Wage and employment effects of a wage norm : The Polish transition experience

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by Alain de Crombrugghe and Gregory de Walque

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Abstract

Most transition countries used tax-supported wage norms in the early 1990's, as a part of their market liberalization programs. This paper analyses how a firm-level tax (or subsidy) on deviations from a pre-set wage norm may promote employment by rotating the labor demand curve perceived by the workers' union around the value of the norm. We derive the conditions such that it yields a positive employment effect. We test the effect of the norm on the wages on a sample of Polish firms in 1990 and 1991. The data support the role of the wage norm on the position of the perceived labor demand and the role of the tax rate on its slope.

Key Words: transition economies, labor market, unions, excess wage tax, employment.

JEL Classification: H23, J23, J5, P31.

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1 Introduction

In imperfectly competitive markets, wages and prices can be set according to the market power of participants. The efficiency cost and the redistribution effects are not always those desired by the government or by society. In transition economies, the inheritance from central planning made market power a central issue; competition could not be taken for granted. Moreover, the redefinition of property rights and the liberalization of wages and prices could affect the objectives and the bargaining power of employers, employees and consumers drastically. A specific problem with wage liberalization in state firms could be the decapitalization of the firm by the workers. In transition economies inheriting no unemployment, layoffs were bound to increase due to reallocation needs across firms in transition, but market power of firms on the goods market and of unions on the labor market could make unemployment needlessly high.

In this context, and out of fear for excessive wage increases, most transition economies introduced some form of wage norm, usually at the firm-level, and enforced it trough taxes on the part of the wage bill or of the average wage which exceeded the norm (Coricelli and Revenga, 1992). Before the major transition of the 1990's, Hungary pioneered the system with its first market reforms in 1968 (Adam, 1974) and Poland followed (Rutkowski, 1994). Poland made heavy use of an excess wage tax in 1990 and 1991. There, in 1990, the norm and the tax were based on the wage bill of each firm, in an environment starting with officially no unemployment. In 1991, Poland switched to the average wage of each firm as the reference. Between 1992 and 1994, it slowly dismantled the system, while many observers estimate that firms and unions adjusted quite fast to the new market system.[1] In Eastern Germany, after reunification, wages were raised in an attempt to accelerate convergence between East and West. There, Akerlof, Rose, Yellen and Hessenius (1991) suggested a wage subsidy to help firms cope with this wage shock as long as productivity had not recovered.

In this paper, we extend the literature on wage setting and excess-wage taxation in a transition economy by looking more specifically at the labor-demand effects of a tax-enforced wage norm at the level of the firm, as it was implemented in Poland in 1990 and 1991. We show that the tax affects the labor demand perceived by the unions and display the condition such that it increases equilibrium employment at the level of the firm in the right-to-manage bargaining model. We also prove that in the efficient bargaining model, the mechanism can only lead to an employment increase if the tax may be turned into a subsidy.

Section 2 reviews historical attempts to define and implement excess wage taxes or wage growth taxes and discusses the related literature. Section 3 defines the tax and the wage norm and shows how the tax-enforced wage norm affects the labor demand perceived by the union. Section 4 analyzes the tax mechanism under different wage and labor bargaining models. It

[1] Basu, Estrin and Svejnar (1997) point to the role of market variables in labor demand equations and the insignificant or low effect of lagged values. Grosfeld and Nivet (1999) find a market-like wage equation but note insider power in the appropriation of productivity gains. Pinto, Belka and Krajewski (1993) insist on the forward looking behavior of managers preparing for privatization and avoiding decapitalization.

demonstrates the positive employment effect of the norm if the latter can either lead to a tax or a subsidy. If only the tax case is considered, the labor demand curve is kinked and the mechanism can affect positively employment only in the right-to-manage bargaining model. Section 5 provides an empirical test of the effect of the wage norm for a sample of Polish firms. It confirms the relevance of our theoretical analysis centred on the perceived labor demand. The concluding section highlights the employment effect at the core of our contribution to the understanding of the tax-enforced wage norm.

2 Historical perspective and elements of literature

In market economies, tax-based income policies under the form of a tax on wage increases attracted a lot of attention, especially in the context of rising inflation in the 1970's (Seidman 1978). The tax was then studied as an instrument to fight inflation but also as a way to obtain a lower level of unemployment. The idea that a tax on wage increases could affect the bargaining strategy of a union that cares both about employment and about wages was suggested by Wallich and Weintraub (1971) and modelled by Kotowitz and Portes (1974) in an intertemporal framework with rates of change of wages as the main target. The tighter monetary and fiscal policies of the late 1980's and of the 1990's reduced the inflation rate as well as the attention for wage controls, as anticipated by Isard (1973). Then, international trade pressures and domestic competition policies also weakened wage claims.

Interest for the interaction between competition policies and market openness on the one hand and workers welfare and bargaining power on the other hand has been revived by the pressure of globalization in industrial economies and by the disappointment with the growth performance of Europe (Sapir *et al.,* 2004). In France, reform fatigue after two decennia of partial liberalization also called for a better understanding of the forces at work on the goods and labor markets (Blanchard, 2004). Blanchard and Giavazzi (2003) show (pp. 892-893) that a reduction of the entry costs of firms or of the bargaining power of workers increases entry and product market competition, hence reduces the mark-up of firms and the unemployment rate while nevertheless increasing the purchasing power of wages (thanks to lower consumption prices). They also show that there can be a positive effect on employment and on real consumption of a reduced bargaining power of workers but that it is slower than this of entry of firms (as it works through the increased profitability of entry).

In transition economies, especially in Poland, the excess-wage tax has been triggered by the government's fear of inflationary wage increases after the 1989 jump to the market economy. This fear compares with the market economies of the 1970's, but was even more understandable in initial conditions of low competition on the labor market and on the goods market. Next to inflation, the importance of enterprise profitability and of employment issues in transition economies was recognized early on by the governments and in the literature. Pinto, Belka and Krajewski (1993) studied a sample of state enterprises and found strong upward wage pressure but also a desire of the managers to present firms in good health for privatization. A 'strong

budget constraint' (Kornai, 1990) was soon perceived by most firms and recognized to be a major equilibrium factor in wage negotiations as in Pinto and van Wijnbergen (1995) and Corricelli and Lane (1993) among others.

