods markets and on the intermediate goods market. This sales increase comes from the following mechanism: higher wages make the firm hire more employees compared to the monopsonistic case where the firm voluntarily restricted its hiring. This leads to higher production and higher sales, given that the wage (hence price) increase is moderate - but of course, to lower profits.[2]

Third, if $\underline{w} > \frac{\kappa+1}{\kappa} w_k^*(z)$, which could be the case for the lowest productivity firms, these firms see their sales decrease. The wage increase is too high to sustain higher sales.

Overall, we have the following comparative statics for compliers, for $k = H, F, M$:

$$\begin{cases} \hat{y}_{k,R} - \hat{y}_{k,N} = 0 & \text{if } w_k^*(z) \geq \underline{w} \\ \hat{y}_{k,R} - \hat{y}_{k,N} \geq 0 & \text{if } w_k^*(z) \leq \underline{w} \leq \frac{\kappa+1}{\kappa} w_k^*(z) \\ \hat{y}_{k,R} - \hat{y}_{k,N} \leq 0 & \text{if } w_k^*(z) \leq \frac{\kappa+1}{\kappa} \underline{w} \end{cases}$$

In practice, note that this third case is likely to be of limited empirical relevance. First, because these lower productivity firms are likely to exit the market. Second, because the RS wage is unlikely to be high enough to trigger a wage increase of more than $\frac{\kappa+1}{\kappa}$, which corresponds to a 20% increase in wages for typical values of the parameter κ.[3] Therefore, we expect that on average over complying firms,

$$\hat{y}_{k,R} - \hat{y}_{k,N} \geq 0, \tag{A.47}$$

both on the final goods market and on the MNE input market.

Turning to the effect on exposed firms, we need to take into account the extensive margin effect of the RS policy in addition to this positive effect of RS on the intensive margin. Because it reduces profits for all firms for which RS is binding, the policy is accompanied by exits of preexisting suppliers that were close to the selection cutoff. Therefore, the effect of the RS policy on exposed firms is overall ambiguous:

$$\hat{Y}_{tot,R} - \hat{Y}_{tot,N} \text{ has ambiguous sign.}$$

[2] These qualitative patterns mask two different subcases: one where firm hiring is set by the labor supply curve, hence sales are given by (A.45). This happens so long as $\underline{w} \leq w^{eq}$, where w_k^{eq} is a firm-specific equilibrium wage for which labor supply equals labor demand on production line k. In the other subcase, the wage increase is high enough that the labor supply is higher than labor demand, hence sales are pinned down by (A.46), but the wage increase is not too high, so that labor hired is still above the monopsonistic level.

[3] For instance, Berger et al. (2021) find values of the labor supply elasticity ranging from $\kappa \in (3, 7)$, which leads to $\frac{1}{\kappa-1} \in (16\%, 50\%)$.

8.4 Robustness

8.4.1 Robustness with unemployment in the simple model

We recompute the welfare gains of a representative worker $\hat{U_H}$, now assuming that there is unemployment in the economy. Specifically, workers choose whether to be unemployed and get a fixed utility u_0, or work and get utility $\frac{\bar{w}}{P_H}$. Each worker has idiosyncratic preferences for either options that are assumed to be distributed Frechet, mean 1 and shape κ. Formally,

$$U(\omega) = \max\left\{\frac{\bar{w}}{P_H}\epsilon_w(\omega), u_0\epsilon_u(\omega)\right\}$$

where $\bar{w} = \frac{X_H}{L_{H,N}+L_{H,R}} = \frac{w_H L_{H,N}+w_H L_{H,R}\left(1+\tilde{t}\right)+\Pi_{H,N}+\Pi_{H,R}}{L_{H,N}+L_{H,R}}$ is the income per capita in the employed sector. Labor market clearing writes:

$$L_{H,N} + L_{H,R} + L_{H,U} = L_H$$

Given the properties of the Frechet distribution, the share of unemployed workers λ^U is:

$$\lambda^U = \frac{L_{H,U}}{L_H} = \frac{u_0^\kappa}{u_0^\kappa + \frac{\bar{w}}{P_H}^\kappa}. \tag{A.48}$$

We now compute how the expected welfare in the economy,

$$U^H = \mathbb{E}(U) \propto \left(u_0^\kappa + \frac{\bar{w}}{P_H}^\kappa\right)^{\frac{1}{\kappa}} \tag{A.49}$$

changes following RS. Given (A.49), a small shock to the economy yields:

$$\hat{U}_H = \left(1-\lambda^U\right)\left(\hat{\bar{w}} - \hat{P}_H\right) \tag{A.50}$$

with

$$\widehat{L_{H,N}+L_{H,R}} = \left(\hat{\bar{w}} - \hat{P_H}\right)\kappa\lambda^U$$

First, we compute $\hat{\bar{w}} - \hat{P}_H$. As in the baseline case, income per capita changes according to:

$$\hat{\bar{w}} = \hat{W}_{H,N} + \Lambda\lambda_{HH}\chi^l_H\hat{\tau}^l_{H,R} + \lambda_{FH}\beta\chi^l_H\hat{\tau}^l_{H,r} + (\Lambda\lambda_{HH} + \lambda_{FH})\hat{T}_R, \tag{A.51}$$

while the expression for change in price index is unchanged compared to the baseline case so that:

$$\hat{\bar{w}} - \hat{P}_H = \lambda_{FH}\hat{W}_{H,N} + \lambda_{FH}\beta\chi^l_H\hat{\tau}^l_{H,r} + (\Lambda\lambda_{HH} + \lambda_{FH})\hat{T}_R \tag{A.52}$$

Second, we use trade balance to solve for $\hat{W}_{H,N}$ as a function of $\hat{\bar{w}} - \hat{P}_H$:

$$\begin{aligned}
\hat{X}_H &= \hat{\lambda}_{MF} - \hat{\lambda}_{FH} \\
\hat{X}_H - \hat{P}_H &= \hat{\lambda}_{MF} - \hat{\lambda}_{FH} - \hat{P}_H \\
\left(\hat{\bar{w}} - \hat{P_H}\right)\left(1+\kappa\lambda^U\right) &= \hat{\lambda}_{MF} - \hat{\lambda}_{FH} - \hat{P}_H.
\end{aligned}$$

Using, as in the baseline case,:

$$\hat{\lambda}_{MF} = \hat{d}_R + (1-\lambda_{MF})(1-\sigma)\left(\hat{W}_{H,N} + \beta\chi^l_H\hat{\tau}^l_{H,R}\right)$$
$$\hat{\lambda}_{FH} = (\sigma-1)\lambda_{HH}\left(\hat{W}_{H,N} + \Lambda\chi^l_H\hat{\tau}^l_{H,R}\right)$$

we get:

$$\hat{W}_{H,N} = \left(\hat{\hat{w}} - \hat{P_H}\right)\frac{\left(1+\kappa\lambda^U\right)}{(\lambda_{FF}+\lambda_{HH})(1-\sigma)-\lambda_{HH}} - \left[\frac{(1-\sigma)\lambda_{FF}\beta - \sigma\lambda_{HH}\Lambda}{(\lambda_{FF}+\lambda_{HH})(1-\sigma)-\lambda_{HH}}\right]\chi^l_H\hat{\tau}^l_{H,R} - \frac{1}{(\lambda_{FF}+\lambda_{HH})(1-\sigma)}$$

Therefore, using (A.52), we have:

$$\hat{\hat{w}} - \hat{P_H} = \frac{(\lambda_{FF}+\lambda_{HH})(1-\sigma)-1}{(\lambda_{FF}+\lambda_{HH})(1-\sigma)-1-\lambda_{FH}\kappa\lambda^U}\left\{(\beta-\Lambda)W_{tax}\chi^l_H\hat{\tau}^l_{H,R} + (\Lambda\lambda_{HH}+\lambda_{FH})W_{prod}\hat{T}_R + W_d\hat{d}_R\right\}$$

so that overall:

$$\hat{U}_H = \frac{1-\lambda^U}{1+\frac{\lambda_{FH}\kappa\lambda^U}{1+(\lambda_{FF}+\lambda_{HH})(\sigma-1)}}\left\{\underbrace{(\beta-\Lambda)W_{tax}\chi^l_H\hat{\tau}^l_{H,R} + (\Lambda\lambda_{HH}+\lambda_{FH})W_{prod}\hat{T}_R + W_d\hat{d}_R}_{\text{baseline }\hat{U}_H}\right\}$$

we see that welfare gains of the baseline case are dampened by the term: $\frac{1-\lambda^U}{1+\frac{\lambda_{FH}\kappa\lambda^U}{1+(\lambda_{FF}+\lambda_{HH})(\sigma-1)}}$ in the presence of unemployment.

