Trade unions and regional development

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Abstract

We focus on the role that labour unions play in the context of a two-region dual economy. We show that (unskilled) unions will increase the wage of unskilled workers and depress growth in both the backward and the advanced regions. The growth effects will be felt more strongly in the relatively poor region. If skilled workers are allowed to migrate and unions recognize that a more aggressive wage-setting policy may foster migration, unions will moderate their wage requests. However, regional unions would then have a strong incentive to coordinate their wage demands across regions. This would further raise the unskilled wage, and more so in the backward region. We conclude that labour market policies designed to foster regional convergence should seek both to discourage centralized wage-setting and favour (skilled) labour mobility. © 1999 Elsevier Science B.V. All rights reserved.

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1. Introduction

The reduction of regional inequalities in Europe has been a recurring objective for policy-makers both at the national level—particularly in Italy, Spain and since 1989 in Germany—and at the European level. However, policy efforts to alleviate regional inequalities have met with mixed success. Recent analyses
However, as observed by a referee, explaining recent European trends exclusively on the basis of this approach may be difficult, since the EU 1992 program was mainly designed to reduce barriers to trade and factor mobility among nations— including the European Commission own evaluation of the internal market— show that inequalities among member states have been declining, but regional disparities within individual countries have been quite stubborn and, in some cases, have even been rising (EC, 1996; Puga, 1997). This pattern is somewhat surprising. There are indeed good reasons to presume that trade costs are lower and factor mobility greater within nations than among nations: traditional theory would then predict a faster rate of convergence in the former case. Moreover, the policy effort to alleviate regional inequalities has been relatively more determined at the national level, particularly in Italy and Germany.

One way to explain this puzzle is to reverse the predictions of standard economic theory and argue, in the spirit of the new economic geography, that the reduction in the barriers to trade and factor mobility may, under well-known circumstances (Krugman, 1991), foster regional inequalities. Centripetal forces therefore would be stronger among regions than among nations. In this paper, we take a different approach and emphasize differences in institutional constraints. We focus in particular on the role of trade unions. By setting a uniform national wage irrespective of local productivity conditions, trade unions are often alleged to depress labour demand particularly in backward regions and exacerbate unemployment differentials. The evidence reported in the next section appears to support this claim. Moreover, union activity, in particular the reliance on centralized wage-setting, may also slow down the process of regional convergence. At this stage, this is little more than a conjecture. It does bear however a noticeable implication. Suppose indeed that centralized wage-setting penalizes the growth prospects of relatively poor areas. Given that unions are typically unable to coordinate their wage requests across national borders, economic convergence would then be less likely to occur within a country than among countries.

The first objective of this paper is to assess the impact of union activity on regional growth. Our formal model draws on a small but rapidly growing literature focussing on the growth impact of labour market imperfections (Daveri and Tabellini, 1997; Sorensen, 1997; Bencivenga and Smith, 1997). We extend this literature to a regional context. We develop a simple model of regional development to show that (unskilled) regional unions will increase wages of unskilled workers and depress growth in both the backward and the advanced regions. We find that the growth effects of union wage requests will be felt more strongly in the relatively poor region, thereby supporting the claim that unions activity can account for the lack of economic convergence.

We also consider alternative wage-setting institutions, comparing in particular the impact of decentralized regional unions and of a national union. For this

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comparison to be meaningful, we need to assume that regional performances are not independent of each other. We capture interregional effects by introducing skilled labour migration among regions. We find that if migration decisions are not irreversible and if unions recognize that a more aggressive wage-setting policy may foster skilled workers migration and further depress the demand for unskilled labour, they will moderate their wage demands with a beneficial impact on growth. However, under these conditions, regional unions will also have a strong incentive to coordinate their wage requests across regions. This will further raise the unskilled wage, and more so in the backward region. We conclude that labour market policies designed to foster regional convergence should seek both to discourage centralized wage-setting and favour (skilled) labour mobility.

2. Trends in European regional inequality

Measuring income inequality and the trend toward convergence is a somewhat controversial matter (Barro and Sala-i-Martin, 1992; Quah, 1993). Yet, there are some clear indications that income dispersion among European countries, as measured by the coefficient of variation of EU member states income, fell steadily after 1986 (EC, 1996). The pattern is much less smooth if we focus on European regions: the coefficient of variation of income in EU regions declines somewhat from 1986 until 1990 but then rises substantially in the following three years. Alternative measures of inequality yield a similar picture. For instance, the gap between the ten richest and the ten poorest regions in the EU increased markedly during the eighties (SVIMEZ, 1996).

Overall, this pattern largely reflects the fact that growth in some of the relatively poor countries (in particular Portugal and Ireland) was substantially faster than the EU average, whereas other backward areas located in relatively prosperous countries lagged behind. The most striking case is that of Southern Italy, which lost considerable ground during the eighties with respect both to the EU and, even more markedly, to Northern Italy. Table 1 provides the basic facts.