Aghion and Blanchard (1994) model the substitution of jobs in state firms by jobs in the private sector. They show that workers who fear income losses may oppose desirable restructuring in state firms if unemployment is too high. They suggest (p. 307) that wage controls in state firms may make restructuring and privatization of state firms more attractive to their workers by reducing unemployment risk. Boeri and Terell (2002) point that unemployment and wages should not be too high but not too low either, as wage increases and temporary unemployment contribute to the restructuring and growth process. High unemployment may feed undesirable unemployment persistence after a shock, as has been observed in other European economies in the 1980's (among others Blanchard and Summers, 1986). Political economy arguments also plead for a low rate of unemployment to avoid that reformers would be voted out (Dewatripont and Roland, 1992). Castanheira (2003) shows in a stylized general equilibrium model with labor market imperfections how employment destruction can be slowed and capital accumulation can be supported. He suggests moderate subsidies to firms, an active use of indirect taxes and he sees a role for taxes on wage increases.

In the transition context of 1990-1991 Poland, the beneficial employment effect of a tax on excess wages shall have occurred through a slower pace of job destruction in the state sector, as long as the private sector was not yet able to create enough new jobs. Average private sector wages remained indeed below state enterprise averages for a long time. The wage and employment effect may have contributed to private sector entry by keeping wages affordable to new investors, while not falling into the trap of low wages and low restructuring documented by Boeri and Terell (2002) for other countries. Moreover, many state firms may have been protected from early decapitalization (Pinto, Belka and Krajewski, 1993 and Castanheira, 2003).

Excess-wage taxes are unpopular despite their positive employment effects, their ability to strengthen the bargaining position of weaker asset owners and their role in favour of long run competitiveness of wages. A reason for the lack of popular support may be the negative effect of the tax on effort in an efficiency-wage world, as noted by Jackman and Layard (1990). This effect sets employers on the same side as employees against the tax, especially if the norm is perceived as too low. Pinto and van Wijnbergen (1995) note indeed that most Polish employers of the Pinto, Belka and Krajewski (1993) sample would have increased wages if the excess wage tax had not been in force.

The difficulty to define the right norm level is one of the main practical arguments against a wage norm, and this probably explains why wage norms usually do not last many years.[2] If norms are not abandoned, they tend to be replaced by more flexible or negotiated guidelines.[3] In

[2] In Poland, the tax raised around 2 percent of GDP of tax revenue Ebrill *et al.* (1995) report 1.5 percent of GDP for 1990 and 3.3 percent of GDP for 1991.

[3] For example Belgium introduced a wage-growth norm at the macroeconomic level in the 'competitiveness law' of 1996. It did this in the context of a public debt above 100 percent of GDP and of a rate of unemployment

addition, perverse definitions should be avoided. Establishing the norm on the wage bill instead of the average wage may discourage employment (Lane, 1994). A wage-growth norm may be hard to enforce if firms and unions find how to play with the fiscal calendar to minimize their tax liabilities.[4]

It is also worth noting that progressive income taxes on labor, which are common in industrial countries, may have the same elasticity-increasing effect on labor demand as an excess-wage tax, since the top rate kicks in only above a pre-set income level. Such taxes may affect wage agreements between unions and firms or between unions and governments in the direction of wage moderation and of job creation. There are thus labor demand effects of labor income taxation and not just labor supply effects as pointed by Hungerbuehler *et al.* (2003) or Aronsson *et al.* (1997). Lockwood and Manning (1993, p. 27) even suggest that the relatively low unemployment rate of the Scandinavian countries may be explained by their high marginal tax rates relative to the average tax rate.[5]

The literature thus suggests that in a transition economy, the excess-wage tax can work as a temporary substitute for competition through its effect on the union's perception of the labor demand. It is worth formalizing this argument and testing the effect of the tax on the labor demand in the following sections.

3 The pivotal role of the norm

There have been numerous formulations of taxes on wage increases or on excess wages. The policy we study in this paper is the one implemented in Poland in 1990 and in 1991. It was nicknamed "popiwek" after its abbreviation PPWW. A wage norm x was defined for each firm. Below the norm, no specific tax or subsidy applied. Above the norm, progressive tax rates well above one hundred percent applied to the parts of the wage expenditure of the firm which exceeded the norm and its predefined multiples. To focus on the main effect of the system, we will model the tax as if only one tax rate applied. Hence we can define the gross wage w_g as:

that was perceived as excessive (above 10 percent despite a massive use of early retirement schemes). The wage growth norm of this small open economy is based on the wage growth of its four main trading partners.

[4] The Polish excess wage tax was not a tax on wage increases but well a tax on wage deviations from a norm. This differs from most of the schemes studied in the 1970's (Kotowitz and Portes, 1974, Oswald, 1984, Jackman and Layard, 1990). Another distinction with the 1970's is that the tax affected the cash flow of the firm independently of its profitability. Some loss-making firms were also subject to the tax. By contrast, the proposal of Wallich and Weintraub (1971) operated as a corporate profit tax : an extra tax rate τ on profits (in percent) was calculated as a multiple α of the difference between the growth rate of the wages in the firm during the fiscal year and the allowed growth rate of wages in the firm. The actual tax liability for a given deviation would decline when profit falls.

[5] The definition of the wage brackets for progressive taxation is also an issue, similar to the problem of setting the wage norm. With the ratio of the marginal tax rate to the (effective) average tax rate, theory provides a useful indictor, expost. Most progressive taxation systems actually include other sources of income than labor income, which may weaken their effect on wage arrangements.

$$w_g = w_n + T \tag{1}$$

with w_n, the average net wage and T, the per worker tax revenue. This tax revenue is simply proportional to the part of the average net wage w_n exceeding the firm-specific norm, x, fixed by the government :

$$T = \tau(w_n - x) \tag{2}$$

with τ, the tax rate. From this expression, we can easily imagine the case of a subsidy for firms paying an average net wage under the norm ($w_n < x$). To our knowledge such a subsidy has never been applied. Nevertheless it corresponds to the scheme proposed for East Germany by Ackerlof *et al.* (1991). In this paper we proceed with the analysis of both cases: without and with discontinuity at the point where the net wage falls below the norm. The empirical tests on the polish experience are restricted to the tax case ($w_n \geq x$).

Let us consider a production function $f(l)$ for the firm, increasing and concave in l. For a profit maximizing firm, the labor demand is obtained as

$$f_l(l) = w_g \quad \text{or equivalently} \quad l(w_g) = f_l^{-1}(w_g) \tag{3}$$

which is downward sloping and convex.

The tax-enforced wage norm affects the perception of the labor demand by the unions. Let's define $l_g = f_l^{-1}(w_g)$ as the labor demand expressed by the firm in function of the gross wage, and $l_n = f_l^{-1}(w_n)$ as the labor demand curve perceived by the union. The effect of the tax is summarized in the following lemma.

