



MACROECONOMIC EFFECTS OF LABOUR MARKET DEREGULATION AND INTERNATIONAL PRODUCTION LOCATION

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Abstract: This paper uses an open-economy macroeconomic model to analyse the effects of labour market deregulation on consumption, exchange rates and the international location of producers. The model shows that labour market deregulation leads to a proportional increase in consumption and an appreciation of the currency in that economy. It also demonstrates that a stronger currency reduces the real profits of domestic producers, leading them to relocate overseas. A welfare analysis reveals that labour market deregulation enhances the relative economic welfare of an economy, despite the outflow of producers.

Keywords: Labour market deregulation, Exchange rate, Production location, Consumption.

JEL classification: F29, F31, F32, F41

I. Introduction

Labour market deregulation includes relaxing regulations on dismissal, entry standards for foreign workers, overtime work and labour dispatch, among others. The benefit of labour market deregulation is increased productivity through enhanced competitiveness. Increased labour productivity enables economies to grow without expanding their population. Several studies have analysed the macroeconomic effects of labour market reforms, such as relaxing hiring and firing regulations, using macroeconomic models. Blanchard and Giavazzi (2003), for instance, investigated the macroeconomic ramifications of labour market deregulation by employing a monopolistic competition model of a closed economy. They concluded that labour market deregulation could initially lead to lower wages and increased unemployment, but ultimately result in higher wages, increased employment and greater production. Anand and Khera (2016), meanwhile, used a

DSGE model to predict the short- and long-term effects of labour market reforms on employment and GDP in India. They found that labour market reforms negatively impact employment and GDP in the short term due to adjustment costs. However, in the long term, reforms increase employment and GDP by enhancing firms' employment flexibility. Another study analysing the macroeconomic impact of labour market deregulation is that of Cacciatore et al. (2016). They used a New Keynesian model to analyse the macroeconomic effects of labour market reform. They demonstrated that labour market deregulation initially increases unemployment, but this effect is reversed in the long term when policies that lower barriers to entry into the product market are implemented simultaneously. Furthermore, Cacciatore and Fiori (2016) predicted the macroeconomic impact of labour market reform using a calibration analysis based on a matching model. This analysis showed that labour market reform leads to an economic recession in the short term, followed by economic expansion in the long term. In a recent empirical study, Duval et al. (2021) examined the impact of labour market reforms on current account dynamics in 26 developed countries over the past 40 years. Their analysis revealed that labour market reforms implemented under weak macroeconomic conditions improved current account balances and increased GDP by reducing precautionary savings. Previous studies analysing the macroeconomic impact of labour market deregulation have generally shown positive long-term results for employment and GDP. However, these studies have focused on closed or small open economy models. No studies have examined the effects of labour market deregulation in bilateral models. In today's globalised economy, firms can easily relocate across borders. Nevertheless, previous studies analysing the effects of labour market deregulation have focused solely on a fixed framework for firm location mobility. Consequently, prior research has only demonstrated that the deregulation of one country's labour market affects other countries through exchange rates. A notable feature of the globalised world is the increasing internationalisation of production sites via global value chains managed by multinational firms. While various factors influence a firm's production base, it is important to note that exchange rates have a significant impact on it.¹

In a world of globalised corporate production, how does the deregulation of one country's labour market affect the macroeconomic and economic welfare outcomes of both countries? This paper clarifies the impact of deregulation policies in one country's labour market on the macroeconomic and economic welfare outcomes of both countries, considering the globalisation of corporate production locations within a bilateral model. Related research includes Johdo's (2015) new open macroeconomic model, which considers the location of international firms as an endogenous variable. This model examines the effects of policy shocks, primarily

¹ Several studies, including those by Duanmu (2012), Boateng et al. (2015), Asiamah et al. (2019) and Li and Nakagawa (2022), have empirically demonstrated the impact of exchange rates on producers' global production locations.

on the demand side, on production and consumption in both the domestic and foreign markets via international firm mobility. However, no research has yet analysed the macroeconomic effects of labour market deregulation using Johdo's model, which incorporates international firm mobility. Using this model, this paper demonstrates how the deregulation of a country's labour market impacts other countries' economies through its effect on the exchange rate and the international location of firms.