Moreover, even lower income dispersion or faster growth in poorer regions did not often mean the end of regional dualism. For instance, income inequality among Spanish regions fell somewhat, but the dispersion of unemployment increased by a fourfold factor between 1970 and 1990 (Bentolila, 1997). In 1994, for instance, the unemployment rate in Andalusia was 18 percentage points larger than in Aragon. Similarly, the unemployment differential between Southern and Northern Italy soared from less than 2% in 1971 to more than 14% in 1996. The case of East Germany also deserves to be mentioned. Income convergence progressed quite rapidly until 1994 (partly in response to the dramatic income fall in 1990), but this came together with growing unemployment
differentials. Moreover, it appears that the speed of income convergence has declined sharply in the last two years.

Lack of (or slow) regional convergence and widening unemployment differentials have helped to shift the policy focus on the working of the labour markets. Trade union activity, in particular the setting of a common minimum wage at the national level, has been increasingly blamed for the mishaps of the backward regions. In Spain, the recently signed labour agreement envisages the possibility of regional wage contracts. In Germany and particularly in Italy the issue of regional wage differentials is still a highly controversial matter. In both countries, labour unions pressed for wage increases in the backward regions and were indeed quite successful in fostering a process of wage convergence. Consider the German case first. The relative wage in the East increased, relative to the West, from 0.30 in April 1990 to 0.47 one year later and 0.55 in April 1992. In absolute terms, the real wage in the East soared by 35% from 1990 to 1992. Rising labour costs took a toll on employment with the official unemployment rate surging from virtually zero in 1990 to 14.8% in 1992 (30%, if workers engaged in temporary work programs are included) and 12.9% in 1996. The Mezzogiorno experience was in many respects similar. In the sixties, Italian unions kept pushing for wage convergence independently of any productivity differentials.\(^2\) The final blow came in 1968 with a national agreement which led to the full abolition of all regional wage differentials (the so-called ‘gabbie salariali’). Unemployment rose quite rapidly even when compared to the rest of the country and has now reached more than 22% in the South against 8% in the North.

\(^2\) The motivations behind the wage push in the backward regions may have been different for the Italian unions compared to Germany. Sociologists typically argue that the quest for egalitarism was a major motivating factor of unions’ behaviour in Italy.
Finally, and more crucially for the purpose of this paper, wage unification may have come at the cost of income convergence. We have already seen how convergence slowed down quite markedly in the case of East Germany. The Italian Mezzogiorno provides a similar picture. The gap between Southern and Northern Italy fell considerably during the sixties. It remained pretty constant during the seventies, but then rose steadily in the following decade, wiping out and then reversing the previous gains. In the next section, we shall outline a model that seeks to account for these trends.

3. Trade unions and regional development: An illustration

3.1. The basic set-up

Following Marshall, we can distinguish three factors affecting the location of economic activity: (i) the exploitation of increasing returns to scale, (ii) the availability of specialized producer services, (iii) the availability of a large pool of skilled workers. The first element is at the core of Krugman’s (1991) analysis, while Faini (1984) focus on the role of (non-traded) producer services. In this paper, we focus on how the cost and the availability of skilled workers determine the regional allocation of production.

The basic set-up is quite simple. We consider a small open economy able to produce \( N \) final traded goods. Following much of the literature (Krugman and Venables, 1995; Bencivenga and Smith, 1997), we assume that one traded good – say agriculture – is produced with a constant returns to scale technology using unskilled labour only. For given world prices, the real wage is therefore fixed in terms of all traded goods. The production of the non-agricultural traded goods – say manufactures – is described by a linear homogeneous function of unskilled \((L)\) and skilled \((S)\) labour.

Let first consider the case where labour markets are perfectly competitive and unskilled wages are thus equalized across sectors. Factor prices are then fully determined by the competitive zero-profit conditions:

\[
P_{Mi} = C_{Mi}(W_{Mi}, \Omega), \quad P_A = C_A(W_A), \quad W_{Mi} = W_A, \quad (1)
\]

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3 The average annual growth rate in per capita GDP between 1980 and 1995 was equal to 1.8% in Northern Italy and to 1.2% in the Mezzogiorno (SVIMEZ, 1997).


5 Goods prices are therefore fixed by assumption: we thus abstract from all regional interactions that may arise from product markets and focus only on labour markets effects.

6 The system of equations (1) implicitly assumes that agricultural goods are produced in a positive quantity. This assumption is not essential to our model, as we shall argue below.
where $W_i$, $\Omega$ and $P_i$ denote, respectively, the unskilled wage in sector $i$, the skilled wage and the price of good $i$. Subscripts A and Mi stand for agriculture and the $i$th manufacture.