Lemma 1: *For any downward-sloping labor demand curve in the wage/employment space, the intersection between the net and gross labor demand curves l_n and l_g occurs at the level of the norm, while the net curves are always flatter than the corresponding gross curve for any value of l different from the intersection value.*

Proof. The relation (1) between the net wage w_n and the gross wage w_g for any level of employment l, using the definition of the tax (2) can be expressed as

$$w_n(l) = \frac{w_g(l) + \tau x}{1 + \tau} \tag{4}$$

or similarly

$$l_n^{-1} = \frac{l_g^{-1} + \tau x}{1 + \tau} \tag{5}$$

with l_g^{-1} and l_n^{-1} the corresponding inverse labor demands. ■

The two different perceptions of the labor demand curve can also be expressed in terms of different perceptions of the elasticity of demand. As most people expected (for example Akerlof *et al.,* 1991), the tax or subsidy increases the wage elasticity of labor demand and can make the

unions more cautious in their wage demands. This pivotal role of the tax-enforced norm will also guide the empirical test at the end of this paper.

In expression (5) we can distinguish two wedges between l_n and l_g : first a *tax rate effect* $(1+\tau)$ as for any proportional tax and second *a norm leverage effect* $\tau x/(1+\tau)$ specific to the present excess wage tax. For any downward-sloping labor demand curve, the tax-rate effect makes the l_n^{-1} curve flatter than the l_g^{-1} curve in the wage-labor space, and the norm leverage effect ensures that labor demand curves cross each other at the norm x where $w_n = x = w_g$. Accordingly, this intersection point moves with the level of the norm x. For higher levels of employment (and lower wages) the tax becomes a subsidy ($T = \tau(w_n - x) < 0$), which eventually ensures a floor for the net wage. Indeed, setting the gross wage w_g equal to zero in expression (4) shows that the net wage is bounded :

$$w_g \geq 0 \Leftrightarrow w_n \geq \frac{\tau x}{1+\tau} \quad . \tag{6}$$

This lower bound on the net wage corresponds to the subsidy per worker that is implied by the norm x and the tax (subsidy) rate τ. For an isoelastic labor demand, there is no upper bound for the net wage, but employment tends to zero for infinitely high wages.

In the next section, we analyze the effect of the tax on wage excess in different wage-labor bargaining set-ups.

4 Labor and wage bargaining

We follow Calvo (1978) and assume the trade union maximizes the difference between the wage of its l employed members and a reservation wage ω. It is a special case of a more general view of a union caring about employment and wages; indeed it corresponds to an equal weighting of wages and employment in the utility function of the union. When considering the behavior of a union at the firm-level (instead of at the national level) it is more realistic to assume that it takes positive outside opportunities into account, hence a non-zero reservation wage.

Interestingly, under this assumption for the objective function of the trade union, the effect of the norm and tax on the union marginal revenue curve mimics this observed for the labor demand curve.

Lemma 2: *If the trade union objective is to maximize the difference between the wage of its employed members and a reservation wage, the pivotal role of the norm on the labor demand curve is transmitted to the union marginal revenue curve.*

Proof. The net and gross marginal revenues m_n and m_g are respectively

$$\begin{aligned} m_n &= w_n + l\frac{\partial w_n}{\partial l} - \omega \\ &= l_n^{-1} + l\frac{\partial l_n^{-1}}{\partial l} - \omega \end{aligned} \qquad \begin{aligned} m_g &= w_g + l\frac{\partial w_g}{\partial l} - \omega \\ &= l_g^{-1} + l\frac{\partial l_g^{-1}}{\partial l} - \omega \end{aligned}$$

and combining these expressions with (5) yields

$$m_n = \frac{m_g + \tau x}{1 + \tau} \quad .$$

■

Lemma 1 and Lemma 2 are illustrated on Figure 1. On the Figure we do not report the marginal revenue curves, but instead these curves augmented of the reservation wage ω, defined respectively as $\mu_n = m_n + \omega$ and $\mu_g = m_g + \omega$. Let us now analyze the effect of the tax under different assumptions concerning the wage bargaining. Specifically, we address the cases of right-to-manage and efficient bargaining.

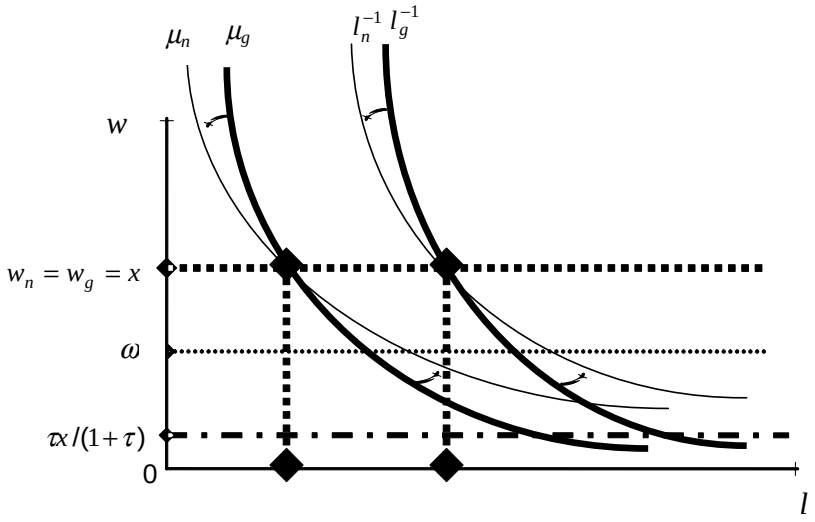

Figure 1: The pivotal role of the norm

4.1 Right-to-manage

In the right-to-manage bargaining model, the firm is responsible for the choice of labor but bargains with the union about the wage paid. In other words, the wage is bargained subject to the constraint that the firm chooses the employment level on its labor demand curve. The wage bargaining may be represented by the maximization of the Nash product

$$\underset{w_n}{Max} \quad \{l\,[w_n - \omega]\}^{\beta}\,\{f(l) - l\,[w_n\,(1+\tau) - \tau x]\}^{1-\beta} \tag{7}$$

subject to (3), where $\beta \in [0,1]$ represents the union bargaining power in the wage negotiation. Substituting for (3), the first order condition for this expression is

$$\begin{aligned} & \beta \left\{ \frac{1+\tau}{f_{ll}(l)} \left(\frac{f_l(l)+\tau x}{1+\tau} - \omega \right) + l \right\} \{ f(l) - l f_l(l) \} \\ = \; & (1-\beta) l^2 (1+\tau) \cdot \left(\frac{f_l(l)+\tau x}{1+\tau} - \omega \right) \end{aligned} \tag{8}$$

which can be represented by an implicit function $F(l, \omega, x, \beta, \tau)$ and yields the equilibrium employment.