Furthermore, the recent AI boom has automated certain complex tasks, reducing the demand for white-collar labour. Looking ahead, demand for simpler tasks is expected to grow. This means that individuality among workers will be less valued and that workers will be required to perform their jobs according to manuals. This corresponds to an increase in the elasticity of substitution between workers. Conversely, labour market deregulation signifies the loss of vested interests and increased competitiveness. Thus, it can also be viewed as an increase in the elasticity of substitution between workers. Therefore, it is important to understand the impact of labour market deregulation in order to predict the impact of AI on the labour market. In light of the depersonalisation of the labour market, this paper aims to analyse the macroeconomic impact of changes in the elasticity of labour input substitution due to labour market deregulation.

We conclude that deregulation of the domestic labour market leads to a proportional increase in domestic consumption, causing the domestic currency to appreciate. Furthermore, it has been established that currency appreciation leads to a decline in the real profits of domestic firms and an increase in those of foreign firms. This results in a shift in the location of these firms, with many choosing to relocate to other countries. Furthermore, we demonstrate that an increase in firm mobility mitigates the impact of labour market deregulation on domestic consumption and the exchange rate. Finally, a welfare analysis shows that labour market deregulation improves the domestic country's relative economic welfare, despite the outflow of firms.

2. Model

The basic structure of the model presented in this paper is based on that described by Johdo (2015, 2021). It is an open economy model comprising domestic and foreign economies. Producers are located within the range $[0, 1]$. Each producer employs local labour and produces a single differentiated product. While the producers themselves are capable of operating internationally, this capability does not extend to their owners. The set of producers located in the domestic economy is represented by the interval $[0, n_t]$, while the set of producers located in the foreign economy is represented by the interval $(n_t, 1]$. Furthermore, each producer supplies one type of good and it is not feasible to carry out productive activities in both economies simultaneously. It is assumed that, in the domestic economy, agents are

located within the range $[0, s]$, whereas those in the foreign economy are situated within the range $(s, 1]$.

The primary objective of agent $i \in (0, s)$ within the domestic economy is to maximise the following lifetime utility function:

$$U_t(i) = E_t \sum_{\tau=t}^{\infty} \beta^{\tau-t} \left(\ln C_{\tau}(i) + \chi \ln \left(\frac{M_{\tau}(i)}{P_{\tau}} \right) - \left(\frac{\kappa}{2} \right) (L_{\tau}^S(i))^2 \right), \quad (1)$$

where β is a discount factor ($0 < \beta < 1$), and the consumption index $C_t(i)$ is defined as $C_t(i) = (\int_0^1 C_t(i, j)^{(\sigma-1)/\sigma} dj)^{\sigma/(\sigma-1)}$, where $\sigma (> 1)$ and $C_t(i, j)$ is the consumption of good j . The second term is real money balances $(M_t(i)/P_t)$, where $M_t(i)$ denotes nominal balances, and $P_t = (\int_0^1 P_t(j)^{1-\sigma} dj)^{1/(1-\sigma)}$ is the consumption price index (CPI), where $P_t(j)$ is the domestic-nominal price of good j . $L_t^S(i)$ is the amount of labor. If there are no trade costs between the two countries, then $P_t(j) = \varepsilon_t P_t^*(j)$ is observed for all goods, where ε_t represents the exchange rate. Therefore, we obtain $P_t = \varepsilon_t P_t^*$ (purchasing power parity). This model assumes the existence of an internationally integrated real bond market, in which domestic and foreign agents can engage in lending and borrowing transactions at the same interest rate. Furthermore, real bond units are expressed in terms of composite consumption goods. At each point in time, agents receive returns on risk-free real bonds, earn wages by supplying labour and receive equal profits from all producers. Thus, the agent's budget constraint can be expressed as follows:

$$P_t B_{t+1}(i) + M_t(i) = P_t(1 + r_t)B_t(i) + M_{t-1}(i) + W_t(i)L_t^S(i) + \int_0^{n_t} \Pi_t(j) dj + \int_{n_t}^1 \varepsilon_t \Pi_t^*(j) dj + P_t T_t(i) - P_t C_t(i), \quad (2)$$

where r_t represents the real interest rate, B_{t+1}^i represents the real bonds held and W_t^i denotes the nominal wage rate. Additionally, $\int_0^{n_t} \Pi_t(j) dj$ ($\int_{n_t}^1 \varepsilon_t \Pi_t^*(j) dj$) are the aggregate nominal flows of profit in the domestic economy (and abroad); and $T_t(i)$ denotes income transfers. The government budget constraint is $T_t = (M_t - M_{t-1})/P_t$, where M_t denotes the aggregate money supply and $T_t = \int_0^s T_t(i) di$.

