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How an export boom affects unemployment ☆

Noel Gaston [a,b,*], Gulasekaran Rajaguru [a]

[a] Globalisation and Development Centre and School of Business, Bond University, Gold Coast, Queensland 4229, Australia
[b] Productivity Commission, Locked Bag 2, Collins Street East, Melbourne, Victoria 8003, Australia

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ABSTRACT

Does trade affect the equilibrium rate of unemployment? To answer this question, we propose a small open economy model that incorporates realistic features of labour markets. The model predicts that a sustained improvement in the terms of trade lowers unemployment. We test this prediction for the case of Australia, an economy that is subject to large terms of trade movements. We use a novel technique to estimate the structural model based on a combination of traditional econometric procedures and the calibration of time-varying parameters. Both reduced form and the structural estimates reveal strong evidence that higher export prices, capital accumulation in tradeable goods industries and lower unemployment benefits reduce the equilibrium unemployment rate.

1. Introduction

Understanding the way in which external economic conditions and globalisation affect domestic labour markets has been a major research endeavour of economists for decades. More recently, the slow pace of recovery from the effects of the global financial crisis (GFC) has further stimulated research on how trade affects unemployment. Four years after the onset of the GFC, the rate of unemployment in many OECD countries remains stubbornly high. Those countries with more resilient economies seem to be those which are "exporting their way to recovery". In particular, the resilience seems to have a lot to do with high trade exposure to a robust Chinese economy.

This paper examines how a country's unemployment rate is affected by the demand for its exports. We use a model of a small open economy with a perfectly (domestically) mobile factor and an immobile factor. Assuming the former to be labour implies that wages are equalised across sectors of the economy. Unemployment occurs due to labour market frictions. In the model, increases in the terms of trade as well as the capital stock in the export sector raise workers' wages (i.e., in all sectors of the economy) but, as we shall see, they also lower equilibrium unemployment. The theory is in the mould of models by Davidson et al. (1999), Helpman and Itskhoki (2010), Hoon (2001a, 2001b), Kee and Hoon (2005) and Moore and Ranjan (2005). These papers incorporate equilibrium unemployment into general equilibrium trade models to show how the unemployment rate is affected by international factors, including the terms of trade.[1]

Our paper is also related to the substantial 'Dutch disease' literature. In particular, Corden and Neary (1982) model the co-existence of a booming export sector and a declining or lagging import-competing sector (taken to be manufacturing industry for most developed economies). Here the traditional concern is that de-industrialisation occurs due to the loss of mobile factors of production to the booming sector.

In this paper, we study the following question: what is the impact of trade on labour market outcomes in a resource-rich developed economy which also has sizeable manufacturing and service sectors?

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* Corresponding author at: Productivity Commission, Locked Bag 2, Collins Street East, Melbourne, Victoria 8003, Australia.
E-mail address: noel.gaston@pc.gov.au (N. Gaston).

[1] In their review of research on trade and labour markets, Davidson and Matusz (2011) discuss how a variety of labour market frictions can be introduced into general equilibrium settings to generate unemployment. The prominent approaches are: implicit contract models, efficiency wage models, bargaining models and search or matching models. These models yield a wide variety of relationships between relative commodity prices and relative factor prices and between trade and unemployment. Unfortunately, the proliferation of models has not yielded a clearer picture as to whether greater trade openness is beneficial or detrimental to the equilibrium rate of unemployment.

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Australia experienced a sharp improvement in its terms of trade since 2000 with a concurrent decline in unemployment. There were, however, simultaneous changes in labour market institutions. So, we would like to know what the main determinants of unemployment are in this environment. To answer this question, one needs to take a stance on the source of unemployment. One source of unemployment is bargaining which drives wages above the market-clearing rate. Australia had near 50% unionisation in 1960 which fell secularly from 1980 onward. Another source is unemployment benefits which increase the reservation wage (but also insures workers). There has been a large variation in this variable over the past few decades as well. So, we outline and test a model that has all these ingredients. In particular, we present a two-sector model, which seems to be the approach adopted in the most recent literature, as well as a three-sector model, more in keeping with the Dutch disease literature.

According to Davidson and Matusz (2011), the empirical evidence on how trade affects the unemployment rate is virtually non-existent. In addition, what little empirical research does exist has contradictory findings. This paper aims to at least partially address this deficiency by estimating the effect of trade on unemployment using both reduced form and structural approaches. The estimation of the structural model is based on a novel combination of traditional econometric procedures and the calibration of time-varying parameters. Using data for Australia for the period 1960–2008, the estimates provide strong evidence that rising demand for exports and higher terms of trade reduce the unemployment rate. Capital accumulation in tradeable goods industries also reduces unemployment. The other major factor found to worsen unemployment is the level of unemployment benefits. In the next section, we outline the theory. Section 3 discusses the data, the econometric methodology and presents the model estimates. The last section concludes.

