Is Small Really Beautiful?
Explaining Different Unemployment
Performances within the Euro-Zone

Sebastian Dullien[*]

Abstract

This article asks why unemployment performance in small countries in European Monetary Union has been superior to that in large EMU countries. Within a model of monopolistic competition, it is shown that a possible answer is a beggar-thy-neighbor policy by the small countries. When dropping the real balance effect from a standard model of monopolistic competition, it is found that a monopoly trade union setting wages for a large economy cannot influence employment and output by changing nominal wages. A trade union in a small country which is in a monetary union with a large country, on the other hand, can increase output and employment by wage restraint.

---
[*] Sebastian Dullien, Financial Times Deutschland, Friedrichstr. 71, 10117 Berlin, Germany, +49 (0) 30 22074 - 170, dullien@web.de.

1.   Introduction

Unemployment in European Monetary Union (EMU) is still rampant. While it is not yet back at the peak level of the early 1990s, the 2001/2002 recession nevertheless left heavy marks in the labour markets. The hope of early 1999/2000 that this time the expansion would help European governments to reduce unemployment substantially lies shattered in pieces. However, what is even more astonishing about the European unemployment performance are the differences between the single countries: It is predominantly the big EMU countries which show a dismal labour market performance while some of the smaller countries until very recently managed to tackle their unemployment problems reasonably well.

This article tries to give an explanation for this feature of European unemployment. It will argue that strategically acting unions in small countries within EMU have the possibility to chose between high real wages and low employment on the one hand and lower real wages and high employment on the other hand. Unions in large countries in contrast do not have this possibility. In their case nominal wage restraint does not lead to lower real wages but only to lower prices. The rationale behind this notion is rather simple: In a small country within EMU changes in nominal wages improve the competitiveness vis-à-vis the rest of EMU and thus influence strongly export demand. Wage changes in large countries on the other hand influence domestic EMU demand in the same direction as the nominal wage change and in such an extent that aggregate demand remains largely unchanged.

The article is organised as follows: Section 2 outlines some features of European unemployment and reviews the standard explanation of the reasons and cure for European unemployment. Section 3 explains why this standard approach is questionable for theoretical reasons, mainly the assumption of a real balance effect. An alternative model without real balances will then be presented. Section 4 concludes.

2. European Unemployment and the Standard Explanation

Table 1 shows some of the main features of the development of EMU unemployment in the late 1990s: While Ireland, Spain and Finland[1] had emerged from the EMS crisis in 1992 with a very high level of unemployment, they managed to bring that level down strongly towards the beginning of the new century.[2] On the other hand, none of the three large EMU countries Italy, France and Germany, managed to make a significant reduction in its unemployment rate. Moreover, at the end of 2001, it was only the three large EMU countries and spain which still had unemployment rates above 7 percent.[3]

When regressing standardized unemployment rates from the Organisation for Economic Cooperation and Development (OECD) for EMU countries in 2001 on the size of the single EMU country (as a share of EMU Gross Domestic Product) and the level of unemployment it experienced in 1993, we get the following equation (with t-statistics in parantheses):[4]

$$U^{2001} = \underset{(0.727)}{0.91038} + \underset{(2.495)}{0.13987} share + \underset{(4.242)}{0.42507} U^{1993}$$
$$R^2 = 0.75745$$

Except the constant, the right-hand variables are significant at the 5-percent-level. We thus see that the size of a country within EMU has a strong positive effect on the unemployment level. Just as can be expected, the initial unemployment rate in 1993 also has a strong influence on unemployment in 2001 which points to a hysteresis problem in EMU. GDP share and initial

---

[1] Though Finland has not been member of European Union at that time, it had pegged its markka to the Ecu. Consequently, it had also been hit by the turbulences after the EMS crisis.

[2] Throughout the whole article, the period from 1993 to 2001 will be examined. Even though EMU only started in 1999, the period from 1993 can be seen as a period of *de facto* fixed exchange rates in Europe as no large alignments took place after 1993.

[3] All unemployment rates in this article are standarised unemployment rates from (OECD 2002).

[4] Note that the sample size is very small and the coefficients therefore might be distorted.

Country	Share of EMU-GDP in 1997	Reduction in Unemployment 1993-2001	Unemployment Level in 1993
Germany	33.41	0	7.9
France	22.15	-2.7	11.3
Italy	18.23	-0.6	10.1
Spain	8.45	-7.5	22.5
Netherlands	5.74	-3.8	6.2
Belgium	3.85	-2.0	8.6
Austria	3.28	-0.4	4.0
Portugal	1.54	-1.5	5.6
Ireland	1.20	-11.8	15.6
Finland	1.89	-7.3	16.4
Luxembourg	0.20	-0.2	2.6

Source: OECD (2002)

Table 1: Level and Reduction of Unemployment in the eleven original EMU members (EMU-11), 1993-2001

unemployment account for roughly 75 percent of the unemployment level in 2001. This leaves plenty of space for additional reasons for reductions in unemployment over that period such increased low wage subsidies, but also hints at a strong role for the size of a country in explaining unemployment performance.