In the domestic economy, producer j , belonging to the interval $[0, n_t]$, engages a continuum of heterogeneous labour inputs on a local scale to produce a unique product according to the following equation: $y_t(j) = (s^{-1/\phi} \int_0^S (L_t^d(i, j))^{(\phi-1)/\phi} di)^{\phi/(\phi-1)}$, where $\phi > 1$ is the elasticity of input substitution. The labour demand for an agent's labour input, as determined by producer j , can be expressed as follows:

$$L_t^d(i, j) = s^{-1} \left(\frac{W_t(i)}{w_t} \right)^{-\phi} y_t(j), \quad (3)$$

where $W_t \equiv (\varsigma^{-1} \int_0^S W_t(i)^{(1-\phi)} di)^{1/(1-\phi)}$.

Next, we will examine the dynamic optimisation problem faced by agents in each economy. First, in the domestic economy, agents maximise $C_t(i)$ subject to $P_t C_t(i) = \int_0^1 P_t(j) C_t(i, j) dj$. Similarly, agents in the foreign economy maximise $C_t^*(i)$ subject to $P_t^* C_t^*(i) = \int_0^1 P_t^*(j) C_t^*(i, j) dj$. The static problem gives rise to the following demand functions:

$$C_t(i, j) = \left(\frac{P_t(j)}{P_t} \right)^{-\sigma} C_t(i), \quad C_t^*(i, j) = \left(\frac{P_t^*(j)}{P_t^*} \right)^{-\sigma} C_t^*(i). \quad (4)$$

By integrating the aggregate demand of equation (4) across all agents on a global scale and equating it to $y_t(j)$, it can be concluded that the market is cleared for any specified product j :

$$y_t(j) = \int_0^S C_t(i, j) di + \int_S^1 C_t^*(i, j) di = \left(\frac{P_t(j)}{P_t} \right)^{-\sigma} C_t^w, \quad (5)$$

where $P_t(j)/P_t = P_t^*(j)/P_t^*$ and $C_t^w \equiv \left(\int_0^S C_t(i, j) di + \int_S^1 C_t^*(i, j) di \right)$ is aggregate per capita world consumption. Similarly, we obtain $y_t^*(j) = (P_t^*(j)/P_t^*)^{-\sigma} C_t^w$. Subsequently, agents proceed to maximise (1) subject to (2). The optimal conditions with respect to $B_{t+1}(i)$ and $M_t(i)$ can be expressed as $1/C_t(i) = \beta E_t[(1 + r_{t+1})/C_{t+1}(i)]$ and $M_t(i)/P_t = \chi C_t(i)((1 + R_{t+1})/R_{t+1})$, respectively, where R_{t+1} is the nominal interest rate.

In monopolistic competitive goods markets, producer j faces the profit optimisation problem. This problem is: $\max_{P_t(j)} \Pi_t(j) = (P_t(j) - W_t)y_t(j)$. By substituting $y_t(j)$ into $\Pi_t(j)$ and then differentiating it by $P_t(j)$, we obtain $P_t(j) = (\sigma/(\sigma - 1))W_t$. Because W_t is given, all domestic producers charge the same price: $P_t(j) = P_t(h)$. Therefore, each producer requires $L_t^d(i, j) = L_t^d(i, h)$. Similarly, $P_t^*(j) = P_t^*(f)$. Accordingly, the real profits in each location are as follows:

$$\Pi_t(h)/P_t = (1/\theta) \left(\frac{P_t(h)}{P_t} \right)^{1-\theta} C_t^w, \quad \Pi_t^*(f)/P_t^* = (1/\theta) \left(\frac{P_t^*(f)}{P_t^*} \right)^{1-\theta} C_t^w. \quad (6)$$

The model posits that the primary motivating factor for producers to relocate to another country is the difference in real profits between the two economies. According to Johdo's (2015, 2021) formulation, producer relocation is presented as follows:

$$n_t - n_{t-1} = \gamma \left[\frac{\Pi_t(h)}{P_t} - \frac{\Pi_t^*(f)}{P_t^*} \right] = \gamma \left[\frac{\Pi_t(h)}{P_t} - \frac{\varepsilon_t \Pi_t^*(f)}{P_t} \right]. \quad (7)$$

The parameter γ ($0 \leq \gamma < \infty$) is indicative of the extent of producer mobility between the two economies. An increase in the value of γ corresponds to an increase in producer mobility between the two economies. As equation (7) shows, the domestic economy's share of producers increases linearly in relation to the difference in real profit between domestic and foreign producers.