Proposition 1: *For the parameter set $x > \omega$, $\tau > 0$ and $\beta \in [0,1]$, under right-to-manage wage bargaining, employment at the firm level is monotonically increasing in the norm x and in the tax rate τ if and only if $F_l > 0$ with*

$$\begin{aligned} F_l \; = \; & (f_l(l) + \tau x - \omega(1+\tau)) \left[\beta \{ f(l) - l f_l(l) \} \frac{-f_{ll}(l)}{[f_{ll}(l)]^2} - l(2-\beta) \right] \\ & + 2\beta \{ f(l) - l f_l(l) \} - l^2 f_{ll}(l) \quad . \end{aligned}$$

Proof. From the implicit function theorem, we may compute the first derivative of labor with respect to τ and x respectively as $-\frac{F_\tau}{F_l}$ and $-\frac{F_x}{F_l}$ with

$$\begin{aligned} F_\tau \; = \; & (x-\omega) \left\{ \beta \frac{f(l) - l f_l(l)}{f_{ll}(l)} - l^2(1-\beta) \right\} \\ F_x \; = \; & \tau \left\{ \beta \frac{f(l) - l f_l(l)}{f_{ll}(l)} - l^2(1-\beta) \right\} \end{aligned}$$

and we observe that F_τ and F_x are both negative under our assumption of a concave production function. ■

Let us now illustrate the proposition by considering some examples. Investigating first the extreme cases $\beta = 0$ (the firm sets unilaterally wage and labor) and $\beta = 1$ (monopoly union) provides some indications about the mechanism of the tax.

Example 1: *Let us consider $\beta = 0$. In this case the firm maximizes its profit by setting the net wage at the reservation level ω while the corresponding employment on the labor demand curve is $l^* = f_l^{-1}(\omega(1+\tau) - \tau x)$, increasing in both x and τ for $x > \omega$.*

It is obvious in this case that Lemma 1 alone explains the effect of the tax. As illustrated in Figure 1, the labor demand l_n^{-1} pivots counterclockwise with the tax rate τ around the norm x in the labor-wage plane, and as long as the norm x is above the reservation wage ω, the intersection of the l_n^{-1} curve with the reservation wage is pushed to the right as either x or τ increases. The mechanism has a positive impact on employment for $x > \omega$, the last statement providing a justification for the restriction $x > \omega$ used in Proposition 1: it prevents a perverse effect of the norm.

Example 2: *In the monopoly union case ($\beta = 1$), the trade union simply maximizes its objective function subject to the labor demand constraint. The first order condition (8) becomes*

$$l^* = -\frac{f_l(l^*) + \tau(x - \omega) + \omega}{f_{ll}(l^*)}$$

and employment is increasing in both x and τ for $x > \omega$.

The effect of the tax on employment is here explained by Lemma 2 and is illustrated on Figure 2. The trade union sets employment such that $\mu_n = \omega$, determining the equilibrium employment l^*. Given this employment, the equilibrium net and gross wages (w_n^* and w_g^*) are determined respectively by the l_n^{-1} and l_g^{-1} labor demand curves. Note that the norm x pushes upward the marginal revenue curve while the tax rate τ pivots counterclockwise the marginal revenue around the norm x in the labor-wage plane. Therefore, higher norm and tax push rightward the intersection of the μ_n curve with the reservation wage ω as long as $x > \omega$, implying higher employment. Given this employment, the wage is determined by the labor demand curve, and according to Lemma 1 it is decreasing in the norm and tax.

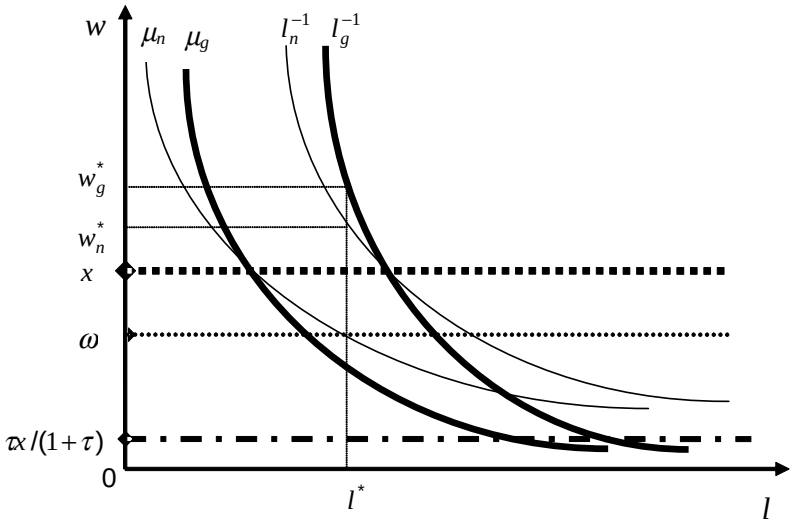

Figure 2: Wage-labor determination in the monopoly union case

Let us now come back to the more general case with $\beta \in [0, 1]$ and consider a specific production function rather standard in economics.

Example 3: *Let us assume an isoelastic production function $f(l) = l^\alpha$, with $\alpha \in]0, 1[$. Substituting for this functional form in the first order condition (8), we obtain after some manipulations*

the following expression for labor at the firm level

$$l^* = \left(\frac{\tau \left(\alpha \left(1 - \beta \right) + \beta \right) \left(\omega - x \right) + \beta\omega(1 - \alpha) + \alpha\omega}{\alpha^2} \right)^{\frac{1}{\alpha - 1}}$$

and employment is increasing in both x and τ for $x > \omega$.

The latter example proves that, under fairly standard assumptions, the condition $F_l > 0$ can be fulfilled such that both the norm and the tax (subsidy) of the wage above (below) the norm have a positive impact on labor in a right-to-manage wage bargaining set-up.