It is easy to check that in equilibrium only one manufactured good will be produced. Moreover, the zero-profit conditions in (1) implicitly define a negatively sloped factor price frontier between the skilled and the unskilled wages. This frontier will play a crucial role in the derivation of our results.

The same set-up with a few modifications also holds if labour markets are not fully competitive due to the presence of a manufacturing trade union. In this case, the wages in agriculture and in manufacturing will not be equalized. The agricultural wage will become the source of alternative income available to union members if they are not employed in manufacturing. Even if agricultural production is nil, and the competitive unskilled wage is thus determined by the zero-profit conditions in the manufacturing sectors, the agricultural wage will still represent the alternative wage for the (unskilled) trade union.\footnote{A different, and perhaps simpler, set-up would be to assume that the alternative wage is equal to the level of unemployment benefits. This approach would however require to endogenize the level of unemployment benefits and this would unduly complicate the model.}

Before assessing the impact of trade union activity, we need to put some more structure into the model. In particular, to get an analytical solution, we postulate a Cobb–Douglas functional form for the production of manufacturing:

$$Q_{Mi} = A_i L_i^\alpha S_i^{1-\alpha}$$

where $A_i$ and $Q_{Mi}$ denote total factor productivity and manufacturing output in sector $i$, and $L_i$ and $S_i$ are inputs of unskilled and labour respectively. In what follows, we drop the subscript $i$ since only one manufacturing good is produced in equilibrium.

Equilibrium can then be derived as follows. Let assume that the total availability of skilled labour is fixed at each point of time. We know that, for a given unskilled wage, the zero-profit conditions for the traded goods sectors will determine the wage of skilled workers. Moreover, competitive manufacturing producers will equate the marginal productivity value of $L_i$ and $S_i$ to $W_i$ and $\Omega$, respectively. Given the Cobb–Douglas functional form, we have that

$$W_M L = \alpha Q_M, \quad \Omega S = (1 - \alpha)Q_M$$

where the price of manufacturing goods has been normalized to one. Substituting the first-order condition for unskilled labour in Eq. (2), we find that

\footnote{The result that wage-setting above competitive market levels leads to specialization is known since the seminal work of Brecher (1974).}
It is easy to show that GDP growth is a function of the rate of increase of skilled labour. Simple calculations show that GDP growth is equal to
\[ a \cdot \tau \cdot A^{1/(1 - \tau)} S = BS. \] (4)

Clearly, manufacturing and GDP growth will depend on the speed at which the economy is able to accumulate skills.

We can also derive the equilibrium wage of skilled workers. Recalling the first-order condition \( \Omega S = (1 - \tau) Q_M = (1 - \tau) BS \), we see that \( \Omega = (1 - \tau) B \). The skilled wage will therefore be a function of both technology and the unskilled wage. Recalling the expression for \( B \) from Eq. (4), we see that the elasticity of \( \Omega \) with respect to the unskilled wage is negative, as claimed earlier, and equal to \(- \tau/(1 - \tau)\).

3.2. The acquisition of skills

We consider a simple framework where agents are assumed to live one period. Skilled workers are assumed to account for a fixed share, \( \sigma \), of the regional population. Even with a fixed \( \sigma \), however, the amount of skills in the economy can vary if (skilled) agents are allowed to choose their skills. In our set-up, agents choose – right at their birth – their skills so as to maximize the utility of consumption. The acquisition of skills is however subject to a convex cost function, which we take to be quadratic, \( \gamma/2 \left( E^2/E - 1 \right) \), where \( E \) denotes individual skills. In words, if agents come from a highly skilled background (i.e. with a high endowment of skills at time \( t - 1 \)), acquiring skills will be less costly. The parameter \( \gamma \) represents the marginal resource cost of education. In equilibrium, we have that \( E = \Omega E_{-1}/\gamma \). In this set-up, therefore the growth rate of skills is a linear function of the skilled wage and is inversely related to the resource cost of education \( \gamma \).

At an aggregate level, the total amount of skills is equal to the amount of skills that each (skilled) individual owns multiplied by the number of skilled workers. If we normalize the regional population to one, then total skills \( S \)
are equal to
\[ S = \sigma E = \sigma \Omega E_{-1}^{\gamma} = \Omega S_{-1}^{\gamma}. \] (5)

From Eq. (4) we know that manufacturing output growth \((g_M)\) will depend on the rate of skills accumulation. Taking logs in Eq. (5) and substituting Eq. (4), we find that
\[ g_M \approx \ln S - \ln S_{-1} = \ln \Omega - \ln \gamma. \] (6)

In this simple set-up, regional growth is a function of the ratio between the skilled wage and the cost of education, \(\gamma\). Had we assumed that the cost of education depends on the unskilled wage, then regional growth would have been negatively related to the unskilled wage as well.