2. Theory of an economy with a booming export sector

2.1. The basic two-sector model

Assume that there are two-sectors, X and Y. The factors of production are labour and capital, L and K. X is assumed to be the export sector and Y is the import-competing sector. We assume that there are a large number of firms in both sectors of the economy and that bargaining takes place with firm-level unions. Nevertheless, workers are free to move between the sectors. On the other hand, capital is assumed to be sector-specific, we denote this fact by using overscores, i.e., $\overline{K}_X$ and $\overline{K}_Y$.

The production function for a firm in sector X is $x=x(k_x,l_x)$ and for a sector Y firm is $y=y(k_y,l_y)$. All firms are profit maximisers, with profit for a representative firm in each sector given by

$$\pi_x = px - wl_x - r_x k_x \quad \text{and} \quad \pi_y = y - wl_y - r_y k_y, \tag{1}$$

where w is the wage and r is the price of capital. Note that good Y is the numeraire and that the price of good Y is normalised to one; hereafter p is referred to as the terms of trade.

We consider an industry in which there is no strategic interaction between firms. Another critical assumption is that the industry market structure generates rents that are shared between firms and unions. In the following, we consider the case of a representative firm in sector X which bargains with a firm-level union over wage-employment contracts. For simplicity, consider the specification for union preferences popularised by McDonald and Solow (1981), where the union comprises m homogeneous workers, each endowed with one unit of labour time. Prior to actual wage and employment negotiations, a worker's expected utility is given by

$$EU = U(w) + (U(\omega) - U(w)) \max\left\{0, \frac{m-l}{m}\right\}, \tag{2}$$

where $U(.)$ is increasing and concave, w is the wage rate if employed and the reservation alternative is denoted by ω. When $l<m$, the set of contracts that maximises the Nash product is characterised by[2]

$$\frac{U(w)-U(\omega)}{U_w} = -\pi_l. \tag{3}$$

Since $U(\omega) \cong U(w) + (\omega - w)U_w(w)$, then $px_l = \omega$, i.e., labour is hired until its marginal revenue product equals the reservation wage. It is straightforward to show that the negotiated wage equals

$$w = \left(1 + \frac{\varphi(1-\eta)}{\eta}\right)\omega, \tag{4}$$

where $\varphi \in (0,1)$ indexes collective bargaining strength and $\eta = l\tilde{\pi}_l/\tilde{\pi} > 0$ is the elasticity of 'net profit'.[3] Most importantly, the negotiated wage is higher than the reservation wage. In fact, regardless of whether bargaining is efficient, or whether unions negotiate over wages alone, the wage is a multiple of the reservation wage.[4] It is noteworthy that this characteristic is not peculiar to bargaining models, per se. For example, in efficiency wage models firms pay workers a wage above the reservation wage in order to reduce turnover costs or to motivate worker effort (Blanchard and Katz, 1997). In matching models, the wage is also determined by bilateral Nash bargaining and splitting the total surplus from a job match. Specifically, workers receive a wage over and above the asset value of being unemployed (Mortensen and Pissarides, 1994). That is,

$$w = \lambda\omega, \quad \lambda > 1. \tag{5}$$

The crucial issue is what determines the reservation wage. Blanchflower et al. (1996, p.243) argue that it can be thought of as a function: $\omega = \omega(w_o, B, u)$, where w_o is the going wage in the other sector(s) of the economy, B ($<w_o$) is the level of income when unemployed (e.g., publicly-provided unemployment benefits) and u is the unemployment rate of the type of worker employed by the firm. According to Nickell and Layard (1999, pp. 3048-9), a reasonable case to consider is

$$\omega = uB + (1-u)w. \tag{6}$$

That is, the reservation wage depends on the wage that can be earned at other firms and the unemployment benefit. These amounts are weighted by the probability of remaining unemployed and the probability of finding another job. Without any worker heterogeneity, these are the economy-wide probabilities of unemployment and employment, respectively. Note that the rate of unemployment is $u = (\overline{L}-L)/\overline{L}$, with $\overline{L}$ the total supply of labour and L the total demand for labour in sectors X and Y.

2.2. The wage-setting curve

At a micro level, u is regarded as exogenous by the worker (and his union). Given that firms within each sector are identical and that every firm-specific union has the same objective function, the equilibrium of this economy entails $w_x = w_y = w$. Therefore, in equilibrium,

[2] An obvious implication of Eq. (2) is that if all union members are employed (i.e., $l \geq m$), then a union representing inside workers becomes completely 'wage-oriented' when it negotiates with the firm. Specifically, unlike the case in which m is so high that all workers have a probability of being unemployed equal to $(m-l)/m$, when m is low so that all union members are employed, the union is completely wage-oriented and maximises $mU(w)$. We consider this particular case in part A of the Appendix.

[3] Combining the first-order conditions yields: $w - \varphi(\tilde{\pi}/l) - (1-\varphi)\omega = 0$, where $\tilde{\pi} = \pi + wl$. Defining $\eta = l\tilde{\pi}_l/\tilde{\pi}$ and noting that $\tilde{\pi}_l = \omega$ yields Eq. (4). Second-order conditions require $\eta<1$.

[4] This is not a particularly novel insight, e.g., see McDonald (2002); see also part A of the Appendix.