4.2 Efficient bargaining

Under the efficient bargaining assumption, the firm and the union bargain simultaneously over wage and labor, using for both negotiations the same bargaining power $\beta \in [0, 1]$. This amounts to assume that wage and labor are decided through a Nash bargaining procedure:

$$\underset{w_n, l}{Max} \quad \left\{ l \cdot \left(w^n - \omega \right) \right\}^{\beta} \cdot \left\{ f(l) - l \cdot \left[w^n (1 + \tau) - \tau x \right] \right\}^{1 - \beta} \quad . \tag{9}$$

Proposition 2: *For the parameter set $x > \omega$, $\tau \in [0, 1]$ and $\beta \in [0, 1]$, under efficient bargaining, employment at the firm level is monotonically increasing in the norm x and in the tax rate τ.*

Proof. Combining the first order conditions for w_n and l, we obtain the usual expressions for equilibrium employment and wage

$$\begin{aligned} l^* &= f_l^{-1} \left(\omega - \tau \left(x - \omega \right) \right) \ , \\ w_n^* &= \beta \left(\frac{\frac{f(l)}{l} + \tau x}{1 + \tau} \right) + (1 - \beta)\omega \ , \end{aligned}$$

and we conclude that equilibrium employment is increasing in x and τ. ■

Noteworthy, labor is set at the same level as in the right-to-manage case with no bargaining power examined in Example 1 supra. The intuition behind this outcome is easy to grasp. Under efficient bargaining, the firm and the union maximize the join profit of their collaboration and share it accordingly to their respective bargaining power. As profit is maximized when the productivity of the marginal labor unit is equal to the reservation wage, labor depends only on the l_n labor demand curve and its intersection with ω. From Lemma 1, we know that the norm mechanism flattens the labor demand curve and shift rightward its intersection with the reservation wage.

4.3 The tax only case

Proposition 1 and 2 consider the mechanism of the norm but keeps away from the tax/subsidy discussion. However, the tax-only case is worth considering, since, with the exception of East Germany, no transition country has thought of subsidizing wages and none could indeed afford it. Let us thus consider how the above outcomes would be modified in the case

$$T = \tau \max(w_n - x, 0) \quad .$$

The first effect will be to affect Lemma 1 and 2. It limits the pivotal role of the norm to the section of the labor demand curve above the norm, creating a kink in x. This means that limiting the mechanism to the tax case kills the employment enhancing effect of the norm for all the wage bargainings considered such that this effect happened through the counterclockwise shift of the lower part of the labor demand curve.

This is in particular true for the right-to-manage case with $\beta = 0$ since the crossing of the labor demand and the reservation wage that determines equilibrium labor occurs below the kink in x since we imposed $x > \omega$. This is also true of the efficient bargaining, since firm and union maximize the profit from their collaboration and choose the same employment level as the firm would, had it the right to set wage at its desired level. From this, we derive the following proposition:

Proposition 3: *If one excludes to subsidize wage and considers only* $T = \tau \max(w_n - x, 0)$*, taxing wages in excess of a norm cannot have any effect on employment if the latter is set efficiently, that is, in order to maximize the firm production.*

It is interesting in the light of this Proposition to remember that the Akerlof *et al.* (1991) proposal of a wage subsidy for Eastern Germany allows to circumvent this potential drawback. However, as explained in Section 2, the dominant feeling is that employment was not decided efficiently in Eastern countries during the transition period. With that respect, the right-to-manage type of bargaining with $\beta > 0$ is probably a better representation of the labor-wage decision at the firm level. Noteworthy, Proposition 1 remains valid for all the cases where the norm x is set below the equilibrium net wage w_n. Even more, since Proposition 1 establishes that employment at the firm level is monotonically increasing with the norm, we can state the following corollary:

Corollary 1: *Considering the same economy as in Proposition 1 and assuming that condition* $F_l > 0$ *holds, if the government levies a tax in case of excess wages but refuses to pay a subsidy in the opposite situation, employment at the firm level is maximized if the norm is set such that* $x = w_n$*.*

In other words, the employment effect of the tax on wage excess is maximized when the norm is set such that, in the corresponding equilibrium, no tax is levied. Figure 3 illustrates

this corollary for the special case of the monopoly union (right-to-manage with $\beta = 1$). The l_n^{-1} curve is truncated below the norm x and beyond the corresponding equilibrium employment level l_x. Hence, the corresponding μ_n curve doesn't apply beyond l_x, inducing a discontinuity in the net marginal revenue curve, with a jump from μ_n to μ_g. There is a norm x^* defined as x such that $\mu_n(l_{x^*}) = \omega$. For this norm x^*, employment is maximized at l_{x^*}. If the norm x rises further, the l_n^{-1} and μ_n curves shift upward and to the left, and the μ_n curve doesn't cross the ω line anymore. Eventually the μ_g curve applies again and the high norm becomes irrelevant. If the government doesn't want to pay a subsidy and has enough information about the reservation wage ω and the μ_n curve of the union given the labour demand of the firm, it can try to set the norm at x^* to maximize unemployment at l_{x^*}. Anyway a high norm cannot deliver less employment than no norm.

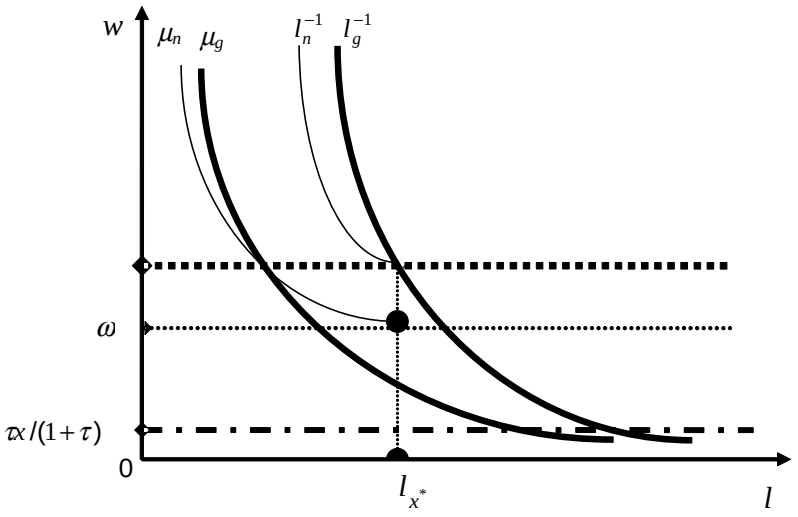

Figure 3: Employment maximizing norm in the tax only case and monopoly union

5 Empirical estimation of the effect of the wage norm

Lemma 1 and 2 show that both the net labor demand and the net marginal revenue curves move upward with the norm (norm-leverage effect) and rotate around it (tax rate effect) when compared to the gross labor demand and gross marginal revenue curves. We established in the previous section that these properties cannot lead to an employment increase if the government restricts the mechanism to the case of a tax and that the wage/labor bargaining procedure within the firm maximizes production.

However, there is a old debate among economists about the bargaining procedures between unions and firms, and the suspicion that these procedures do not lead to the optimal level of employment is even bigger in the particular case of Eastern countries in transition. Under right-to-manage bargaining, Proposition 1 establishes the condition for the tax on wage excess to lead to a higher level of employment, provided the norm is set above the reservation wage. Example 2 and 3 prove that this condition is for sure fulfilled in the case of a monopoly union or for such a consensual production function as $f(l) = l^{\alpha}$ and Corollary 1 states that these results are maintained even if the mechanism is discontinuous and does not allow the tax to turn into a subsidy.