Standard textbook economics as embodied in the AS-AD-model[5] has a simple explanation for unemployment: If labour supply is larger than labour demand, the price for labour (the wage level) must be too high. When nominal wages fall, the demand for labour increases lowering the excess supply in the labour market. With more labour employed, output increases. At first, aggregate demand does not change with increasing aggregate supply as aggregate demand is a function not of the wage sum paid, but of the real money supply. With excess supply in

---

[5] For an exposition see Romer (1996, chapter 5) or Felderer and Homburg (1994).

goods markets, prices fall. As the nominal money supply is exogenously fixed, this falling price level leads to an increase in the *real* money supply. This increased real money supply will lead to falling interest rates which in turn increase investment demand. This effect is called *Keynes effect*. With the increased investment demand, aggregate demand grows as to equal the new (increased) aggregate supply. Besides the Keynes effect, in some extentions of AS-AD a second real balance effect, the *Pigou effect*, is included. Here, an increased real money supply increases consumption demand as it is argued that the real money stock is part of household wealth and consumption demand a function of household wealth.

This argument has recently been used by a new strand of literature relating the interaction of wage bargaining structures and monetary policy to changes in employment. Soskice and Iversen (2000) and Coricelli, Cukierman, and Dalmazzo (2000) (SICCD hereafter) argue within a model of monopolistic competition that strategically acting unions can use the real balance effect to reach their employment target under a non-accommodating monetary policy which does not alter the money supply in order to influence employment: By exercising wage restraint, they can increase aggregate demand and thus aggregate employment.

The interesting thing in both of the contributions is the emerging non-neutrality of the monetary policy rule: If the central bank accommodates wage changes in a way that it changes the money stock so that some employment target is met, unions do not have an incentive to exercise wage restraint as the real wage/unemployment outcome is the same regardless of their behaviour. If, on the other hand, the central bank sets its nominal money supply regardless of the unions' behaviour, unions can in fact increase employment and output by wage restraint. As soon as employment enters into their utility function, they can be expected to make use of this option by lowering their wages and thus increasing output and employment. Consequently, SICCD conclude that a shift to a less accommodating monetary policy[6]

---

[6] Or more *conservative* in Coricelli, Cukierman, and Dalmazzo's (2000) terms.

leads to a higher output and employment if unions are able to act strategically.

When looking at the European performances, this explanation seems to fit some of the cases quite nicely: With entering the hard phase of the European monetary system and later EMU, monetary policy for all of the countries but Germany became less accommodating. Moreover, one could even argue that monetary policy in Germany grew less accommodating since the 1970s: Not only did the Bundesbank continously lower the rate of inflation which it considered "inevitable" until the rate of German CPI change reached what the Bundesbank considered as price stability in 1984 (Bundesbank 1995, p. 83). In addition, it became less concerned about ouput considerations: After the oil price shock in 1973, the Bundesbank disinflated only gradually. The slowing of business activity in 1974 led the Bundesbank at least partly to accommodate price increases (Bundesbank 1974, p. 17). In 1990, when a demand shock from German reunification hit the German Economy, the Bundesbank reacted less flexible and thus less accommodating (Bernanke, Laubach, Mishkin, and Posen 1999, p. 74).

With this shift in the monetary policy stance, the structure of wage increases also changed: While unit labour costs were often a factor pushing up inflation in the 1970s and 1980s, wage setting in EMU after 1993 has been restrained. As figure 1 shows, the cumulated increases in unit labour costs since 1993 have been significantly below an increase with the ECB's upper inflation limit of 2 percent and even well below a steady increase by 1.5 percent – the rate many observers believe the ECB's inflation target actually to be at. In some countries such as Ireland and Germany unit labour costs at the end of the decade were even below their 1993 value.

