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# The impact of trade on employment, welfare, and income distribution in unionized general oligopolistic equilibrium

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## ABSTRACT

This paper sets up a multi-sector general oligopolistic equilibrium trade model in which all firms face wage claims of firm-level unions. By accounting for productivity differences across industries, the model features income inequality along multiple lines, including inequality between firm owners and workers as well as within these two groups of agents, and involuntary unemployment. We use this setting to study the impact of trade liberalization on key macroeconomic performance measures. In particular, we show that a movement from autarky to free trade with a fully symmetric partner country lowers union wage claims and therefore stimulates employment and raises welfare. Whether firms can extract a larger share of rents in the open economy depends on the competitive environment in the product market. Furthermore, the distribution of profit income across firm owners remains unaffected, while the distribution of wage income becomes more equal when a country opens up to trade with a fully symmetric trading partner. We also analyze how country size differences and technological dissimilarity of trading partners affect the results from our analysis.

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## 1. Introduction

The distributional effects of international trade are of major concern to the general public and policy makers alike. The common fear is that market integration improves the outside opportunities of firm owners, and hence limits the possibility of workers to skim a fair share of the rents arising from economic activity (OECD, 2007). This issue has been prominently discussed in a large literature on union wage setting in an international oligopoly (see, e.g., Mezzetti and Dinopoulos, 1991; Naylor, 1998; Lommerud et al., 2003). However, by focussing on rent sharing at the firm or industry level in a partial equilibrium environment, this literature is not well equipped for analyzing the implications of trade on the economy-wide distribution of profit and wage income, an issue that is of primary interest for policy makers who are concerned about the impact of trade on inequality and social justice (Bernanke, 2007; OECD, 2007). Furthermore, by considering a competitive outside sector that absorbs all workers who do not find a job in unionized industries, existing studies in this literature ignore a key channel through which trade affects inequality, namely changes in the unemployment rate. When being

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interested in a comprehensive picture of inequality, this seems to be a major shortcoming, since even in countries that offer generous unemployment compensation those who do not find a job are at the lower tail of the income distribution, so that changes in the unemployment rate have serious distributional consequences.<sup>2</sup>

It is the aim of this paper to provide a detailed discussion of how opening up to trade affects rent sharing and thereby the economy-wide distribution of profit and wage income as well as involuntary unemployment. A prerequisite for studying these effects is a model in which firms can make pure profits in equilibrium, and considering a unionized oligopoly seems promising in this respect as it relates the results to a well-established literature on rent sharing in an international trade context. On the other hand, the model should allow for economy-wide effects, and hence we have to embed the unionized oligopoly into a general equilibrium framework. Neary's (2009) general oligopolistic equilibrium (GOLE) model seems to be a suitable framework for this purpose. With a continuum of industries, a small and exogenous number of symmetric firms within each sector, Cournot competition between these firms, and labor as the only factor of production, it captures in a theoretically convincing way the intuitively appealing idea that firms are large and have market power in their own industry, but at the same time are small in the aggregate (and thus can rationally ignore their impact on economy-wide variables), without relying on the common approach of introducing a competitive outside sector that rules out, by construction, any general equilibrium feedback effects of labor market adjustments. Assuming in the GOLE model that industries differ in their technology and that all producers are confronted with wage claims of firm-level unions, we get a tractable theoretical framework, in which the interaction of industry-specific factors and rent sharing between firms and unions generate income inequality along multiple lines.<sup>3</sup> In particular, the resulting framework features inter-group inequality between firm owners and workers as well as intra-group inequality within these two groups of agents, and, of course, involuntary unemployment.<sup>4</sup>

After introducing the main model ingredients, characterizing the closed economy equilibrium and shedding light on the role of unemployment compensation for aggregate employment, welfare and income distribution, we study in detail the consequences of a country's movement from autarky to free trade. To keep the analysis simple, we first look at trade between two fully symmetric countries, while the role of country asymmetries is addressed in an extension to this benchmark scenario. Thereby, we consider two forms of asymmetry, namely size and Ricardian technology differences. With respect to the role of country size differences, there is a presumption from previous work that trade effects are less pronounced in larger economies. We analyze whether such insights extend to a model in which both product and labor markets are imperfectly competitive. With respect to the role of Ricardian technology differences, we know from previous research that in an otherwise identical model with perfectly competitive goods and labor markets, trade leads to full specialization in the production of the two economies (see Dornbusch et al., 1977). This is no longer true if consumers are served by quantity-setting oligopolistically competitive producers. In this case, we can expect co-existence of domestic and foreign producers over a large subset of industries and, as pointed out by Neary (2009), either country's production even remains fully diversified in the open economy if the prevailing technology differences are not too large. This is the case we are focussing on in our paper, and we analyze within this full diversification framework how the insights from the benchmark model of identical countries have to be modified when allowing for technological dissimilarity.

As a first result of our analysis, we find that trade exerts a union-disciplining effect and thus reduces union wage claims, similar to a partial equilibrium setting (see Huizinga, 1993; Sørensen, 1993). The fall in union wage claims provides an employment stimulus which lowers involuntary unemployment and raises welfare. In the case of fully symmetric trading partners or countries that only differ in their market size, all firms are equally exposed to foreign competition despite prevailing differences in labor productivity across sectors, and the welfare stimulus arises from a proportional increase in output and thus consumption of all industrial goods. With Ricardian technology differences, the positive welfare effect is reinforced as countries (partially) specialize their production according to the law of comparative advantage, while employment declines in response to the relocation of economic activity. For high degrees of technological dissimilarity, this second-round employment reducing effect can be more pronounced than the initial employment stimulus of trade between symmetric countries, so that trade may aggravate the unemployment problem. However, this is not possible if technology differences are sufficiently small, so that trade between industrialized economies can be expected to have a positive employment effect—a result that seems to be well in line with empirical evidence (see Dutt et al., 2009; Felbermayr et al., 2011).

With respect to the outcome of rent sharing, we find that the average worker may gain or lose relative to the average firm owner, with the respective result depending crucially on the market power of producers. To be more specific, we

<sup>2</sup> Since getting unemployed is usually associated with a significant social decline it is not surprising that the risk of job loss is the main concern of workers, regarding the labor market implications of trade liberalization (see Scheve and Slaughter, 2001). In view of such observations, Davidson et al. (1999, p. 272) claim that "trade economists should begin to seriously consider environments in which unemployment is carefully modeled."

<sup>3</sup> There is clear supportive evidence for the idea that this interaction is indeed a key determinant of income inequality. For instance, see Dickens and Katz (1987), Krueger and Summers (1988), Katz and Summers (1989), and Grey (1993). More recent evidence is provided by Du Caju et al. (2010). Using the European Structure of Earning Survey, an internationally harmonized matched employer–employee data set, these authors document the existence and persistence of inter-industry wage differentials in European industries, and they conclude that these differentials are consistent with rent sharing.

<sup>4</sup> Our model is not the first one that introduces labor unions into a GOLE model along the lines of Neary (2009). Bastos and Kreickemeier (2009) use such a framework to show that general equilibrium feedback effects through labor market adjustments are important and that accounting for these feedback effects can change the impact of trade on wages in unionized industries in a qualitative way. However, Bastos and Kreickemeier (2009) assume that unions are only active in a subset of industries, so that involuntary unemployment does not materialize in their setting. Furthermore, they do not address the role of rent sharing for the economy-wide distribution of income, an issue that is in the center of this paper's interest.

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