The foundation of the employment effect of the tax in the pivotal role of the norm can be tested with firm-level data on wages and employment, by estimating an inverse labor demand, that is a wage equation.

In equations (4) and (5) we expressed the relation between the inverse 'net' labor demand and the inverse 'gross' labor demand as :

$$w_n(l) = l_n^{-1} = \frac{l_g^{-1} + \tau x}{1 + \tau} \quad .$$

We can thus write a wage equation relating the net wage to the usual determinants of the gross wage and to the norm x. If the coefficient of the norm is significant, it indicates that the norm played a role in the wage determination. Moreover we can interpret the estimated coefficients as reflecting the actual value of the tax rate τ.

We specify a logarithmic wage equation to be estimated. In order to identify the relevant variables and coefficients, let us start from a general isoelastic labor demand of the type $l = Aw_g^{-\gamma}$, where A is a shift variable driven, for example, by the sale of output by the firm, w_g is the gross wage, and $\gamma > 0$ is the elasticity of labor demand to the gross wage. For the firms to which the tax does not apply, the isoelastic labor demand curve gives immediately the wage equation :

$$\ln w_n = \frac{1}{\gamma} \ln A - \frac{1}{\gamma} \ln l \quad \text{when } x > w_n = w_g \ . \tag{10a}$$

For the firms to which the tax applies, we substitute for w_n according to (4), and obtain

$$\ln w_n = \frac{1}{\gamma\,(1+\tau)} \ln A - \frac{1}{\gamma\,(1+\tau)} \ln l + \frac{\tau}{1+\tau} \ln x + R \qquad \text{for } x \leq w_n \leq w_g \tag{10b}$$

from a first-order Taylor approximation[6] with R, the remainder of the approximation. For the firms with an average net wage w_n above the wage norm x, an important advantage of this formulation is that τ, the taxation rate, and γ, the wage elasticity of the labor demand, appear in the coefficients to be estimated. By construction this formulation is coherent with Lemma 1 and expression (5) and poses that the effect of the tax is the same on all coefficients of the wage equation.

We index the firms of the sample by i, pool them all in a single regression and we let the coefficients vary by using a multiplicative binary variable $D_i = 1$ for firms with wages above the

[6] The detail of the derivation of the approximation can be found in de Crombrugghe and de Walque (1997).

norm ($w_{ni} > x_i$) and $D_i = 0$ for the other firms ($w_{ni} \leq x_i$). The equation to be estimated in cross-section by ordinary least squares becomes:

$$\begin{aligned} \ln w_{ni} &= \alpha_0 + \beta_0 D_i + \alpha_1 \ln A_i + \beta_1 D_i \ln A_i \\ &\quad + \alpha_2 \ln l_i + \beta_2 D_i \ln l_i + \beta_3 D_i \ln x_i + \varepsilon_i \quad . \end{aligned} \tag{10c}$$

In order to estimate this equation, we use a unique firm-level data set assembled by Pinto, Belka and Krajewski (1993) for their early study of the behavior of 75 Polish state firms in transition and that these authors kindly accepted to provide us. The data set contains monthly observations of the average net wage, the wage norm, the employment and the sales of 43 firms[7] for 1990 and 1991. Firm-level data for such variables during the transition period are not easily available. Moreover, this sample has the advantage that it is complemented by interviews of the managers and that it has received some attention in other papers (among others Pinto and van Wijnbergen, 1995) which facilitates its interpretation.

Table 1 : Summary of the data (periodical averages across firms)

sample size:	1989	1990	1991	1992
43 manufacturing firms	Jul.-Dec.	Jan.-Dec.	Jan.-Dec.	Jan.-June
Employment per firm	3,928	4,099	3,244	2,863
(coefficient of variation across firms)	*0.53*	*0.70*	*0.53*	*0.58*
Wage per worker (monthly in 1000 zl)	354	1,052	1,729	2,506
(coefficient of variation across firms)	*0.17*	*0.24*	*0.19*	*0.24*
Norm per worker (in 1000 zl)	n.a.	900	2084	2,611
(coefficient of variation across firms)		*0.21*	*1.07*	*0.67*
Sales per worker (in 1000 zl)	n.a.	19,542	25,280	n.a.
(coefficient of variation across firms)		*0.70*	*0.88*	
Excess-wage tax per worker (in 1000 zl)	n.a.	251	419	99
(coefficient of variation across firms)		*1.26*	*1.47*	*2.27*

Notes: Sales per worker and excess-wage tax per worker computed as monthly average over the year, that is end of year cumulative value/(12· average employment over the year).
Exchange rate on Jan. 1, 1990 : USD 1 = 10,000 PLZ (zl).

Source: Pinto, Belka & Krajewski (1993) sample, own treatment of data provided by Piotr Urbanek, University of Lodz.

Table 1 reports summary data of the variables we use. The fall in employment appears in 1991 and 1992. Real wages fell in 1990 and rose in 1991 and 1992; indeed, the inflation and devaluations of 1989 hurted the real wages in 1989-90 despite the nominal increase. The excess wage tax liability per worker is high, but this hides huge variations across firms. The average

[7] Some of the 75 firms of the original sample do no report all the necessary data.

monthly sales per worker also vary widely across firms and even more so in 1991 than in 1990; this may indeed affect the bargaining relations between employers and employees across firms. The sales variable is thus relevant in the wage equation next to the employment and the norm.

We estimate separate regressions for 1990 and 1991 and use arithmetic averages of the variables over 12 months. This choice follows the institutional reality of both the tax system and the wage setting process. Indeed, the tax underwent significant changes about once a year.[8] The wages could be revised every month and employment fluctuated monthly as well. Nevertheless, most of the Polish data show a seasonal pattern for wages, with high bonuses paid in the fourth quarter and a real wage drop in January, which all indicate that the monthly wages should be seen as part of an annual package. The wage norm x is also different each month within a firm and across firms, and the tax is due on monthly excesses but the overall tax liability is determined once at the end of the year. From this, we conclude that the appropriate time span is one year and that the arithmetic average of each variable over the twelve months contains useful information that would be lost if we simply used point to point observations.

Table 2 reports our estimates. It presents five regressions for each year. The first three partly omit the dummies, while the fourth one corresponds to equation (10c) but without restriction on the estimated coefficients. The fifth regression tests the restriction that the coefficients on sales and employment in (10c) are equal in absolute value as implied by (10a) and (10b). The last two specifications have a better fit, especially in 1990.