8.4.2 Extension: more general demand system

We allow here for a more flexible demand system faced by CR firms, with different elasticities of substitution between the final goods and the intermediate input markets. Specifically, we assume that:

$$U_i = \left(\int_{\Omega_i} d_\omega q_\omega^{\frac{\sigma_i-1}{\sigma_i}} d\omega\right)^{\frac{\sigma_i}{\sigma_i-1}}, \text{ for } i = H, F$$
$$M = \left(\int_{\Omega_x} m_{\omega(x)}^{\frac{\sigma_M-1}{\sigma_M}} d\omega(x) + \xi\ell_M^{\frac{\sigma_M-1}{\sigma_M}}\right)^{\frac{\sigma_M}{\sigma_M-1}}.$$

with $\sigma_H = \sigma_F$ butσ_M is possibly different.

Comparative statics The comparative statics are modified as follows. The relative impact of RS on firms' output prices is unchanged,but firm sales on destination market $j = H, F, M$ for a firm with RS status $r = R$ or N are now given by:

$$y_{Hj,r} = p_{Hj,r}^{1-\sigma_j}D_{j,r}, \tag{A.53}$$

where

$$D_{j,r} = P_j^{\sigma_j-1}X_j \quad \text{for } j = H, F$$
$$\text{and } D_{M,r} = N_r R_r^M M_r.$$

Therefore, computations for sales on the final goods market are unchanged (where the relevant elasticity of substitution is σ_H) and sales to the MNE become:

$$y_{HM,r} = p_{HM,r}^{1-\sigma_M} N_r R_r^{\sigma_M-\sigma_H} d_r \left(\frac{\sigma_H}{\sigma_H-1}\varrho_{Mj}\right)^{-\sigma_H} (\varrho)^{1-\sigma_H} \sum_j \varrho_{Mj}^{-\sigma_H} D_{j,r}.$$

The comparative statics on sales of compliers are:

$$\hat{y}_{Hj,R} - \hat{y}_{Hj,N} = (1-\sigma_H)\,\chi_H^l \hat{\tau}_R^l < 0, \quad \text{for} j = H, F. \tag{A.54}$$

$$\hat{y}_{HM,R} - \hat{y}_{HM,N} = (1-\sigma_M)\,\beta\chi_H^l\hat{\tau}_R^l + (\sigma_M-\sigma_H)\,\Xi \left(\frac{\beta + \left(\frac{\sigma_M-1-\theta}{1-\sigma_M}\right)\frac{\sigma_M}{\sigma_M-1}}{1+\Xi\left(\frac{\sigma_M-1-\theta}{1-\sigma_M}\right)\frac{\sigma_M-\sigma_H}{\sigma_M-1}}\right)\chi_H^l\hat{\tau}_R^l \tag{A.55}$$

$$+ \hat{d}_R \left(1-(\sigma_M-\sigma_H)\left(\frac{\Xi\frac{\theta-\sigma_M+1}{\sigma_M-1}\frac{1}{\sigma_M-1}}{1+\Xi\left(\frac{\theta-\sigma_M+1}{\sigma_M-1}\right)\frac{\sigma_M-\sigma_H}{\sigma_M-1}}\right)\right)$$

Turning to exposed firms, computations for sales on the final goods market are unchanged (where the relevant elasticity of substitution is σ_H). The relative change in the productivity cutoff for serving the MNE market is:

$$\hat{z}^*_{HM,R} - \hat{z}^*_{HM,N} = \frac{\sigma_M}{\sigma_M-1}\chi_H^l\hat{\tau}_R^l - \frac{\sigma_M-\sigma_H}{\sigma_M-1}\left(\frac{\Xi\beta\chi_H^l\hat{\tau}_R^l + \Xi\left(\frac{\sigma_M-1-\theta}{1-\sigma_M}\right)\frac{\sigma_M}{\sigma_M-1}\chi_H^l\hat{\tau}_R^l - \Xi\frac{\sigma_M-1-\theta}{1-\sigma_M}\frac{1}{\sigma_M-1}\hat{d}_R}{1+\Xi\left(\frac{\sigma_M-1-\theta}{1-\sigma_M}\right)\frac{\sigma_M-\sigma_H}{\sigma_M-1}}\right) - \frac{1}{\sigma_M-1}\hat{d}_R$$

so that the impact of RS on exposed firms (including total sales) is:

$$\hat{Y}_{Hj,R} - \hat{Y}_{Hj,N} = (1-\sigma_H)\;\chi_H^l\hat{\tau}_R^l\; < 0, \quad \text{for} j = H, F. \tag{A.56}$$

$$\hat{Y}_{HM,R} - \hat{Y}_{HM,N} = \left\{(1-\sigma_M)\,\beta - (\theta-\sigma_M+1)\,\frac{\sigma_M}{\sigma_M-1} + \frac{\theta\,(\sigma_M-\sigma_H)}{\sigma_M-1}\left(\frac{\beta+\frac{\theta-\sigma_M+1}{\sigma_M-1}\frac{\sigma_M}{\sigma_M-1}}{1+\Xi\frac{\theta-\sigma_M+1}{\sigma_M-1}\frac{\sigma_M-\sigma_H}{\sigma_M-1}}\right)\Xi\right\}\chi_H^l\hat{\tau}_R^l \tag{A.57}$$

$$+ \left(\frac{\theta}{\sigma_M-1} - (\sigma_M-\sigma_H)\,\frac{\theta}{\sigma_M-1}\left(\frac{\frac{\theta-\sigma_M+1}{\sigma_M-1}\frac{1}{\sigma_M-1}}{1+\Xi\left(\frac{\theta-\sigma_M+1}{\sigma_M-1}\right)\frac{\sigma_M-\sigma_H}{\sigma_M-1}}\right)\Xi\right)\hat{d}_R \tag{A.58}$$

$$\hat{Y}_{Htot,R} - \hat{Y}_{Htot,N} = (1-\zeta)\,(1-\sigma_H)\;\chi_H^l\hat{\tau}_R^l + \zeta\left\{(1-\sigma_M)\,\beta - (\theta-\sigma_M+1)\,\frac{\sigma_M}{\sigma_M-1} + \frac{\theta\,(\sigma_M-\sigma_H)}{\sigma_M-1}\left(\frac{\beta+\frac{\theta-\sigma_M+1}{\sigma_M-1}\frac{\sigma_M}{\sigma_M-1}}{1+\Xi\frac{\theta-\sigma_M+1}{\sigma_M-1}\frac{\sigma_M-\sigma_H}{\sigma_M-1}}\right)\Xi\right\}\chi_H^l \tag{A.59}$$

$$+ \zeta\frac{\theta}{\sigma_M-1}\left(1-(\sigma_M-\sigma_H)\left(\frac{\frac{\theta-\sigma_M+1}{\sigma_M-1}\frac{1}{\sigma_M-1}}{1+\Xi\left(\frac{\theta-\sigma_M+1}{\sigma_M-1}\right)\frac{\sigma_M-\sigma_H}{\sigma_M-1}}\right)\Xi\right)\hat{d}_R \tag{A.60}$$