### 3.3. The role of trade unions

We can now assess the impact of union activity on both the level and the growth of output. Consider a simple two-region model (say North and South). Growth in each region is described by Eq. (6). Throughout, we focus on the monopoly union model,\(^{12}\) where the unions set the wage and the firm chooses employment. We make the following assumptions. First, unions operate only in the manufacturing sector where they set the wage of unskilled workers.\(^{13}\) Second, membership in region \(i\) (where \(i = N, S\)) is fixed and equal to \(M^i\). Third, the utility of a representative member is equal to \(U(W^i_M)\) if employed and to \(U(W^i)\) if unemployed, where \(W^i_M\) and \(W^i\) denote, respectively, the wage set by the union and the value of alternative opportunities in region \(i\).\(^{14}\) Finally, trade union behaviour is constrained by the firm’s labour demand function in Eq. (3).

We embed these assumptions in different institutional set-ups. Our reference case focusses on regional labour unions, where each union sets the regional wage taking the behaviour of the other union as given. We will also consider the case

\[ \text{\footnotesize \textsuperscript{12}The modelling of trade union behaviour is a somewhat controversial issue in the literature. It is still a matter of debate whether labour unions are adequately described as attempting to maximize a well-defined objective function, as argued for instance by Dunlop (1944). Empirical support in this respect comes from the Pencavel (1984a,b) and Dertouzos and Pencavel (1981). On the other hand, according to Ross (1948), an adequate understanding of labour union behaviour needs to take into account their political nature; the consideration of the political process which underlies union’s decision-making should be made explicit. In this paper, we take a fairly traditional stance and assume that trade unions aim at maximizing the expected welfare of their (representative) member.}
\]

\[ \text{\footnotesize \textsuperscript{13}There is indeed considerable evidence that union coverage is relatively higher in the manufacturing sector. See for instance OECD (1994).}
\]

\[ \text{\footnotesize \textsuperscript{14}Recall from our earlier discussion that the value of } W^i \text{ is determined either by the fixed value of unemployment benefits or by the agricultural wage.} \]
where one national union operates in both regions, either acting as a discriminating monopolist or setting the wage at a common level for both areas.

Formally, the objective function in the case of a regional union can be written as

\[ U(W^i_M)L^i + U(W^i)(M^i - L'), \quad i = N, S. \]  

(7)

For a national union that acts as a discriminating monopolist, the objective function becomes

\[ \sum_{i=N,S} \{U(W^i_M)L^i + U(W^i)(M^i - L')\}. \]  

(8)

Clearly, in none of these frameworks will interregional considerations play any role. Denoting the elasticity of labour demand as \( \eta^i \), the wage in region \( i \) will be determined for both a national and a regional union by the following expression:

\[ \frac{U(W^i_M) - U(W^i)}{W^i_M U'(W^i_M)} = \frac{1}{\eta^i}, \]  

(9)

and will not depend therefore on economic conditions in the other region.

We can apply Eq. (9) to our set-up. Suppose that unions fully consider the general equilibrium implications of raising the unskilled wage, but take the stock of skills as given. It can then be shown that the (absolute) elasticity of unskilled labour demand with respect to the wage will be \( 1/(1 - \alpha) \).\(^1\) If we postulate a logarithmic utility function, we find that

\[ \ln W^i_M - \ln W^i = 1 - \alpha. \]  

(10)

Union activity will boost the unskilled wage, with a negative impact on the demand for unskilled workers. This is not the end of the story, however. In addition to the direct effect of the wage on unskilled labour demand, there is also an indirect effect working through the skilled wage and the supply of skills. This can be seen as follows. At each point of time, the skilled wage is equal to \( \Omega = (1 - \alpha)B \). The increase in the unskilled wage will lead to a fall of \( B \) and thus depress the skilled wage. From Eq. (4), we see that the elasticity of \( \Omega \) with respect to \( W_M \) is equal to \( -\alpha/(1 - \alpha) \). The fall in \( \Omega \) will then lead to a lower stock of skills (see Eq. (5)), with a unit elasticity. The decline in \( S \) will in turn depress manufacturing output (through Eq. (4)) and the demand for unskilled workers, again with a unitary elasticity.

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\(^1\) With a Cobb-Douglas (the log of) labour demand is equal to \( \ln z + \ln Q_M - \ln W_M \) (see Eq. (3)). Using Eq. (4) we then see that the elasticity of labour demand with respect to the wage is equal to \( \partial \ln Q_M/\partial \ln W_M - 1 = -\alpha/(1 - \alpha) - 1 = -1/(1 - \alpha) \) as claimed.
This would occur for instance if the skilled-intensive manufacturing sector requires a non-traded intermediate input and the North is relatively more efficient at producing such input. See Faini (1984) for a model where productivity differentials in the production of non-traded inputs can arise endogenously.

