



# Unions, innovation and cross-country wage inequality



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## ARTICLE INFO

### Article history:

Received 14 July 2015

Received in revised form

20 December 2015

Accepted 27 December 2015

Available online 18 January 2016

### JEL classification:

O30

O43

E24

J51

### Keywords:

Economic growth

R&D

Labor unions

Wage inequality

## ABSTRACT

This study explores the macroeconomic effects of labor unions in a two-country R&D-based growth model in which the market size of each country determines the incentives for innovation. We find that an increase in the bargaining power of a wage-oriented union leads to a decrease in employment in the domestic economy. This result has two important implications on innovation. First, it reduces the rates of innovation and economic growth. Second, it causes innovation to be directed to the foreign economy, which in turn causes a negative effect on domestic wages relative to foreign wages in the long run. We also derive welfare implications and calibrate our model to data in the US and the UK to quantify the effects of labor unions on social welfare and wage inequality across countries. Our calibrated model is able to explain about half of the decrease in relative wage between the US and the UK from 1980 to 2007. Furthermore, the decrease in unions' bargaining power leads to quantitatively significant welfare gains in the two countries.

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## 1. Introduction

This study explores the macroeconomic effects of labor unions in an open-economy R&D-based growth model. We consider a two-country model in which a labor union bargains with employers over wages and employment in each country and the market size of each country determines the incentives for innovation. Within this growth-theoretic framework, we find that an increase in the bargaining power of a wage-oriented union leads to a decrease in employment in the domestic economy. In contrast, an increase in the bargaining power of an employment-oriented union leads to an increase in employment. Empirical studies<sup>1</sup> often find that increasing the degree of unionization has a negative effect on employment, which is consistent with our result under a wage-oriented union. This result has two important implications on innovation. First, by decreasing employment, an increase in the bargaining power of a wage-oriented union reduces the rates of innovation and economic growth. This theoretical implication is consistent with empirical studies that find negative effects of unions on innovation and growth.<sup>2</sup> Second, by decreasing employment and the market size of the domestic economy, an

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<sup>1</sup> See for example Montgomery (1989), Blanchflower et al. (1991), Nickell and Layard (1999) and Krol and Svorny (2007).

<sup>2</sup> See for example Connolly et al. (1986), Hirsch and Link (1987), Acs and Audretsch (1988), Carmeci and Mauro (2003) and Bradley et al. (2016). In contrast, Schnabel and Wagner (1994) and Addison et al. (2001) find positive effects of unions on innovation and growth in Germany, which would be consistent with our results under an employment-oriented union.

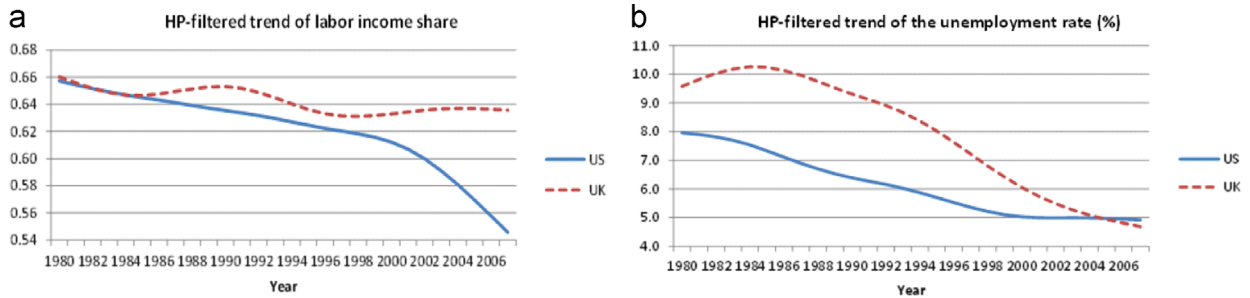


Fig. 1. HP-filter trends of labor income share and unemployment rate.

increase in the bargaining power of a wage-oriented union causes innovation to be directed to the foreign economy, which in turn causes a negative long-run effect on domestic wages relative to foreign wages. In the long run, this negative effect on relative wage income across countries would dominate the positive effect of labor unions on wages if the elasticity of substitution between domestic and foreign goods is sufficiently large. We also derive welfare implications and discuss them in the main text.