Finally, turning to the impact of RS on sales of the MNE subsidiary, we get:

$$\widehat{R_R M_R} - \widehat{R_N M_N} = (1-\sigma_H)\,\frac{\beta+\frac{\theta-\sigma_M+1}{\sigma_M-1}\frac{\sigma_M}{\sigma_M-1}}{1+\Xi\frac{\theta-\sigma_M+1}{\sigma_M-1}\frac{\sigma_M-\sigma_H}{\sigma_M-1}}\,\Xi\chi_H^l\hat{\tau}_R^l + \left(1+\Xi\frac{\frac{\theta-\sigma_M+1}{\sigma_M-1}\frac{\sigma_H-1}{\sigma_M-1}}{1+\Xi\frac{\theta-\sigma_M+1}{\sigma_M-1}\frac{\sigma_M-\sigma_H}{\sigma_M-1}}\right)\hat{d}_R$$

Welfare computations We are interested in change in Welfare for workers of type t,

$$\hat{U}_H^t = \hat{X}_H^t - \hat{P}_H. \tag{A.61}$$

Income of type t is given by:

$$X_H^t = \sum_{r=R,N} \left\{ \sum_{j=H,M,F} \tilde{w}_{H,r}^t L_{Hj,r}^t + \tilde{w}_{M,r}^t L_{M,r}^t \right\} + \sum_{j=H,M,F} \left(a_{Hj,N} - 1\right) \tilde{w}_{H,N}^t L_{Hj,N}^t + \left(a_{Hj,R} - 1\right) \tilde{w}_{H,R}^t L_{Hj,R}^t$$

where $a_{H,N} = \frac{\theta\sigma_H}{\theta\sigma_H - (\sigma_H - 1)} = a_{F,N}$ while $a_{M,N} \equiv \frac{\theta\sigma_M}{\theta\sigma_M - (\sigma_M - 1)}$. Taking log-differentials of equation A.11 yields:

$$\hat{X}_H^t = \Phi^t \left(\hat{w}_{H,N}^t + \phi_{H,R}^t \left(\hat{\tau}_R^t + \hat{T}_R \right) + \phi_M^t \hat{L}_M^t \right) + \left(1 - \Phi^t\right) \left[\hat{w}_{H,N}^t + \sum_{j=H,F,M} \Psi_j \hat{L_{Hj}^t} + \Psi_{R2}^t \left(\hat{\tau}_R^t + \hat{T}_R \right) + \Psi_{HM,R} \hat{a}_{a_{M,} \tag{A.62}$$

where Φ^t is the share of the labor income in income of type $t$in the initial equilibrium:

$$\Phi^t \equiv \frac{\sum_{j=H,M,F} \chi_H^t X_{Hj}/a_j + \chi_M^t W_M L_M}{\sum_{j=H,M,F} \chi_H^t X_{Hj} + \chi_M^t W_M L_M},$$

$\phi_{H,R}^t$ is the share of total Home wage bill for type $t$corresponding to firms that will implement RS:

$$\phi_{H,R}^t \equiv \frac{\sum_{j=H,M,F} \gamma \phi_{Hj,R} X_{Hj}/a_i}{\sum_{j=H,M,F} X_{Hj}/a_j + \chi_M^t W L_M},$$

ϕ_M^t is the share of total Home wage bill for type t corresponding to MNE subsidiaries M:

$$\phi_M^t \equiv \frac{\chi_M^t W L_M}{\sum_{j=H,M,F} X_{Hj}/a_j + \chi_M^t W L_M},$$

Ψ_j is the share total Home firm profits coming from each market j:

$$\Psi_j = \frac{\Pi_{Hj}^t}{\sum_{j=H,F,M} \Pi_{Hj}^t}$$

Ψ_j is the share total Home firm profits corresponding firms that will implement RS:

$$\Psi_{R2}^t = \frac{\sum_{j=H,M,F} \Pi_{Hj,R}^t}{\sum_{j=H,F,M} \Pi_{Hj}^t}$$

and finally $\varphi_{HM,R}$ is the share home firm profits corresponding to sales to MNE subsidiaries that will implement RS:

$$\Psi_{HM,R} \equiv \frac{\gamma \Pi_{HM}}{\sum_{j=H,M,F} \Pi_{Hj}}.$$

These profits will be differentially affected since RS can be accompanied by a reduction in supplier's markup, through the imperfect pass-through β of the policy. Specifically,

$$\hat{a}_{M,R} = (\beta - 1)\, \chi_H^l \hat{\tau}_R^l. \tag{A.63}$$

Summing up over both types, change in aggregate total income is

$$\hat{X}_H = \sum_t \frac{X_H^t}{X_H} \hat{X}_H^t. \tag{A.64}$$

Denote X_{ij} the expenditure of country $j = H, F$ on final goods produced by firms in country $i = H, F$ or final goods sold by MNE's headquarters in Foreign when $i = M$, and let P_{ij} denote the corresponding price index. Given CES demand 1, changes in expenditure are given by:

$$\hat{X}_{ij} = (1-\sigma_j)\left(\hat{P}_{ij} - \hat{P}_j\right) + \hat{X}_j \qquad \text{for } i,j = H,F \tag{A.65}$$

$$\hat{X}_{Mj} = \gamma \hat{d}_R + (1-\sigma_j)\left(\hat{P}_{Mj} - \hat{P}_j\right) + \hat{X}_j \qquad \text{for } j = H,F \tag{A.66}$$

$$\hat{X}_{HM,r} = (1-\sigma_M)\left(\hat{P}_{M,r} - \hat{R}_r\right) + \hat{R_r M_r} \qquad \text{for } r = N,R \tag{A.67}$$

$$\hat{R_r M_r} = \hat{d}_r + \sum_{j=H,F} \frac{X_{Mj}}{X_{MH}+X_{MF}} \left[(1-\sigma_j)\left(\hat{R}_r - \hat{P}_j\right) + \hat{X}_j\right] \tag{A.68}$$

$$\hat{Y_M} = \gamma \hat{R_R M_R} + (1-\gamma)\hat{R_N M_N} \tag{A.69}$$

Price index changes are given by:

$$\hat{P}_j = \sum_{i=H,F,M} \lambda_{ij}\hat{P}_{ij} \qquad \text{for } i,j = H,F \tag{A.70}$$

$$\hat{P}_{ij} = \hat{W}_{i,N} + \gamma\phi_{ij}\chi_i^l \hat{\tau}_{i,T}^l + \frac{\theta - (\sigma_j - 1)}{\sigma_j - 1}\hat{z}_{ij} \qquad \text{for } i,j = H,F \tag{A.71}$$

$$\hat{P}_{HM,r} = \hat{W}_{i,N} + \beta\chi_H^l \hat{\tau}_{H,r}^l + \frac{\theta - (\sigma_j - 1)}{\sigma_j - 1}\hat{z}_{HM,r} \qquad \text{for } r = N,R \tag{A.72}$$

$$\hat{R}_r = \Xi \hat{P}_{HM,r} + (1-\Xi)\hat{W}_{M,r} \qquad \text{for } r = N,R \tag{A.73}$$