Unions could try to take into account the indirect effect of an increase in the unskilled wage on the accumulation of skills and thereby on the demand for unskilled labour. Formally, this would be equivalent to assume that the unions recognize that the ‘true’ wage elasticity of labour demand is \(1/(1 - \alpha) + \alpha/(1 - \alpha)\), rather than just \(1/(1 - \alpha)\), when the stock of skills is taken as given. The higher wage elasticity of labour demand would in turn moderate union demand for higher wages. Unions however face a basic time-consistency problem. They can promise wage moderation before agents accumulate skills, but would have an incentive to raise wages afterwards (Van der Ploeg, 1987). If unions are unable to pre-commit to their wage policies, then the time consistent solution of wages will be that described by Eq. (10).

Overall, union activity will have therefore several effects. First, it will foster the substitution away from unskilled labour through standard channels. Second, it will lower output, both by increasing the unskilled wage and by lowering the incentive for skill accumulation. Third, it will depress growth because of its negative impact on the skilled wage.

4. Regional asymmetries and the growth impact of trade unions

4.1. North–South model

We have so far assumed the two regions to be fully symmetric. Clearly, regional wages and regional growth will differ if the elasticity of labour demand or the value of alternative employment opportunities vary across regions. In this section, we assess the implications of an asymmetric set-up, where the two regions differ in some basic characteristics. We take a Ricardian approach and postulate that producers in the two regions face different technologies.

Let suppose for concreteness that there are two manufacturing traded goods (say 1 and 2) and that good 2 is relatively skilled labour intensive. We assume that the North is more efficient at producing skilled-intensive manufactured goods,\(^{16}\) namely that \(A^N_2 > A^S_2\) (where \(A^i_k\) denotes total factor productivity in sector \(k\) in region \(i\)). The two regions are however endowed with the same technology for producing good 1 and the agricultural good. With a constant unskilled wage, each region will specialize in the production of just one manufacturing good. Moreover, assuming that the pattern of specialization in the two regions is not the same, the North will specialize in the skilled intensive good.

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\(^{16}\) This would occur for instance if the skilled-intensive manufacturing sector requires a non-traded intermediate input and the North is relatively more efficient at producing such input. See Faini (1984) for a model where productivity differentials in the production of non-traded inputs can arise endogenously.
(good 2), while the South will produce only good 1. The North will then enjoy a higher skilled wage\(^{17}\) and as a result will also grow faster.\(^{18}\)

Finally, differences in the pattern of specialization also imply a different impact of trade unions activity on regional growth. Given that the North is specialized in the skill-intensive sector, the wage elasticity of labour demand will be lower in that region. This will increase the market power of Northern unions and lead to a higher unskilled wage in the North. Apparently, the North should suffer more from union activity. However, the increase in \(W_M\) will also (negatively) affect the wage of skilled workers. Furthermore, because of the different pattern of specialization, the skilled wage will fall more in the South than in the North.\(^{19}\) Intuitively, the increase in the unskilled wage will have a more pervasive impact in the region that specializes in the unskilled labour intensive good. The more pronounced decline in the skilled wage in the South imply that growth will fall more in the South than in the North (see Eq. (6)).\(^{20}\) Even the initial drop in the level of output will be more marked in the South.\(^{21}\)

### 4.2. Introducing migrations

One crucial shortcoming of the previous set-up is that workers are fully tied to their initial location. However, differences in wage rates and employment opportunities may prompt some workers to migrate. In what follows, we assume

\[^{17}\text{Each region will specialize in the good that yields a higher skilled wage. For a given pattern of specialization, the skilled wage in region } i \text{ is equal to:}\]

\[\Omega_i = (A_i^1)^{1-x} \left( \frac{x}{W_M^i} \right)^{x(1-x)} (1-x), \quad i = N, S\]

The skilled wage would be the same in the two regions only if both areas specialized in good 1 (since \(A_N^1 = A_S^1\) by assumption). Clearly, if the North can generate a higher \(\Omega\) by specializing in good 2, it will then have a higher skilled wage than in the South, even if the South also specializes in good 2 (since \(A_N^2 < A_S^2\)).