In accordance with the approach set out by Corsetti and Pesenti (2001), the model incorporates nominal rigidities through the implementation of one-period wage contracts. These contracts stipulate that the nominal wage in period t is predetermined in the previous period. In a monopolistically competitive labour market, an agent provides a specific type of labour to all local producers. Consequently, equilibrium labour market conditions for both the domestic and foreign economies can be expressed as follows: $L_t^s(i) = \int_0^{n_t} L_t^d(i, j) dj$ and $L_t^{s*}(i) = \int_{n_t}^1 L_t^{d*}(i, j) dj$, respectively. Substituting equation (3) and $L_t^s(i) = \int_0^{n_t} L_t^d(i, j) dj$ into (2) results in the maximisation of (1) with respect to $W_t(i)$, yielding the following condition:

$$\phi \left(\frac{W_t(i)}{P_t} \right)^{-1} E_{t-1} \left(\kappa (L_t^s(i))^2 \right) = (\phi - 1) E_{t-1} \left(\frac{L_t^s(i)}{C_t(i)} \right). \quad (8)$$

The equilibrium condition for the bond market is represented by the following equation: $\int_0^s B_{t+1}(i) di + \int_s^1 B_{t+1}^*(i) di = 0$. It is assumed that the money markets of both economies always clear.

3. Symmetric solution with zero shock

We present the equilibrium solution for a symmetric steady state, where $B_0 = 0$ and $s = s^* = 1/2$. In the steady state, $1/C_t(i) = \beta E_t[(1 + r_{t+1})/C_{t+1}(i)]$, which yields $r_{ss} = (1 - \beta)/\beta \equiv \delta$, where δ is the real interest rate. The steady-state allocation of producers is $n_{ss} = 1/2$. Hence, from (8),

$$\begin{aligned} L_{ss}^s &= L_{ss}^{s*} = C_{ss} = C_{ss}^* = C_{ss}^w = y_{ss}(h) = y_{ss}^*(f) \\ &= \\ ((\phi-1)/\phi)^{1/2} ((\sigma-1)/\sigma)^{1/2} (1/\kappa)^{1/2}. \end{aligned} \quad (9)$$

The following real profits are yielded by substituting C_{ss}^w from (9) into (6):

$$\begin{aligned} \Pi_{ss}(h)/P_{ss} &= \Pi_{ss}^*(f)/P_{ss}^* = \\ (1/\sigma) ((\phi-1)/\phi)^{1/2} ((\sigma-1)/\sigma)^{1/2} (1/\kappa)^{1/2}. \end{aligned} \quad (10)$$

4. Log-linearized version of the model

The objective is to examine the macroeconomic consequences of sudden, unanticipated and permanent deregulation of the domestic economy's labour market. To this end, a log-linear approximation of the system is employed around the zero-shock steady state, as previously derived. As outlined in the seminal work by Obstfeld and Rogoff (1995), the symbol $\hat{X}$ signifies short-run percentage deviations from the steady state for any given variable X , and these deviations are shown to be consistent with the duration of nominal wage contracts. This provides a robust theoretical framework for further analysis. Therefore, $\hat{W} = \hat{W}^* = \hat{P}(h) = \hat{P}^*(f) = 0$. Furthermore, $\bar{X}$ is employed to represent long-run percentage deviations, which are consistent with flexible nominal wages.

5. Deregulation of the domestic economy's labour market

This section examines the impact of an unexpected permanent deregulation of the labour market on the domestic economy's exchange rate, producer location, and consumption. To this end, equation (7) is log-linearised. This yields the following expression for the domestic economy's share of producers:

$$\hat{n} = 2\gamma((\phi-1)/\phi)^{1/2}((\sigma-1)/\sigma)^{3/2}(1/\kappa)^{1/2}\hat{\epsilon}. \quad (11)$$

Equation (11) shows that a fall in the exchange rate encourages producers to move towards the domestic economy. Intuitively, depreciation increases domestic production levels through the expenditure-switching effect.² This, in turn, increases the profits of domestic producers and, consequently, causes foreign producers to relocate to the domestic economy. Equation (11) shows that exchange rate changes have a greater impact when γ is larger.