$$\hat{P}_{Mj} = (1-\gamma)\hat{R}_N + \gamma\hat{R}_R \qquad \text{for } j = H,F \tag{A.74}$$

where we have used the usual notation for trade shares, $\lambda_{ij} = \frac{X_{ij}}{X_j}$, while threshold changes are:

$$\hat{z}_{ij} = \frac{\sigma_j}{\sigma_j - 1}\hat{W}_{i,N} - \hat{P}_j - \frac{1}{\sigma_j - 1}\hat{X}_j \qquad \text{for } i = H; j = H,F \tag{A.75}$$

$$\hat{z}_{Fj} = 0 \tag{A.76}$$

$$\hat{z}_{HM,r} = \frac{\sigma_M}{\sigma_M - 1}\hat{W}_{H,r} - \frac{\sigma_i - \sigma_f}{\sigma_i - 1}\hat{R}_r - \frac{1}{\sigma_M - 1}\hat{d}_r - \sum_{j=H,F}\frac{X_{Mj}}{X_{MH}+X_{MF}}\left[\hat{P}_j + \frac{1}{\sigma_M - 1}\hat{X}_j\right] \qquad \text{for } r = N,R \tag{A.77}$$

Log-differentiating Foreign income and the trade balanced yields:

$$\hat{X}_F = \frac{w_F L_F}{w_F L_F + \frac{1}{\sigma_H - 1}E_x}\hat{W}_F + \frac{\frac{1}{\sigma_H - 1}Y_M}{w_F L_F + \frac{1}{\sigma_H - 1}Y_M}\hat{Y}_M \tag{A.78}$$

$$\frac{X_{FH}}{X_{FH}+\frac{1}{\sigma_H}X_{MH}}\hat{X}_{FH}+\frac{\frac{1}{\sigma_H}X_{MH}}{X_{FH}+\frac{1}{\sigma_H}X_{MH}}\hat{X}_{MH}=\frac{\frac{\sigma_H-1}{\sigma_H}X_{MF}}{X_{HF}+\frac{\sigma_H-1}{\sigma_H}X_{MF}}\hat{X}_{MF}+\frac{X_{HF}}{X_{HF}+\frac{\sigma_H-1}{\sigma_H}X_{MF}}\hat{X}_{HF} \tag{A.79}$$

Changes in labor allocations $\hat{L}_H^t$ and $\hat{L}_M^t$ needed in equation A.62 are given by noting that $\hat{L}_H^t = -\hat{L}_M^t \frac{L_M^t}{L_H^t}$, and by using MNE's change in labor demand, given CES combination of high- and low wage workers:

$$\hat{WL}_{M,r} = (1-\sigma_M)\left(\hat{W}_{M,r}-\hat{W}_{H,r}\right)+\hat{X}_{M,r} \tag{A.80}$$

$$\hat{wL}^t_{M,r} = (1-\rho)\left(\hat{w}^t_H-\hat{W}_M\right)+\hat{WL}_{M,r} \tag{A.81}$$

$$\hat{wL}^t_{M} = (1-\rho)\left(\hat{w}^t_H-\hat{W}_M\right)+\gamma(1-\sigma_M)\left(\hat{W}_M-\hat{W}_{H,R}\right)+(1-\gamma)\,(1-\sigma_M)\left(\hat{W}_M-\hat{W}_{H,N}\right)+\gamma\hat{X}_{M,R}+(1-\gamma \tag{A.82}$$

so that overall:

$$\hat{L}^t_M = (1-\gamma)\,\hat{wL}^t_{M,N}+\gamma\hat{wL}^t_{M,R}-\hat{w}^t_{H,N} \text{ for } t=l,h. \tag{A.83}$$

Finally, log-differentiating labor market clearing leads to:

$$\hat{w}^h_{H,N}-\hat{w}^l_{H,N}=\frac{\varphi_{H,R}\Phi^h_{labor}\hat{\tau}_{H,R}+\frac{1}{\rho}\left(1-\tau_M^{-\rho}\right)\left(1-\Phi^h_{labor}\right)\hat{L^h_M}}{1-\left(1-\tau_M^{-\rho}\right)\left(1-\Phi^h_{labor}\right)} \tag{A.84}$$

where Φ^t_{labor} is the share of workers of type t hired by firms, rather than by MNE subsidiaries.

$$\Phi^t_{labor}\equiv\frac{\sum_{j=H,M,F}X_{Hj}/a_j}{\sum_{j=H,M,F}X_{Hj}/a_j+\frac{\chi^t_M}{\chi^t_H}\frac{W_ML_M}{T_M}}.$$

Change in welfare for Home worker of type t is given by the solution of the system of equations A.61-A.84.

8.4.3 Robustness: MNEs implement RS at their subsidiaries

We consider here the alternative assumption on labor policies at the MNE subsidiary laid out in 12. Specifically, we assume that MNE subsidiaries offer the exact same labor conditions than their suppliers, that is, standard labor market conditions without RS, and RS-labor conditions for MNE that have implemented RS. That is:

$$\tau^t_{M,r}=\tau^t_{H,r}, \text{for } t=\{l,h\}\,; r=\{N,R\}\,.$$

In this case, the first order effect of a small RS policy $\left(\hat{\tau}_R,\hat{T}_R,\hat{d}_R\right)$ applied by a fraction $\gamma$of MNEs is different from the one computed in the baseline, as the policy also applies to workers directly employed by MNE subsidiaries. We report here the equations that differ from the welfare computations detailed in Appendix section 8.1.2. First, the change in wage indexes is now:

$$\hat{W}_{H,R} - \hat{W}_{H,N} = \chi_H^l \hat{\tau}_R^l, \tag{A.85}$$
$$\hat{W}_{M,R} - \hat{W}_{M,N} = \chi_H^l \hat{\tau}_R^l. \tag{A.86}$$

which replace (A.32)and (A.33).

Second, change in income for a representative worker of type t is:

$$\hat{X}_H^t = \Phi^t \left(\hat{w}_{H,N}^t + \phi_{H,R}^{\tilde{t}} \left(\hat{\tau}_R^t + \hat{T}_R \right) \right) + \left(1 - \Phi^t\right) \left[\hat{w}_{H,N}^t + \hat{L}_H^t + \varphi_{H,R} \left(\hat{\tau}_R^t + \hat{T}_R \right) + \varphi_{HM,R} \hat{a} \frac{a}{a-1} \right] \tag{A.87}$$

instead of (A.14), where Φ^t, $\varphi_{H,R}$ and $\varphi_{MH,R}$ are like in the baseline, but the share of total Home wage bill for type $t$corresponding to firms that will implement RS is now $\phi_{H,R}^{\tilde{t}}$,with

$$\phi_{H,R}^{\tilde{t}} \equiv \frac{\sum_{j=H,M,F} X_{Hj,R} + aWL_{M,R}}{\sum_{r=R,N} \left\{ \sum_{j=H,M,F} X_{Hj,r} + aWL_{M,r}^t \right\}}.$$

Finally, log-differentiating labor market clearing leads to:

$$\hat{w}_{H,N}^h - \hat{w}_{H,N}^l = \frac{\sum_{j=H,M,F} X_{Hj,R} + aWL_{M,R}}{\sum_{r=R,N} \left\{ \sum_{j=H,M,F} X_{Hj,r} + aWL_{M,r}^t \right\}} \hat{\tau}_R, \tag{A.88}$$

which replaces (A.88). The other equations in A.13-A.88 are unchanged. Together with the substitutions above, these yield change in welfare for Home worker of type t.