\[^{18}\text{Notice though that this non-convergence result depends crucially on the way we specify both the skill-acquisition cost function and the technological gap between the two regions. Suppose for instance that we assume that the North has a technological superiority also in the production of the agricultural good. The unskilled wage will then be higher in the North. If the cost of education also depends (negatively, see footnote 11) on the unskilled wage, it could then well be that the net return to education is now higher in the South. The South would then enjoy a faster rate of growth.}\]

\[^{19}\text{The percentage fall in } \Omega \text{ is equal to the percentage increase in the unskilled wage } (1-x, \text{ from Eq. (10)}) \text{ multiplied by } x/(1-x). \text{ Clearly, } \Omega \text{ will fall more in the high } x \text{ region.}\]

\[^{20}\text{Had we assumed that the cost of accumulating skills is a function of the unskilled wage (see footnote 11), then the fall in growth rates would have been the same in the two regions.}\]

\[^{21}\text{From Eq. (4) and the expression for } S:\]

\[\Delta \ln Q_M = - x/(1-x) \Delta \ln W_M + \Delta \ln \Omega = - (z + x)/(1-z) \Delta \ln W_M = - 2x\]

where \(\Delta\) denotes a difference operator.
that unskilled workers do not migrate, say either because unskilled wages do not differ or, in the case they do differ, because of financing constraints (see Lopez and Schiff (1998) on this issue). Skilled workers on the contrary can migrate, but are reluctant to do so to the extent that they value more consuming in their home location. We model this home bias in locational preferences by assuming that skilled workers utility increases by a factor \(\ln \theta\) (with \(\theta \geq 1\)), when they reside in their own region. For concreteness, we only consider the case where Southern workers migrate. Migration will occur if \(\Omega^N \geq \ln \theta + \ln \Omega^S\), i.e. if

\[
\Omega^N \geq \theta \Omega^S. \tag{11}
\]

We assume that the parameter \(\theta\) is distributed among Southern born agents according to a Pareto distribution,\(^{22}\) with \(\theta \in (x_0, +\infty)\) and \(x_0 = 1.\(^{23}\) The share of Southern skilled workers that will not migrate (\(\mu\)) will then be equal to

\[
\mu = \text{prob}\left(\theta \geq \frac{\Omega^N}{\Omega^S}\right) = x_0 \left(\frac{\Omega^S}{\Omega^N}\right)^\varepsilon. \tag{12}
\]

The parameter \(\varepsilon\) can be taken as an indicator of labour mobility. An increase in \(\varepsilon\) is associated both to a decline in the average value of \(\theta\) (i.e. the preference bias toward the home location) and a reduction in \(\mu.\(^{24}\)

We can now assess the implications of skilled migration on growth. Having normalized the population in each region to one, the number of skilled workers in the South is equal to \(\mu \sigma\), where \(\sigma\) denotes the population share of skilled workers. Plugging Eq. (12) in Eq. (4) and taking logs shows that

\[
q^S_M = \ln Q^S_M = \ln B^S + \ln \mu + \ln \sigma + \ln E^S
\]

\[
= - \frac{\chi^S}{1 - \chi^S} w^S_M + \varepsilon(\omega^S - \omega^N) + \ln \sigma + \omega^S - \ln \gamma + \ln E^S_{-1} \tag{13}
\]

where lower-case letters are used to denote logarithms and irrelevant constants have been omitted. Regarding the North, the stock of skilled workers will be identically equal to \((1 + 1 - \mu) \sigma\), namely the sum of Northern skilled workers and of skilled migrants from the South. Northern output will therefore be equal to

\[
q^N_M = \ln B^N + \ln(1 + 1 - \mu) + \ln \sigma + \ln E^N
\]

\[
= - \frac{\chi^N}{1 - \chi^N} w^N_M + \varepsilon(\omega^N - \omega^S) + \ln \sigma + \omega^N - \ln \gamma + \ln E^N_{-1} \tag{14}
\]

where we have repeatedly used the approximation \(\ln(1 + x) \approx x.\)

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\(^{22}\) The Pareto density function is \(\varepsilon x_0^\varepsilon/\theta^{\varepsilon+1}.\)

\(^{23}\) This is equivalent to assume that no agent in the local population has a preference for living in the other region.

\(^{24}\) See Faini (1996) for details.
Consider union policy. Once again, unions are assumed not to be able to pre-commit their wage policy with respect to the accumulation of skills. Regarding migration, we can make two alternative hypotheses. First, we could suppose that the location decisions are irreversible and are taken before unions set the wage. Anticipating union behaviour, skilled workers would then migrate in large numbers, with a negative effect on regional output.

Alternatively, we could assume that migration decisions are not irreversible or, perhaps less plausibly, that unions can precommit their wage policy before the locational choice of skilled workers. Introducing skilled labour migration would then definitely affect the wage elasticity of unskilled labour demand. Recall that with a Cobb–Douglas specification, labour demand in say the South is equal to \( l^S = q^S_M - w^S_M \) with \( q^S_M \) determined by Eq. (13). A regional union would allow for the fact that a (proportional) increase in the unskilled wage would depress the skilled wage in their home region by \( \alpha_i/(1 - \alpha_i) \), foster the migration of skilled workers and in the end further depress the demand for unskilled workers. Formally, the elasticity of labour demand would be equal to

\[
\eta^i = - \frac{\alpha^i}{1 - \alpha^i} - \varepsilon \frac{\alpha^i}{1 - \alpha^i} - 1 = - \frac{1 + \varepsilon \alpha^i}{1 - \alpha^i} 
\]  

where the first term measures the output effect of a higher \( W_M \) for given skills, the second term captures the effect on output stemming from the migration of skilled workers while the last term allows for the substitution effects.\(^{25}\)