In our model, the elasticity of input substitution ($\phi > 1$) can be interpreted as a parameter that determines the degree of labour market regulation in the domestic economy. In other words, a higher value of ϕ indicates a less regulated labour market. This is because labour market deregulation signifies a loss of vested interests and increased competitiveness, which can be interpreted as an increase in the elasticity of substitution between workers. We will now examine the macroeconomic consequences of a permanent increase in ϕ in period 1: $\bar{\phi} > 0$. The solutions are as follows:

² The real price of domestic goods for consumers has declined as a result of the exchange rate depreciating in both economies. Consequently, there has been a shift in global consumption patterns, with consumers switching from foreign goods to domestic products. This phenomenon is known as the 'expenditure-switching effect'.

$$\hat{C} - \hat{C}^* = \left(\frac{\gamma_2}{2\delta\gamma_3 + \gamma_1 + \delta} \right) \bar{\phi}, \quad (12)$$

$$\hat{\varepsilon} = - \left(\frac{\gamma_2}{2\delta\gamma_3 + \gamma_1 + \delta} \right) \bar{\phi}, \quad (13)$$

$$\hat{n} = -2\gamma((\phi-1)/\phi)^{1/2}((\sigma-1)/\sigma)^{3/2}(1/\kappa)^{1/2} \left(\frac{\gamma_2}{2\delta\gamma_3 + \gamma_1 + \delta} \right) \bar{\phi}, \quad (14)$$

where

$$\gamma_1 = \left\{ 1 + \left(\frac{\sigma-1}{\sigma} \right) \left[\frac{\sigma-1+4\gamma((\phi-1)/\phi)^{1/2}((\sigma-1)/\sigma)^{3/2}(1/\kappa)^{1/2}}{\sigma+1+4\gamma((\phi-1)/\phi)^{1/2}((\sigma-1)/\sigma)^{3/2}(1/\kappa)^{1/2}} \right] \right\} > 0, \quad (15)$$

$$\gamma_2 = (\phi-1)^{-1} \left(\frac{\sigma-1}{\sigma} \right) \left[\frac{\sigma-1+4\gamma((\phi-1)/\phi)^{1/2}((\sigma-1)/\sigma)^{3/2}(1/\kappa)^{1/2}}{\sigma+1+4\gamma((\phi-1)/\phi)^{1/2}((\sigma-1)/\sigma)^{3/2}(1/\kappa)^{1/2}} \right] > 0, \quad (16)$$

$$\gamma_3 = \left(\frac{\sigma-1}{\sigma} \right)^2 \left[\frac{\sigma}{2} + 2\gamma((\phi-1)/\phi)^{1/2}((\sigma-1)/\sigma)^{1/2}(1/\kappa)^{1/2} \right] > 0. \quad (17)$$

As equation (12) indicates, an unanticipated and permanent deregulation of the domestic economy's labour market is associated with a proportional rise in the level of domestic consumption.³ The result in (12) can be explained intuitively as follows. First, an unanticipated permanent deregulation of the labour market in the domestic economy results in an immediate increase in domestic consumption under a given exchange rate, due to the deregulation increasing labour productivity.⁴ This effect will henceforth be referred to as the 'distortion-reducing effect'. This is because deregulating the labour market improves the undersupply caused by monopolistic labour supply, thereby correcting the resulting underproduction. Consequently, an increase in domestic consumption leads to an appreciation of the exchange rate. According to the money demand function, an increase in consumption leads to an expansion in the demand for real money balances, necessitating an appreciation of the domestic currency. As a result of the exchange rate appreciation, world consumption demand shifts towards foreign goods due to the rise in the relative price of domestic goods. This leads to producers based in the domestic economy relocating to the foreign country due to the decrease in their relative profitability (see equation (11)). This relocation leads to a reduction in relative labour income within the domestic economy and subsequently results in a decline in relative consumption within the domestic economy. This phenomenon, referred to henceforth as the 'location-shifting effect', highlights the importance of considering contextual

³ In this model, the equilibrium conditions of the money market yield the result that $\hat{\varepsilon} = \bar{\varepsilon}$, and the Euler consumption equations similarly yield the result that $\hat{C} - \hat{C}^* = \bar{C} - \bar{C}^*$.