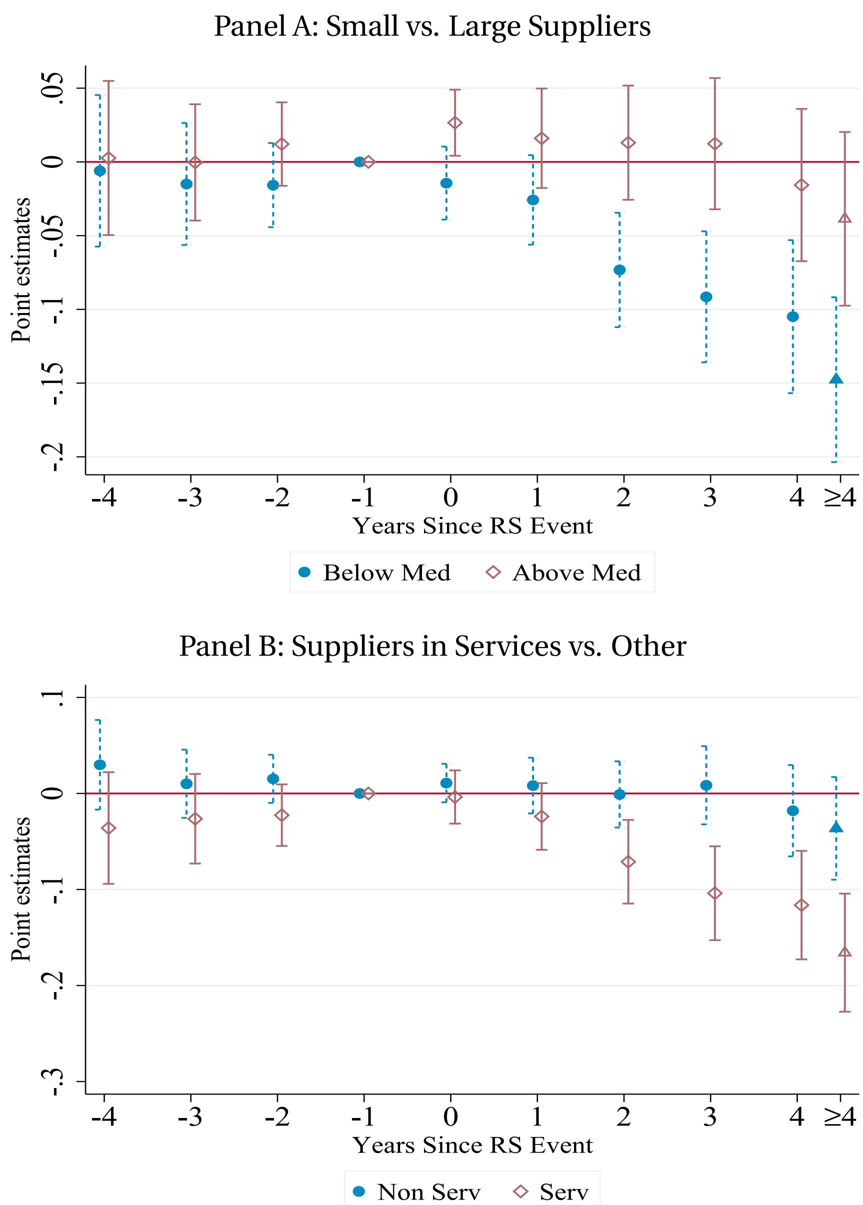
8.4.4 Model with multiple sourcing countries

TBD

Appendix B: Additional Figures and Tables

Figures

Figure A.1: Sales Effect by Supplier Type



Notes: The figure plots estimates from the event study specification in column 4 of Panel A in Table 2 after including additional interactions of the event timeline dummies with supplier type dummies. 95 percent confidence intervals are based on standard errors clustered at the level of firms. See Section 4 for discussion.

Figure A.2: Sales Effect by MNE Type

Panel A: Labor Inspectors per 10.000 Employed People

Panel B: OECD Index of Strictness in Labor Market Regulatory Protection

Panel C: MNE from Country Above vs. Below Median Management Score

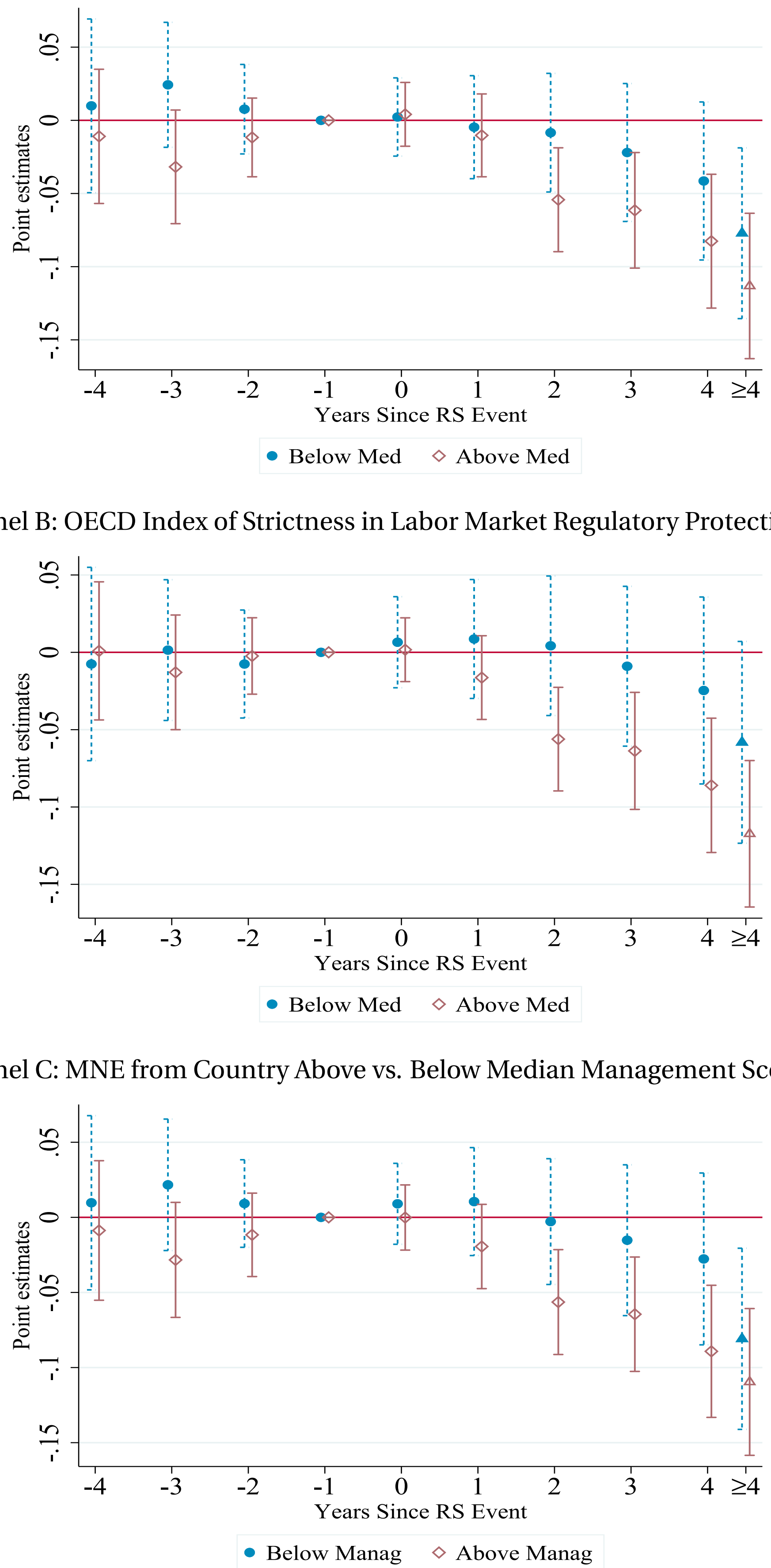
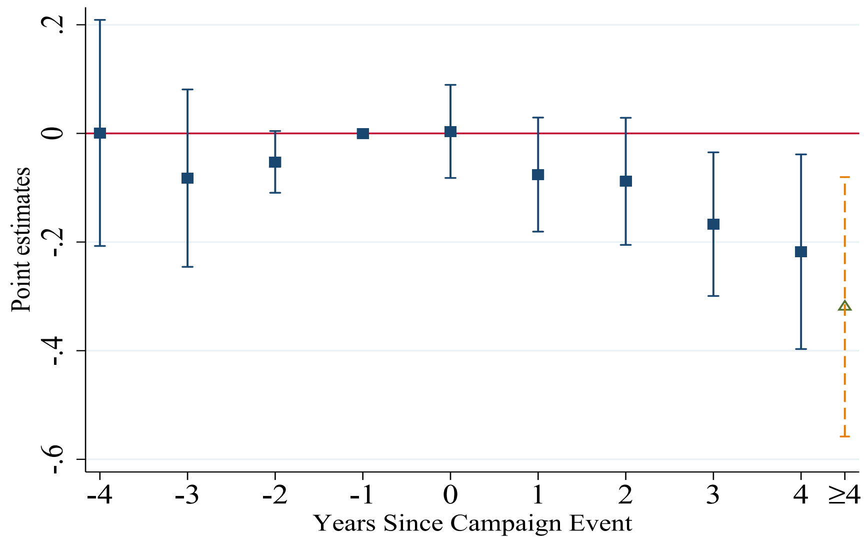
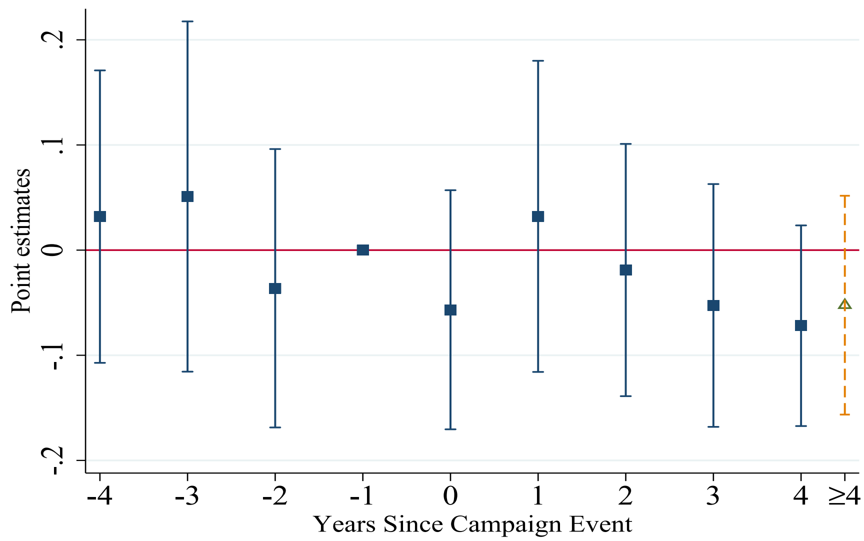