In the fifth regression, the constraint on the coefficients is not rejected and the size of the coefficients is compatible with their economic interpretation. Indeed (10b) suggests that β_3, the coefficient of the norm x, can give an estimate of the tax rate τ : $\tau = \beta_3/(1-\beta_3)$. We thus obtain $\tau_{90} \simeq 3,52$ and $\tau_{91} \simeq 0,71$ in R5 and $\tau_{90} \simeq 6,09$ and $\tau_{91} \simeq 0,65$ in R4. The absolute size of these tax rates corresponds to tax rates actually imposed in these years and their relative size from one year to the other reflects the general reduction of the rates in 1991.

For tax-liable firms, the dampening effect of the tax on the wage effect of sales and employment appears in the coefficients associated with the multiplicative dummy. The coefficient associated with the multiplicative dummy is of the opposite sign and of smaller absolute value than the 'gross' coefficient for the same variable. This confirms the wage dampening effect of the tax and especially its ability to increase the wage elasticity of the labor demand.

The wage elasticity of the labor demand is the inverse value of the coefficient of employment in the estimated equation ($\gamma = 1/\alpha_2$). Then, R1 implies an point estimate of γ of $4,83$ in 1990 and of $4,29$ in 1991, which is sufficiently above 1 for a standard monopoly model to apply. In the full regressions R4 and R5, the 'net' labor demand wage elasticity is the inverse of the sum of the two coefficients on employment ($\gamma/(1+\tau) = 1/(\alpha_2+\beta_2)$). It can be computed that R4 and R5 imply γ point estimates of 26 and 12 respectively for 1990, which is quite high. For 1991 the estimates drops to $6,1$ and $6,9$. All these estimates are higher than the estimates in R1 for the corresponding year or than the coefficient for firms not subject to the tax.

[8] The norm for 1990 was based on the September wage bill for each firm. The norm for 1991 was about 15 percent above what it would have been without adjustment (see Coricelli and Revenga, 1992).

Table 2: Estimation of equation (10c)

Dependent variable is $\ln(w_{ni})$			43 observations		
	R1	R2	R3	R4	R5[b]
year 1990[a]					
$cst.$	1.504*	1.175	1.493*	0.175	1.171*
	(5.513)	(0.104)	(5.696)	(0.160)	(4.592)
D_i		1.462		-0.313	-0.843
		(0.858)		(-0.275)	(-2.594)
$ln(sales_i)$	0.201*	0.274*	0.177*	0.275*	0.260*
	(7.566)	(2.729)	(6.225)	(4.185)	(3.947)
$D_i \cdot ln(sales_i)$		-0.091		-0.199*	-0.182*
		(-0.867)		(-2.844)	(-2.589)
$ln(l_i)$	-0.207*	-0.159	-0.182*	-0.159	-0.260*
	(-6.221)	(-0.830)	(-5.349)	(-1.272)	(-3.947)
$D_i \cdot ln(l_i)$		-0.035		0.121	0.182*
		(-0.180)		(0.356)	(2.589)
$D_i \cdot \ln(x_i)$			0.061*	0.859*	0.779*
			(2.089)	(7.141)	(6.690)
$R^2_{adj.}$	0.585	0.580	0.617	0.821	0.809
year 1991[a]					
$cst.$	2.396*	2.431	2.474*	2.431*	1.468*
	(11.408)	(4.948)	(11.026)	(5.479)	(7.351)
D_i		-0.050		-1.157	-0.431
		(-0.090)		(-1.869)	(-1.087)
$ln(sales_i)$	0.182*	0.251*	0.172*	0.251*	0.304*
	(9.018)	(4.567)	(7.703)	(5.057)	(6.498)
$D_i \cdot ln(sales_i)$		-0.092		-0.107	-0.158*
		(-1.452)		(-1.987)	(-3.043)
$ln(l_i)$	-0.233*	-0.348*	-0.232*	-0.348*	-0.304*
	(-8.540)	(-6.561)	(-8.467)	(-7.265)	(-6.498)
$D_i \cdot ln(l_i)$		0.153*		0.184*	0.158*
		(2.509)		(3.283)	(3.043)
$D_i \cdot \ln(x_i)$			0.015	0.394*	0.416*
			(0.987)	(3.061)	(3.129)
$R^2_{adj.}$	0.690	0.718	0.690	0.770	0.743

numbers into brackets are t-statistics

* means that the coefficient is significant at the 5 percent level

[a] $D_i = 0$ for 5 firms in 1990 and 11 firms in 1991

[b] estimated imposing $\alpha_1 = -\beta_1$ and $\alpha_2 = -\beta_2$. The restriction is not rejected at the five percents level in 1990, and at the 1 percent level in 1991.

Our estimates of the labor demand curve in 1990 and 1991 for 43 Polish firms do not reject our model of the effect of the norm on the perception of the labor demand at the level of the firm. As the marginal revenue curve is directly linked to the labor demand curve (Lemma 2), our estimates suggest that the norm should also have induced a counterclockwise shift of the marginal revenue curve, favouring employment in a monopoly union equilibrium (see Example 2 above). Proposition 1, together with Example 3 and Corollary 1, establishes that this outcome also holds for a wide range of cases in the more general right-to-manage setting.

This supports the claim that the excess-wage tax has indeed been favorable to employment in Poland in the early transition years 1990-1991 and that it may have protected firms from excessive decapitalization by protecting the employer surplus from excessive wage claims.

Our results on the role of the wage norm complement those of Pinto and van Wijnbergen (1995). They study the wage behavior of the same sample of Polish firms from the 'hard budget constraint' point of view and they look at the accumulated tax liability as a possible determinant of feasible wage increases. They regress the quarterly difference between the growth rate of the wage bill and the growth rate of the wage norm of the firms on three variables: the growth rate of their quarterly real gross value added, the growth rate of their quarterly bank borrowing and the growth rate of their cumulative popiwek liability per employee. They find that the cumulative popiwek liability per employee has a significant negative effect on the growth rate of the wage bill above the wage norm. The evidence is thus compatible with the hypothesis that the popiwek played its role through a labor demand effect to moderate wage claims in Poland's early transition years.

6 Conclusion

Transition economies faced specific challenges on their labor market. Wage and price liberalization in still imperfectly competitive markets could have led to excessive increases with undesirable redistribution, decapitalization and unemployment effects. Production restructuring and privatization could have induced large reallocations of labor, which in turn could have caused high unemployment rates, with a risk of reform reversal or of persistence of unemployment. In this context, a tax-enforced wage norm was imposed on state firms in Poland, as in many transition countries.