For a regional union, therefore, the elasticity of labour demand will be equal to \( (1 + \varepsilon \alpha^i)/(1 - \alpha^i) \) which is larger than its (absolute) value with no migration, \( 1/(1 - \alpha^i) \). The possibility of skilled workers migration makes labour demand more elastic and reduces the monopoly power of trade unions, resulting in lower regional wages. Using Eq. (10), we see that the proportional increase in the unskilled wage will be equal to \( (1 - \alpha^i)/(1 + \varepsilon \alpha^i) \). Therefore, the higher is mobility (as measured by the parameter \( \varepsilon \)), the lower will be the increase in the unskilled wage.

The growth and output impact of union activity can now be easily determined. Consider again Eqs. (13) and (14). At first sight, the impact on output is ambiguous given that unskilled wages increase in both regions. Some simple algebra shows however that output will fall in both regions. Moreover, output will decline more in the backward region. Growth effects will also be significant. From Eq. (6), we know that growth is linearly related to the skilled wage. Moreover, the proportional fall of the skilled wage is equal to

\[
\Delta \omega^i = - \frac{\alpha^i}{1 - \alpha^i} \Delta w^M = - \frac{\alpha^i}{1 + \varepsilon \alpha^i} 
\]  

Eq. (15) is derived under the assumption that unions cannot precommit to their wage policies with respect to the accumulation of skills. As a result, unions take as given the (pre-migration) stock of skills.
where $\Delta$ denotes a difference operator. Eq. (16) highlights two facts. First, the higher is mobility, the lower the fall in the growth rate. Second, growth will fall more in the South, namely in the high $\alpha$ region.

So far, we have considered a simple institutional set-up where each regional union sets the unskilled wage in its region taking the wage in the other region as given. This did not matter when interregional effects were absent. However, as Eqs. (13) and (14) show, with skilled labour migration output and labour demand in one region are also a function of the wage in the other region. For instance, an increase in the (unskilled) wage in region $i$ will depress the skilled wage in that region, lead to more migration of skilled workers and boost labour demand in the other region. The demand for labour in one region substitutes, therefore, the demand for labour in the other region.

The presence of interregional effects makes the comparison of different institutional frameworks more interesting. The substitutability between labour demands in the two regions provides an incentive for the creation of a centralized (national) union (Horn and Wolinsky, 1988). A national union would indeed internalize the fact that raising the wage in one region will boost labour demand in the other region. It would act, therefore, as a multiproduct monopolist who sets the price of two substitutable commodities. It is well-known that, under such circumstances, the monopolist will set its prices higher than a single product monopolist. Compared to a regional union, therefore, a national union will have an incentive to raise the wage in both regions. The negative output and growth effects of union activity will be as a result more pronounced.

A national union may also affect the process of regional convergence. This can be seen as follows. The positive externality of increasing the wage in region $i$ on the labour demand in region $j$ is proportional to the cross-wage elasticity of labour demand in region $j$ and to the relative size of the wage bill in region $j$.\footnote{See Tirole (1989, p. 70) for a formal derivation.} In our set-up, the elasticity of labour demand with respect to the other region’s wage is constant and equal in the two regions (Eqs. (13) and (14)). However, the wage bill is larger in the North because of its more developed manufacturing base. The externality from raising the wage in the South is therefore larger than the externality from raising the wage in the North. Most likely, therefore, a national union will raise the unskilled wage more in the South than in the North. The concern that centralized wage-setting may lead to a stronger wage push in the South than in the North and thus jeopardize the process of regional convergence appears well founded.

Finally, a national union may feel compelled, say for egalitarian reasons or for preserving its internal cohesion, to set a common wage across regions. At an optimum, the national wage will be equal to an average of the regional wages.
set by a discriminating monopolistic union. Yet, with wage discrimination, unskilled wages were higher in the North than in the South. Moving to a common national wage would then imply a fall in the Northern wage and a further rise in the Southern wage, compounding once more the growth and the output effect of union activity in the backward region.