Figure A.3: Effects of Negative Supply-Chain Related Campaigns

Panel A: Effects on MNE Global Sales



Panel B: Effects on Probability of RS Rollout



Notes: 95 percent confidence intervals are based on standard errors clustered at the level of firms. See Section 4 for discussion.

Tables

Table A.1: MNE Sample Coverage

Total Sales	85.2%
Number of Workers	85.6%
Wage Bill	86.8%
Exports	94.7%
Imports	86.8%
Value Added	88.6%
Domestic Purchases	80.0%
Total Net Assets	86.3%

Notes: Table A.1 presents the total coverage for the period 2008 to 2019 (summing all years) of the values for the 481 MNEs out the values for the full sample of 2,156 firms part of a corporate group with partial foreign ownership (across eight variables).

Table A.2: Descriptive Statistics for the Sample of MNEs

	# Firms	Mean	S.D.	Median
A. MNEs not implementing an RS policy				
Total Sales	346	52839.0	148191.4	19193.2
Employment	346	470.2	993.3	201.6
Wage Bill	346	5881.3	12053.6	2788.0
Exports	273	15993.7	41295.8	1458.0
Imports	339	12565.3	26850.7	2095.2
Value Added	346	12437.6	28444.9	5030.9
Domestic Purchases	346	66.5	113.4	35.6
Total Net Assets	345	59516.7	121826.7	19203.1
Firms in Manuf. Sectors	346	31.8	46.6	0.0
Firms in Agric. Sectors	346	6.4	24.4	0.0
Firms in Ret. & Wholes. Sectors	346	16.5	37.1	0.0
Firms in Serv. Sectors	346	45.4	49.9	0.0
Firms with HQ in USA	346	28.0	45.0	0.0
Firms with HQ in Europe	346	18.2	38.6	0.0
B. MNEs implementing an RS policy				
Total Sales	135	95347.8	164168.8	42198.5
Employment	135	698.7	1506.2	300.2
Wage Bill	135	11823.7	17655.0	5621.7
Exports	123	38373.8	137648.4	2419.2
Imports	135	32911.8	118798.8	5948.3
Value Added	135	38546.0	98811.1	13012.8
Domestic Purchases	135	87.1	104.9	51.2
Total Net Assets	135	162894.2	502242.1	37030.8
Firms in Manuf. Sectors	135	37.0	48.5	0.0
Firms in Agric. Sectors	135	1.5	12.1	0.0
Firms in Ret. & Wholes. Sectors	135	15.6	36.4	0.0
Firms in Serv. Sectors	135	45.9	50.0	0.0
Firms with HQ in USA	135	39.3	49.0	0.0
Firms with HQ in Europe	135	24.4	43.1	0.0

Notes: Table A.2 presents descriptive statistics for: (A) the sample of MNEs that do not implement an RS policy and (B) the sample of MNEs that implemented an RS policy. With the exception of the number of workers, the mean, standard deviation, and median are in thousands of CPI-deflated 2013 U.S. dollars. These statistics are averages across 2008 to 2019.

Table A.3: Summary Statistics for Domestic Firms (Treated Suppliers and Never-Treated Suppliers)