Startlingly, the wage restraint did not show up in overall unemployment figures. True, Ireland and Spain did indeed manage to reduce unemployment sharply. However, Germany did not show promising developments in the labour market though it also exercises wage restraint relative to the central bank's inflation target. The same can be said about France and Italy, countries in which unit labour cost development also lagged far
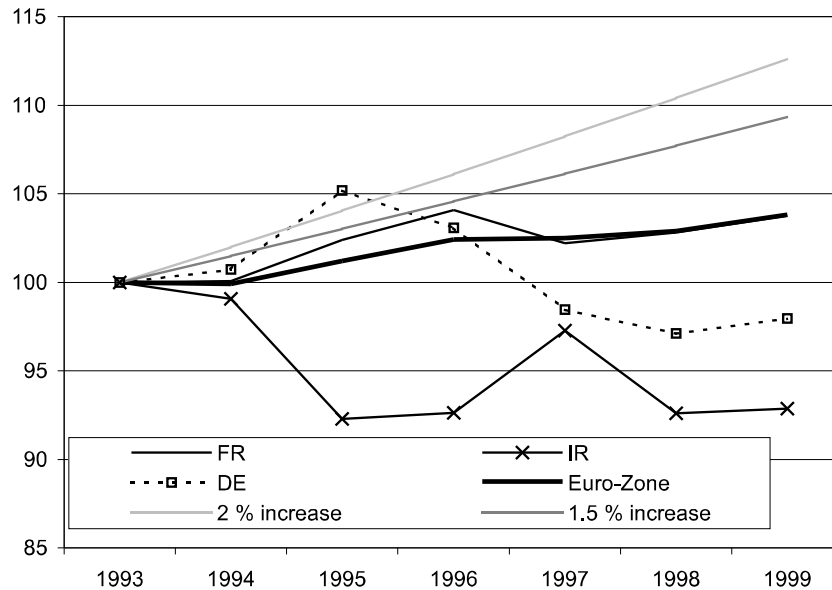
Figure 1: Unit labour cost developments in EMU

behind even an 1.5 percent annual increase.

Moreover, there might be two more cases in which wage restraint in small countries has led to a fall in unemployment, but which are not covered in the table as the wage restraint happened slightly before 1993: Finland and the Netherlands. The Finnish markka devalued sharply after 1991. Even though this eroded real wages, unions did not push for strong nominal wage increases. Unit labour costs in European Currency Units (ECU) terms only slowly recovered after. Finish unit labour costs measured in ECU were were still only roughly three quarter the 1991 value in 1999. The devaluation with wage restraint was followed by a large reduction in unemployment.

The Netherlands experienced their wage-restraint-led reduction in unemployment even earlier than that. After the recession of the early 1980s, collective bargaining partners took up responsible for employment-friendly wage agreements in the *Wassenaar* agreement of 1982. A period of wage growth below the European partners' wage increases followed while the Dutch guilder

remained tightly pegged to the German mark. In the following years, unemployment fell from a peak of almost 12 percent to little more than 2 percent in 2001.[7]

3.   A Model Without Real Balances

While thus the SICCD-explanation seems to be quite promising at first, it does not seem to work for large EMU countries. Here, two questions have to be raised: First, why did strategically acting unions in Ireland or Spain did indeed agree to larger wage restraint than German wage bargainers? Second, why was the positive effect of wage restraint on employment negligible in Germany while it was appeared so strongly in the smaller countries?

As I will argue below, these two questions cannot be answered separately. The only reason why unions exercise wage restraint is that they expect to make employment gains while giving away part of their real wage. If for economic reasons wage restraint does not lead to higher employment, unions with rational expectations will not be prone to make these wage restraints in the first place. If unions were not sure whether wage restraint did indeed lead to higher employment, they would at first restrain their wages a little and would observe what happens. If it then turned out that wage restraint was fruitless, there would be little reason to expect further wage restraint.

3.1.   Questioning the Real Balance Effect

One reason why the initial wage restraint as exercised by German wage bargainers after 1995 might not have produced the labour market improvements as envisioned by SICCD is the possibility that the real balance effect does not work in practise as it is assumed in the models. Thus, in aggregate lower unit labour costs might not have improved output and employment.

For a small open economy in which exports play a large role and which is small enough that there are no feed-back effects

---

[7] Due to space restrictions, I am not able to elaborate further on the particularities of the single countries experiences with periods of wage restraint here. The interested reader is refered to Dullien (2003).

Country	Unit labour costs (in ECU) in 1999 as percentage of 1993 value
Germany	97.9
France	103.8
Italy	104.6
Spain	96.6
Netherlands	104.3
Belgium	103.3
Austria	98.0
Portugal	111.9
Ireland	92.9
Finland	*109.0
Luxembourg	108.8
EMU-11	103.8
1.5 % annual increase	112.6
2.0 % annual increase	109.3

*Development for Finland might vastly overstate actual level of real exchage rate as Finland sharply devalued from 1991 to 1993.
ULC in Finland were 1999 only roughly 77 percent of 1991 value.

Source: European Commission (1998)

Table 2: Unit labour cost developments in EMU-11, 1993-2001

from trade partners the case how lower nominal wages lead to higher employment is easy: With the nominal exchange rate fixed, lower nominal wages lead to a real depreciation. As is standard in trade theory, this would improve the current account thus increasing aggregate demand and output. A large economy, however, needs a way how *domestic* demand is increased when nominal wages fall – and this is the real balance effect.