⁴ Sobota et al. (2025) present an empirical study which demonstrates that labour market reforms in Germany have contributed to increased labour productivity.

influences on consumer behaviour. The net effect on relative domestic consumption depends on the relative strengths of the distortion-reducing and location-shifting effects. However, equation (12) shows that the positive distortion-reducing effect dominates the negative location-shifting effect; therefore, such deregulation causes a rise in relative domestic consumption.

Turning to exchange rate changes, equation (13) shows that permanent deregulation of the domestic labour market leads to exchange rate appreciation. The exchange rate effect is determined by two different mechanisms. Conversely, permanent deregulation in the domestic economy necessitates currency appreciation due to the distortion-reducing effect of the rise in relative domestic consumption. However, deregulation has been shown to increase the price of domestic products relative to foreign products. This is due to the initial appreciation of the domestic currency, resulting in a shift in world demand towards foreign products. This shift in demand, in turn, raises the profits of foreign producers and causes domestic producers to relocate to the foreign economy. Consequently, this relocation reduces labour income in the domestic economy and decreases short-run domestic consumption. This exerts pressure on the domestic currency to depreciate by decreasing money demand. Thus, the impact of the deregulation shock on the exchange rate in the domestic economy is ambiguous. However, according to equation (13), the former dominates the latter; therefore, such unanticipated permanent labour market deregulation in the domestic economy leads to the domestic currency appreciating.

As demonstrated in equation (12), an increase in γ mitigates the diminishing impact of the deregulation shock on relative domestic consumption in the labour market. Intuitively, as γ increases (i.e. as the relocation of producers becomes more flexible), there is a greater increase in foreign labour income because more producers relocate to the foreign economy. Consequently, the negative location-shifting effect is greater. Consequently, an increase in γ mitigates the increase in relative domestic consumption through the more substantial negative location-shifting effect. Furthermore, an increase in γ mitigates the impact of deregulation on exchange rate appreciation in the labour market. The impact of the deregulation shock on the exchange rate depends on the extent to which relative domestic consumption responds to the aforementioned shock.

This study focuses on the impact of international producer relocation and labour market deregulation on consumption disparities and exchange rates. The key differences between our findings and those of the Rudux model, which assumes fixed producer locations, are as follows: Assuming fixed producer allocation, domestic labour market deregulation in the Rudux model increases domestic products and decreases foreign products. Therefore, under the assumption of nominal price or wage rigidity, the decline in foreign product production is the main factor behind the international spillover mechanism in the Rudux model. However, our study is based on the Rudux model, in which the proportion of domestic and foreign-located

producers is endogenous. A novel feature of our model is that the share of domestic producers responds to exchange rate fluctuations caused by domestic labour market deregulation. In this model, we find that unexpected deregulation in the domestic labour market results in an increase in domestic consumption relative to foreign consumption when nominal wage rigidities encourage domestic producers to relocate abroad. This suggests that if the outflow of firms is caused by labour market deregulation, it may not necessarily have a negative impact on domestic consumption. Additionally, our model shows that the greater the mobility of producers, the weaker the international spillover effect of domestic labour market deregulation through exchange rates. Therefore, the negative impact of domestic labour market deregulation on foreign economies could be mitigated by the government implementing parallel deregulation to encourage producers to relocate abroad.

6. Welfare analysis

Here, we focus on the real component of an agent's utility. Equation (1) can be rewritten as $U_0^R = E_t \sum_{\tau=0}^{\infty} \beta^\tau \left(\ln C_\tau(i) - \left(\frac{\kappa}{2}\right) (L_\tau^S(i))^2 \right)$. Accordingly, the total differentiation of this equation yields

$$dU_0^R = \hat{C} - \kappa(L_{0,ss}^S)^2 \hat{L}^S + \left(\frac{1}{\delta}\right) (\bar{C} - \kappa(L_{0,ss}^S)^2 \bar{L}^S). \quad (18)$$