	Never-treated suppliers	Treated suppliers	Difference
	(1)	(2)	(3)
Time Invariant Characteristics			
Agriculture, Forestry and Fishing	9.221	4.546	4.675***
	(28.93)	(20.83)	(0.46)
Manufacturing	10.77	13.92	-3.156***
	(31.00)	(34.62)	(0.53)
Electricity and Gas	0.148	0.154	-0.00581
	(3.84)	(3.92)	(0.06)
Sewerage and Waste Management	0.801	0.769	0.0326
	(8.92)	(8.73)	(0.15)
Construction	7.551	3.404	4.147***
	(26.42)	(18.14)	(0.42)
Wholesale and Retail Trade	26.60	29.06	-2.454**
	(44.19)	(45.41)	(0.75)
Transportation and Storage	8.432	10.04	-1.605***
	(27.79)	(30.05)	(0.47)
Accommodation and Food Services	5.733	3.514	2.218***
	(23.25)	(18.42)	(0.37)
Information and Communication	2.484	4.810	-2.326***
	(15.56)	(21.40)	(0.29)
Real Estate	2.521	2.943	-0.422
	(15.68)	(16.90)	(0.27)
Professional, Scientific and Technical	12.00	14.50	-2.494***
	(32.50)	(35.21)	(0.56)
Administrative and Support Service	6.774	6.962	-0.188
	(25.13)	(25.45)	(0.42)
Education	0.561	0.483	0.0777
	(7.47)	(6.94)	(0.12)
Human Health and Social Work	1.837	1.230	0.607**
	(13.43)	(11.02)	(0.22)
Art, Entertainment and Recreation	1.097	1.142	-0.0449
	(10.42)	(10.63)	(0.18)
Other Services	3.008	2.240	0.768**
	(17.08)	(14.80)	(0.28)
Mining and Quarrying	0.456	0.286	0.171
	(6.74)	(5.34)	(0.11)
Time Variant Characteristics			
Total Sales (thous. U.S. dollars)	1276.1	3010.9	-1734.8***
	(4960.31)	(13688.54)	(82.86)
Number of Workers	16.16	32.34	-16.18***
	(47.63)	(108.85)	(0.77)
Total Sales (thous. U.S. dollars) / Worker	118.5	145.7	-27.18***
	(445.59)	(526.56)	(6.77)
Wage Bill per Worker	7.095	8.173	-1.078***
	(7.03)	(6.24)	(0.11)
Share of Importers	24.90	41.01	-16.10***
	(43.24)	(49.19)	(0.66)
Share of Exporters	6.920	14.45	-7.532***
	(25.38)	(35.17)	(0.39)
Number of Firms	16223	4553	

Notes: Table A.3 presents descriptive statistics for the sample of suppliers experiencing an RS-policy event from an MNE buyer (column (2)) and other suppliers to MNEs that did not experience an RS-policy event (column (1)). All time-varying variables correspond to averages across time for each supplier. In the case of column (2), we only use the year before their event to compute the averages. Standard deviations in parentheses.

Table A.4: Worker-Level Event Study

Panel A: All Workers

	(1) TWFE	(2) TWFE	(3) SA	(4) IV
$\eta = -4$	-0.007***	-0.003	0.005**	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)
$\eta = -3$	-0.006***	-0.005***	0.002	-0.007***
	(0.002)	(0.002)	(0.002)	(0.002)
$\eta = -2$	-0.001	-0.000	0.003***	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)
$\eta = -1$	0	0	0	0
	(0)	(0)	(0)	(0)
$\eta = 0$	0.002**	-0.000	-0.003***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
$\eta = 1$	0.006***	0.002	-0.002	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
$\eta = 2$	0.010***	0.004***	-0.000	0.006***
	(0.001)	(0.001)	(0.002)	(0.002)
$\eta = 3$	0.012***	0.006***	0.001	0.009***
	(0.002)	(0.002)	(0.002)	(0.002)
$\eta = 4$	0.017***	0.011***	0.006***	0.015***
	(0.002)	(0.002)	(0.002)	(0.002)
$\eta \geq 4$	0.015***	0.011***	0.001	0.016***
	(0.002)	(0.002)	(0.002)	(0.002)
Year-Sect FE	Yes	Yes	Yes	Yes
Worker-Firm FE	Yes	Yes	Yes	Yes
Controls	No	Yes	Yes	Yes
Adjusted R^2	0.84	0.84	0.84	–
# Observations	4974613	4974613	4974613	4974613
# Firms	67023	67023	67023	67023
# Workers	768114	768114	768114	768114

Table A.5: Transaction-Level Event Study

Panel A: Intensive Margin

	(1) TWFE	(2) SA	(3) IV
$\eta = -4$	0.003	0.006	0.001
	(0.025)	(0.025)	(0.026)
$\eta = -3$	-0.003	-0.006	0.001
	(0.018)	(0.018)	(0.019)
$\eta = -2$	-0.012	-0.017	-0.005
	(0.014)	(0.014)	(0.015)
$\eta = -1$	0	0	0
	(0)	(0)	(0)
$\eta = 0$	-0.003	-0.003	0.000
	(0.013)	(0.013)	(0.013)
$\eta = 1$	-0.004	-0.001	0.000
	(0.016)	(0.015)	(0.017)
$\eta = 2$	-0.010	-0.006	-0.009
	(0.021)	(0.020)	(0.022)
$\eta = 3$	-0.007	-0.005	-0.010
	(0.023)	(0.023)	(0.024)
$\eta = 4$	-0.045*	-0.046*	-0.057*
	(0.027)	(0.027)	(0.030)
$\eta \geq 4$	-0.061**	-0.060**	-0.069**
	(0.027)	(0.028)	(0.031)
Year-Sect FE	Yes	Yes	Yes
Year-MNEBroadSect FE	Yes	Yes	Yes
MNC-Supplier FE	Yes	Yes	Yes
Adjusted R^2	0.67	0.67	–
# Observations	281894	281894	281894
# MNCs	433	433	433
# Suppliers	14260	14260	14260
# Sup Sector-Year Bins	3036	3036	3036

Panel B: Total Sales to RS-Active MNEs

	(1)	(2)
	PPML	PPML
$\eta = -4$	-0.230***	0.021
	(0.045)	(0.044)
$\eta = -3$	-0.182***	-0.024
	(0.032)	(0.032)
$\eta = -2$	-0.095***	-0.008
	(0.023)	(0.022)
$\eta = -1$	0	0
	(0)	(0)
$\eta = 0$	-0.118***	-0.091***
	(0.019)	(0.019)
$\eta = 1$	-0.191***	-0.144***
	(0.028)	(0.028)
$\eta = 2$	-0.240***	-0.188***
	(0.036)	(0.039)
$\eta = 3$	-0.323***	-0.250***
	(0.044)	(0.048)
$\eta = 4$	-0.438***	-0.342***
	(0.051)	(0.057)
$\eta \geq 4$	-0.400***	-0.272***
	(0.054)	(0.057)
Firm FE	Yes	Yes
Year-Sect FE	Yes	Yes
Controls	No	Yes
# Observations	98576	65682
# Firms	11188	9682
# Sector-Year Bins	2727	2600

Notes: See Section 4 for discussion. Panel A presents estimates for specification 32. The first-stage F-statistic for the final IV column exceeds 50. Panel B presents estimates of a PPML estimation with total sales to RS-active MNEs as the outcome. Standard errors clustered at the level of firms. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.6: Effect on CR Subsidiary Sales and Relative Size

	(1)	(2)	(3)	(4)	(5)	(6)
	TWFE	SA	IV	TWFE	SA	IV
$\eta = -4$	0.147	0.184*	0.166*	0.122	0.285	0.138
	(0.091)	(0.100)	(0.096)	(0.105)	(0.279)	(0.118)
$\eta = -3$	0.103	0.102	0.120	0.130	0.235	0.141
	(0.084)	(0.089)	(0.088)	(0.113)	(0.233)	(0.122)
$\eta = -2$	-0.018	-0.024	-0.019	0.175	0.202	0.186
	(0.060)	(0.057)	(0.063)	(0.134)	(0.178)	(0.141)
$\eta = -1$	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)
$\eta = 0$	0.068	0.076	0.075	0.172	0.156	0.186
	(0.046)	(0.047)	(0.049)	(0.154)	(0.162)	(0.165)
$\eta = 1$	-0.027	0.013	-0.006	0.208	0.135	0.223
	(0.085)	(0.080)	(0.090)	(0.180)	(0.138)	(0.192)
$\eta = 2$	0.001	0.042	0.020	0.274	0.217	0.297
	(0.084)	(0.083)	(0.089)	(0.232)	(0.209)	(0.251)
$\eta = 3$	0.002	0.055	0.023	0.292	0.217	0.316
	(0.098)	(0.100)	(0.103)	(0.249)	(0.217)	(0.267)
$\eta = 4$	-0.045	-0.010	-0.035	0.314	0.276	0.343
	(0.105)	(0.108)	(0.111)	(0.269)	(0.252)	(0.290)
$\eta \geq 4$	-0.150	-0.152	-0.147	0.319	0.165	0.347
	(0.118)	(0.119)	(0.124)	(0.268)	(0.132)	(0.287)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Sect FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.83	0.83	–	0.40	0.44	–
# Observations	3917	3917	3917	1549	1549	1549
# MNCs	365	365	365	160	160	160
# Sector-Year Bins	873	873	873	432	432	432