To provide an illustrative numerical analysis, we calibrate our model to data in the US and the UK. We consider the cross-country effects of labor unions between the US and the UK for the following reasons. We consider the US because it is the largest economy in the world. The largest trading partner of the US is the European Union. Within the European Union, the UK has a similar set of institutions that govern unionization and collective bargaining as the US. As Card et al. (2004) point out, “[a]s with other aspects of the economy, collective bargaining institutions in these countries are broadly similar... Thus it is possible to compare the structure of wages for workers whose wages are set by union contracts... A similar task is far more difficult in other countries including the major European countries...”.

Fig. 1a plots the HP-filter trends of labor income share of GDP from 1980 to 2007 in the US and the UK.<sup>3</sup> This figure shows a well-documented stylized fact that the labor share of income has gradually declined since the early 1980s. Fig. 1b plots the HP-filter trends of unemployment rates in the two countries.<sup>4</sup> This figure shows that unemployment has also gradually declined in these two countries until 2007.<sup>5</sup> We calibrate our model to compute the degree of unions’ wage orientation and the decrease in workers’ bargaining power that enable the model to replicate this simultaneous decrease in labor income share and unemployment in the two countries. We find that the degree of unions’ wage orientation must be stronger in the UK than in the US in order for the calibrated economies to match the data. We also explore the quantitative implications on social welfare and wage inequality across the two countries. Our calibrated model is able to explain about half of the decrease in relative wage between the US and the UK from 1980 to 2007. Furthermore, we find that both countries gain from the decrease in unions’ bargaining power, but the welfare improvement in the UK is greater than that in the US due to changes in relative wage income. Specifically, the welfare gains are equivalent to a permanent increase in consumption of 5.2% in the US and 8.1% in the UK.

This study relates to the literature on labor unions. Early studies in this literature focus on the formulation of labor unions’ objective function; see for example Oswald (1985) for a survey. We follow a common approach in the literature to specify a Stone–Geary union objective function over wages and employment. Pemberton (1988) provides a microeconomic foundation for this union objective function as “the outcome of an internal bargain between the leadership and membership” in a managerial union. Our study relates most closely to a recent branch of this literature that explores the effects of labor unions on innovation and economic growth. Palokangas (1996) is the seminal study in this branch of the literature. Subsequent studies, such as Palokangas (2000, 2004, 2005), Boone (2000) and Ji et al. (2016), also analyze the effects of labor unions in R&D-based growth models.<sup>6</sup> Palokangas (1996, 2000, 2004, 2005) finds that increasing the bargaining power of labor union serves to increase economic growth, whereas Boone (2000) finds that labor union dampens economic growth. Ji et al. (2016) find that labor union has both a negative growth effect via unemployment and a positive growth effect via endogenous market structure, and these two effects exactly offset each other leaving an overall neutral effect on growth. Our theoretical model is able to replicate (via an alternative mechanism) the above results that increasing the bargaining power of labor unions can have a positive effect on growth and innovation (under an employment-oriented union), a negative effect on growth and innovation (under a wage-oriented union) and a neutral effect on growth and innovation (when the union is neither wage nor employment oriented).<sup>7</sup> In addition to analyzing the effects of labor unions

<sup>3</sup> Data source: OECD Annual Indicators on Unit Labour Costs.

<sup>4</sup> Data source: US Bureau of Labor Statistics, and UK Office for National Statistics.

<sup>5</sup> We do not consider data after 2007 because of the financial crisis.

<sup>6</sup> See also Peretto (2011) who explores the interaction between the market power of unions in the labor market and the market power of firms in the product market.

<sup>7</sup> Chang et al. (2007) also find that unions’ wage orientation determines the effects of their bargaining power on economic growth, but they consider an AK-type growth model in which economic growth is driven by capital accumulation. Our study complements their interesting analysis by exploring the effects of labor unions in an open-economy R&D-based growth model.

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