5. Endogeneizing the occupational choice

We now consider the individual agent’s choice between remaining unskilled, and earn the unskilled wage,\(^{27}\) or becoming skilled and earn the wage \(\Omega\). Compared to Section 3, we model therefore both the decision to become skilled and the amount of skill accumulation. We follow a simple approach where the ‘basic’ cost of education, namely the cost of becoming skilled, is proportional to the skilled wage. Formally, the wage net of education costs is taken to be equal to \(\Omega_i/\phi\), where \(\phi > 1\). We also assume that educational costs are different across individuals and are a linear function of their utility parameter, i.e., \(\phi = C\theta\), where \(C\) is a positive constant. This formulation seeks to capture the fact that individuals who have a stronger preference for their home location and a more pronounced aversion toward migration are also those for which becoming skilled may be more costly. Agents face three possibilities, namely (i) to remain unskilled, (ii) to become skilled and stay in their home region, (iii) to become skilled and migrate. The indirect utilities from these three possibilities are proportional to \(h_{WS}/\theta\), \(\Omega_S/\phi\) and \(\Omega_N/\phi\), respectively. Again, for concreteness, we only consider the case where agents migrate from the backward region in the South.

Agents will choose to become skilled and remain in the South if the two following conditions hold: (a) \((\Omega_S/\phi) > (\Omega_N/\phi)\), and (b) \((\theta\Omega_S/\phi) > (\theta W_S)\), namely if their utility from doing so is higher than if they had migrated to the North (condition (a)) or they had remained unskilled (condition (b)). Similarly, agents will become skilled and migrate if (a) \((\Omega_S/\phi) > (\theta\Omega_N/\phi)\), and (b) \((\Omega_N/\phi) > (\theta W_S)\). These conditions define different ranges of \(\theta\) over which agents will make a given choice. There are various orderings depending on the values of \(W_S, \Omega_S\) and \(\Omega_N\). It can be shown however that the only ordering consistent with an interior solution requires that those agents for which \(\theta < (\Omega_N/\Omega_S)\) become skilled and migrate, whereas those agents for which \(\theta > (\Omega_S/CW_S)\) remain unskilled. For intermediate values of \(\theta\) agents will become skilled but will not migrate.

\(^{27}\)For the sake of precision, unskilled agents would earn the union wage \(W_M\) if employed in manufacturing and the alternative wage \(W\) otherwise.
Under our distributional assumptions, therefore, the share of agents that become skilled and migrate will be equal to

\[ (1 - \mu)\sigma = \text{prob} \left( \theta \leq \frac{\Omega^N}{\Omega^S} \right) = \int_1^{\mu^S: \mu^S} \frac{e^{\theta} e^{\theta+1}}{\theta^{e+1}} d\theta = 1 - \left( \frac{\Omega^S}{\Omega^N} \right)^e \]  

(17)

while the share of those that become skilled and remain in the South will be

\[ \mu\sigma = \text{prob} \left( \frac{\Omega^N}{\Omega^S} \leq \theta \leq \frac{\Omega^S}{CW^S} \right) = \left( \frac{\Omega^S}{\Omega^N} \right)^e - \left( \frac{CW^S}{\Omega^S} \right)^e. \]  

(18)

Eqs. (17) and (18) show the same qualitative results found in the earlier section. The amount of skilled workers in the South is an increasing function of the skilled wage there and a negative function of both the skilled wage in the North and the unskilled wage in the South. Compared to Section 3, though, Eq. (17) and Eq. (18) point to a further channel through which unions can affect the output and the growth performance of a regional economy. In addition to affecting the accumulation of skills and the locational choice of skilled workers, unions can also influence the choice of becoming skilled. This points to a rich menu of effects of union wage policy on regional labour demand. Traditional econometric analyses that focus on the estimation of standard substitution effects are most likely to miss most of these channels and underestimate the impact of union activity on the regional economy.

6. Conclusions

We have shown with the help of a simple model that trade union activity can have a marked effect on regional growth and the process of regional convergence. We have also seen that the impact of trade unions will largely depend on institutional and economic factors. In particular, allowing for skilled workers migration has a major effect on our results. If migration decisions are irreversible and if the union is unable to precommit its wage policy, then the time-consistent solution for wages will be the same with and without migration. In the former case, though, its impact on the backward region will be more damaging.

When migration decisions are not irreversible, the picture becomes more complex. On the one hand, the fear of fostering migration may prompt a regional union to moderate its wage requests. However, once the possibility of skilled labour migration is allowed for, trade unions will have an incentive to coordinate their wage requests. Under plausible conditions, this would lead to a relatively larger increase of the wage in the backward region and jeopardize the convergence process. This effect will be even stronger if unions feel compelled to follow egalitarian policies. Overall, centralized unions are likely to be
relatively more damaging to the backward region. This may explain why convergence has often proceeded at slower pace within countries than among countries.

The emphasis in this paper has been on regional interactions that arise through labour markets and factor mobility effects. We have therefore implicitly neglected all those interactions that work through product markets. As shown by the endogenous growth literature, trade patterns can definitely affect the growth performance of trading economies. Future research should focus on the joint role of trade and factor mobility patterns in shaping regional economic performance.

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