Notes: The table presents TWFE, Sun and Abraham, and IV estimates for specifications 31. In columns 1-3 the outcome is the log of CR subsidiary sales. In columns 4-6 the outcome is the percentage that the CR subsidiary sales represents in global MNE sales.

information/note for the Tax ID splitting figure Table A.7 below has nine columns, for three different definitions of "ID splitting" and three regressions (TWFE, SA, IV) per definition.

Definition 1 This is an outsourcing measure in the spirit of Goldschmidt and Schmieder QJE 2017. In particular, the outsourcing measure is an indicator equal to one if there is a flow of workers from a tax ID to another satisfying the following conditions:

1. The size of the outflow from the predecessor firm is more than or equal to 1/3 of the predecessor's total employment in time t-1
2. Either the successor is a new firm (i.e. the tax ID shows up in the data for the first time at time t), or the inflow from the predecessor to the successor makes up 2/3 or more of the successor's total employment in time t
3. The number of workers at the predecessor in time t-1 is at least 5.
4. We only consider cases in which the successor firm operates in the same industry as the predecessor.

Definition 2 The idea here is to determine if there are "big" groups of workers that move together from firm i to firm j. To achieve that, we compute the following for each firm i and year t:

$$X_{i,t} = \max_{j \neq i} \frac{w_{i,t}^{j,t+1}}{\sum_{j \neq i} w_{i,t}^{j,t+1}},$$

where $w_{i,t}^{j,t+1}$ is the number of workers that move from firm i in year t to firm j in year t+1. Note that we consider exclusively workers that move to another firm (not the ones that continue in the same firm or are unemployed) in year t+1. Hence, this variable measures how big (relative to the total outflow of workers from firm i) is the biggest group that move together to a new firm.

Definition 3 The previous measure can take the value of 1 (the maximum possible) in the case that the complete outflow of workers move to the same firm (and in particular in the extreme case in which only one worker leaves the firm and moves to another one). The alternative that we consider here is to calculate

$$X_{i,t}^{'} = \max_{j \neq i} \frac{w_{i,t}^{j,t+1}}{W_{i,t}},$$

where $W_{i,t}$ is the total of workers of firm i in year t.

Table A.7: Tax ID Splitting Event Study

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Def1_TWFE	Def1_SA	Def1_IV	Def2_TWFE	Def2_SA	Def2_IV	Def3_TWFE	Def3_SA	Def3_IV
$\eta = -4$	0.002	0.002	0.002	0.014*	0.010	0.011	-0.003	-0.003	-0.001
	(0.001)	(0.001)	(0.001)	(0.008)	(0.008)	(0.008)	(0.005)	(0.006)	(0.005)
$\eta = -3$	0.002	0.002*	0.002	0.007	0.003	0.004	-0.003	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.007)	(0.007)	(0.008)	(0.004)	(0.005)	(0.005)
$\eta = -2$	0.001	0.001	0.000	0.003	0.000	0.005	-0.011***	-0.011***	-0.009**
	(0.001)	(0.001)	(0.001)	(0.006)	(0.006)	(0.007)	(0.004)	(0.004)	(0.004)
$\eta = -1$	0	0	0	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
$\eta = 0$	0.000	0.000	-0.000	-0.003	-0.003	-0.003	0.002	0.001	0.004
	(0.001)	(0.001)	(0.001)	(0.006)	(0.006)	(0.006)	(0.004)	(0.004)	(0.004)
$\eta = 1$	0.001	0.001	0.001	0.006	0.006	0.007	0.001	-0.000	0.003
	(0.001)	(0.001)	(0.001)	(0.006)	(0.006)	(0.007)	(0.004)	(0.004)	(0.005)
$\eta = 2$	0.001	0.001	-0.001	0.004	0.005	0.005	0.008*	0.009*	0.012**
	(0.001)	(0.001)	(0.001)	(0.007)	(0.007)	(0.007)	(0.004)	(0.005)	(0.005)
$\eta = 3$	-0.000	0.000	-0.000	0.001	0.001	0.002	0.004	0.003	0.004
	(0.001)	(0.001)	(0.001)	(0.007)	(0.007)	(0.008)	(0.005)	(0.005)	(0.005)
$\eta = 4$	-0.000	0.000	-0.001	0.011	0.012	0.010	0.008	0.006	0.009
	(0.001)	(0.001)	(0.001)	(0.008)	(0.008)	(0.009)	(0.005)	(0.006)	(0.006)
$\eta \geq 4$	0.001	0.001	0.001	0.011*	0.015**	0.012	0.009**	0.008*	0.011**
	(0.001)	(0.001)	(0.001)	(0.007)	(0.008)	(0.008)	(0.005)	(0.005)	(0.005)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Sect FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.062	0.061	–	0.38	0.38	–	0.25	0.25	–
# Observations	145641	145641	145641	110180	110180	110180	149436	149436	149436
# Firms	19242	19242	19242	18079	18079	18079	19599	19599	19599
# Sector-Year Bins	2671	2671	2671	2588	2588	2588	2674	2674	2674

Table A.8: Effect of Negative Supply-Chain Related Campaigns

	(1)	(2)	(3)	(4)
	TWFE	SA	TWFE	SA
$\eta = -4$	-0.007	0.027	-0.035	-0.022
	(0.074)	(0.080)	(0.059)	(0.054)
$\eta = -3$	-0.013	0.010	-0.065	-0.035
	(0.068)	(0.069)	(0.054)	(0.045)
$\eta = -2$	-0.079	-0.079	-0.047	-0.046
	(0.058)	(0.058)	(0.037)	(0.040)
$\eta = -1$	0	0	0	0
	(0)	(0)	(0)	(0)
$\eta = 0$	-0.088	-0.094	-0.009	-0.014
	(0.056)	(0.059)	(0.025)	(0.024)
$\eta = 1$	-0.038	-0.044	-0.053*	-0.057*
	(0.063)	(0.065)	(0.032)	(0.032)
$\eta = 2$	-0.045	-0.050	-0.084**	-0.092**
	(0.061)	(0.062)	(0.042)	(0.041)
$\eta = 3$	-0.112**	-0.118**	-0.106**	-0.118**
	(0.050)	(0.052)	(0.049)	(0.047)
$\eta = 4$	-0.114**	-0.132***	-0.098	-0.113*
	(0.045)	(0.050)	(0.064)	(0.064)
$\eta \geq 4$	-0.099**	-0.140**	-0.168**	-0.193**
	(0.048)	(0.062)	(0.078)	(0.080)
Firm FE	Yes	Yes	Yes	Yes
Year-Sector FE	Yes	Yes	Yes	Yes
# Observations	4672	4672	2555	2555

Notes: The table presents TWFE and Sun and Abraham estimates for specifications 31. In columns 1 and 2 the outcome is an indicator of the MNE implementing an RS rollout. In columns 3 and 4 the outcome is the log of the global MNE sales.