Our theoretical analysis of the tax-enforced wage norm on the labor demand curve shows two effects: a norm leverage effect that shifts the labor demand curve upwards with the norm and a tax rate effect that flattens the labor demand curve. The rotation of the labor demand curve unambiguously increases equilibrium employment and lowers the equilibrium wage in a pure monopoly union model and in a wide range of right-to-manage models. Introducing the possibility for the tax to turn into a subsidy for wages below the norm extends the positive employment effect of the norm to the efficient-bargaining model.

The empirical estimate of a wage equation on a cross-section of Polish firms confirms the

significant effect of the norm on the net wage for a given level of employment and the slope-flattening effect of the tax rate on the coefficients of sales and of employment. This adds to other evidence that the norm indeed moderated the wages reached in state firms. In the Polish transition context the positive employment effect of the tax-enforced wage norm will have taken the form of a slower aggregate increase in unemployment during the first critical years.

The way to deal with imperfectly competitive goods and labor markets remains an issue today in most countries of Europe, East and West alike. A market-entry link between wage moderation and product market competition (Blanchard and Giavazzi, 2003) may shed some light on the issues of today as well as of the transition of the 1990's. The labor demand effect of the wage norm on equilibrium wages and employment might thus be studied in various contexts of macroeconomic policy or of tax policy.

References

[1] Adam, J. (1974). 'The system of wage regulation in Hungary', Canadian Journal of Economics, 7, pp. 578-593.

[2] Aghion, P. and Blanchard, O. (1994). 'On the speed of transition in Central Europe', in Fisher, S. and Rothemberg, J. (Eds) NBER Macroeconomics Annual, pp. 283-330.

[3] Akerlof, G., Rose, A.K., Yellen, J. and Hessenius, H. (1991). 'East Germany in from the cold: the economics aftermath of currency union', Brooking Papers on Economics Activity, 1, pp. 1-106.

[4] Aronsson, T., Wikstrom, M., Brannlund, R. (1997). 'Wage determination under non-linear taxes: estimation and an application to panel data', Oxford Economic Papers, 49, pp. 404-418.

[5] Basu, S., Estrin, S. and Svejnar, J. (1997). 'Employment and wage behaviour of industrial enterprises in transition economies : the cases of Poland and Czechoslovakia', Economics of Transition, 5, pp. 271-288.

[6] Blanchard, O. (2004) 'The economic future of europe', Journal of Economic Perspectives, 18, pp. 3-26.

[7] Blanchard, O. and Giavazzi, F. (2003). 'Macroeconomic effects of regulation and deregulation in goods and labour markets', Quarterly Journal of Economics, 118, pp. 879-909.

[8] Blanchard, O. and Summers, L. (1986). 'Hysteresis and the european unemployment problem', NBER Macroeconomics Annual, pp. 15-89.

[9] Boeri T. and Terrell K. (2002). 'Institutional determinants of labour reallocation in transition', Journal of Economic Perspectives, 16, pp. 51-76.

[10] Calvo, G. (1978). 'Urban unemployment and wage determination in LDCs: trade unions in the Harris-Todaro model', International Economic Review, 19, pp. 65-81.

[11] Castanheira, M. (2003). 'Public finance and the optimal speed of transition', Economics of Transition, 11, pp. 435-462.

[12] Coricelli, F. and Lane, T. (1993). 'Wage controls during the transition from central planning to a market economy', The World Bank Research Observer, 8, pp. 195-210.

[13] Coricelli, F. and Revenga, A. (1992). 'Wage policy in during the transition to a market economy : Poland 1990-91', World Bank Discussion Papers No. 158.

[14] de Crombrugghe, A. and de Walque, G. (1997). 'Fiscal norming of wages to promote employment with monopoly unions', CEPR Discussion Papers 1766.

[15] Dewatripont, M. and Roland, G. (1992). 'Economic reform and dynamic political constraints', Review of Economic Studies, 59, pp. 703-30.

[16] Grosfeld, I. and Nivet, J.F. (1999). 'Insider power and wage setting in transition : evidence from a panel of large Polish firms 1988-1994', European Economic Review, 43, pp. 1137-1147.

[17] Hindriks, J. and Myles, G.D. (2006). Intermediate Public Economics, Cambridge, MA : MIT Press.

[18] Hungerbühler, M., Lehman, E., Parmentier, A. and Van der Linden, B. (2006). 'Optimal redistributive taxation in a search equilibrium model', Review of Economic Studies, 73, pp. 743-767.

[19] Isard, P. (1973). 'The effectiveness of using the tax system to curb inflationary collective bargains: an analysis of the Wallich-Weintraub plan', Journal of Political Economy, 81, pp. 729-740.

[20] Jackman, R. and Layard, R. (1990). 'The real effects of tax-based income policies', Scandinavian Journal of Economics, 92, pp. 309-324.

[21] Kornai, J. (1990). The Road to Freedom, New-York, Wiley.

[22] Kotowitz, Y., Portes, R. (1974). 'The tax on Wage Increases : Theoretical Analysis', Journal of Public Economics, 3, pp. 113-132.

[23] Lane, T. (1994). 'Wage controls and employment in economies in transition', Journal of Comparative Economics, 19, pp. 171-187.

[24] Lockwood, B. and Manning, A. (1993). 'Wage setting and the tax system: theory and evidence from the United Kingdom', Journal of Public Economics, 52, pp. 1-29.

[25] OECD, OECD Economic Survey (Poland), 1992 and 1994.

[26] Oswald, A. (1984). 'Three theorems on inflation taxes and marginal employment subsidies', Economic Journal, 94, pp. 599-611.

[27] Pinto, B., Belka, M. and Krajewski, S. (1993). 'Transforming state enterprises in Poland : evidence on adjustment by manufacturing firms', Brooking Papers on Economic Activity, 1, pp. 213-270.

[28] Pinto, B. van Wijnbergen, S. (1995). 'Ownership and corporate control in Poland : why state firms defied the odds', CEPR Discussion Paper No. 1273.

[29] Rutkowski, J. (1994). 'Wage determination in Late Socialism: The case of Poland', Economics of Planning, 27, pp. 135-164.

[30] Sapir, A., Aghion, P., Bertola, G., Hellwig, M., Pisani-Ferry, J., Rosati, D., Viñals, J. and Wallace, H. (2004). An agenda for a growing Europe : The Sapir report, Oxford: Oxford University Press.

[31] Seidman, L.S. (1978). 'Tax based income policies', Brooking Papers on Economic Activity, 2, pp. 301-362.

[32] Wallich, H., Weintraub, S. (1971). 'A tax-based incomes policy', Journal of Economic Issues, 5, pp. 1-19.

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