Subtracting the relevant foreign welfare from equation (18) gives us the following equation for domestic relative welfare:

$$\begin{aligned} dU_0^R - dU_0^{R*} &= (\hat{C} - \hat{C}^*) - \tilde{\phi}\tilde{\sigma}(\hat{L}^S - \hat{L}^{*S}) + (1/\delta)(\bar{C} - \bar{C}^*) - (1/\delta)\tilde{\phi}\tilde{\sigma}(\bar{L}^S - \bar{L}^{*S}) \\ &= ((1 + \delta)/\delta)(\hat{C} - \hat{C}^*) - \tilde{\phi}\tilde{\sigma}[\hat{L}^S - \hat{L}^{*S} + (1/\delta)(\bar{L}^S - \bar{L}^{*S})], \end{aligned} \quad (19)$$

where $\tilde{\sigma} \equiv (\sigma - 1)/\sigma$, $\tilde{\phi} \equiv (\phi - 1)/\phi$, and

$$\hat{C} - \hat{C}^* = \bar{C} - \bar{C}^* = \left(\frac{\gamma_2}{2\delta\gamma_3 + \gamma_1 + \delta}\right) \bar{\phi}, \quad (20)$$

$$\begin{aligned} \hat{L}^S - \hat{L}^{*S} &= - \left[4\gamma((\phi - 1)/\phi)^{1/2} (\sigma - 1)/\sigma^{3/2} (1/\kappa)^{1/2} + \right. \\ &\quad \left. \sigma \right] \left(\frac{\gamma_2}{2\delta\gamma_3 + \gamma_1 + \delta}\right) \bar{\phi}, \end{aligned} \quad (21)$$

$$\bar{L}^S - \bar{L}^{*S} = \gamma_4 \left[(\phi - 1)^{-1} - \left(\frac{\gamma_2}{2\delta\gamma_3 + \gamma_1 + \delta}\right) \right] \bar{\phi}, \quad (22)$$

$$\gamma_4 = \left[\frac{\sigma + 4\gamma \left(\frac{\phi-1}{\phi}\right)^{\frac{1}{2}} \left(\frac{\sigma-1}{\sigma}\right)^{\frac{3}{2}} \left(\frac{1}{\kappa}\right)^{\frac{1}{2}}}{\sigma + 1 + 4\gamma \left(\frac{\phi-1}{\phi}\right)^{\frac{1}{2}} \left(\frac{\sigma-1}{\sigma}\right)^{\frac{3}{2}} \left(\frac{1}{\kappa}\right)^{\frac{1}{2}}} \right]. \quad (23)$$

Substituting equations (20), (21) and (22) into equation (19) gives the following result:

$$\begin{aligned} dU_0^R - dU_0^{R*} = & ((1 + \delta)/\delta) \left(\frac{\gamma_2}{2\delta\gamma_3 + \gamma_1 + \delta} \right) \bar{\phi} + \\ & \tilde{\phi}\tilde{\sigma} \left\{ \left[4\gamma \left((\phi-1)/\phi \right)^{1/2} \left((\sigma-1)/\sigma \right)^{3/2} (1/\kappa)^{1/2} + \sigma \right] \left(\frac{\gamma_2}{2\delta\gamma_3 + \gamma_1 + \delta} \right) + \right. \\ & \left. (1/\delta)\gamma_4 \left[\left(\frac{\gamma_2}{2\delta\gamma_3 + \gamma_1 + \delta} \right) - (\phi-1)^{-1} \right] \right\} \bar{\phi} \end{aligned} \quad (24)$$

The first term in equation (24) is always positive. However, the sign of the second term is uncertain. Therefore, the welfare effect of deregulating the domestic labour market is generally uncertain. As shown in equations (21) and (22), deregulating the domestic labour market increases the labour supply, which reduces the well-being of domestic households. However, when the elasticity of labour substitution is small, the positive scale of the first term becomes relatively larger. This results in a positive domestic relative welfare effect. Intuitively, this can be explained as follows: The smaller the elasticity of labour substitution, the greater the distortion-reducing effect and the greater the effect of increasing domestic consumption. This welfare effect suggests that labour market deregulation should be implemented in uncompetitive labour markets, even if it increases the labour supply.

7. Concluding remarks

In this paper, we expand the Redux model to include the international relocation of producers. Using a generalised model, we examined the impact of producer relocation on the responses of relative consumption and the exchange rate to labour market deregulation within the domestic economy. Our analysis revealed the following: i) Deregulation in the domestic labour market results in a proportional increase in relative domestic consumption and currency appreciation. ii) This then decreases (increases) the relative real profits of domestic (foreign) producers, consequently prompting relocation to foreign economies. iii) An increase in producer mobility weakens the effects of the deregulation shock on relative consumption and the exchange rate. iv) When labour substitution elasticity is low, deregulation of the domestic labour market improves domestic welfare.

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