While the assumption of a real balance effect increasing aggregate demand when prices are falling is a key element of many textbook macroeconomic models,[8] it is not a necessary assumption. Instead, it might even be problematic as the theoretical foundation is rather weak.

In standard models such as AS-AD or the New Classical approaches, real balances influence aggregate demand via two channels: First, as real balances are part of the private sector's net wealth, and consumption is a function of net wealth, consumption increases with increasing real balances (*Pigou effect*). Second, when individuals suddenly face higher real balances than they would hold in equilibrium, they start reallocating their assets. They will start buying bonds against their money holdings which will drive down the interest rate. Lower interest rates then translate into higher investment demand (*Keynes effect*).

Thus, money needs to be net wealth for the private sector for the Pigou effect to work. For the Keynes effect to work, the money supply has to be set exogeneously. Both assumptions are questionable on empirical and theoretical terms. In the Euro area, money comes into circulation by banks borrowing money from the European Central Bank to lend it out to their clients. An increased money stock always comes with equivalently increased liability of some private party. In consequence, with changes in the price level the net wealth position of the private sector remains unchanged: As the money stock is backed by the same amount of private-sector's liabilities to the central bank, private sector debt increases at the same time and by the same

---

[8] It should be noted that some very recent contribution such as Romer (1999), Romer (2000) or Clarida, Gali, and Gertler (1999) completely drop the real balance effect as mechanism of monetary policy transmission. See below.

amount as does gross private sector wealth when prices fall. In consequence, private net wealth does not change with changes in the price level.

As a counter-argument one could argue that at least a small share of money circulating in the Euro area is in fact backed by government debt.[9]For this part of the money supply one could argue that a fall in prices increases private wealth since private liabilities are not increased. But, even for money backed by government debt it is questionable if a Pigou effect can be at work: If Ricardian equivalence holds and thus an increase in the stock of government debt hold by the public does not make the economy richer (as they expect to service the debt by higher future taxes), the private sector does not get richer when the real value of government debt rises due to a fall in the price level: The real debt burden of the government (and thus future tax burden) would rise exactly by the same amount the real value of money in the individuals' portfolios increases. The net effect would be zero.

The fact that money comes into existence when commercial banks borrow from the central bank also calls into question the notion of a Keynes effect when prices change. In the standard textbook models, the real value of money available for credit in the economy increases with a falling price level. However, as in reality the money stock is not exogeneously fixed and money is created as a reflex to credit demand and to the commercial banks' willingness to provide loans, one can assume that the money stock moves proportionally with the price level: As households and firms need credits in order to conduct *real* investment or to consume more in *real* terms, they will demand accordingly less credit when prices are falling (Betz 2001, p. 58ff).

For the case of firms and households being credit constrained, it is the banking sector which will change the nominal credit volume with a changing price level. With all prices decreasing, also expected future nominal household or firm earnings will decrease. The banks will lower their nominal credit ceilings. The opposite

---

[9] This stock mostly dates from the time before the beginning of European Monetary Union.

is true for rising prices. As expected future nominal cash-flows increase, credit ceilings are raised. If neither banks nor firms live under money illusion, the real credit constraint does not change when the price level changes.

These problems with real balance effects have led to a recent trend away from models which rely on the real balance effect as a mechanism of monetary policy transmission. Romer (1999, 2000) as well as modern literature on the efficiency of monetary policy rules building on New Keynesian models as presented in Clarida, Gali, and Gertler (1999) use the short term (real) interest rate as the way monetary policy affects the real economy and drop real balances completely from the picture. This path will also be followed by the model presented in this article.

3.2. The Baseline Model

The model presented here builds on models of monopolistic competition as presented in Dixit and Stiglitz (1977),Blanchard and Fischer (1989, chapter 8) or Blanchard and Kiyotaki (1987) which are widely used today. It takes into account some of the modifications made by Coricelli, Cukierman, and Dalmazzo (2000), notably the profit maximising firm. The main change,however, is that aggregate demand will not be modeled as a function of real balances.

The economy is composed of n monopolistically competitive firms each producing a good i given a simple production function with constant returns to scale. Labour N_i is the only input factor. For simplicity, a labour productivity of unity is assumed:

$$y_i = N_i \tag{1}$$

Each firm faces a (real) demand y_i^D for its output[10] being a function of the price of its good P_i, the price level P, the share α_i this particular good has in the individuals' CES-utility function[11], the (absolute value of the) elasticity of demand facing the

---

[10] Blanchard and Fischer (1989, p. 376ff) show how to derive this demand function from the individuals' maximisation decisions.
[11] All α's add up to 1.

individual firm η and the aggregate nominal demand Y^D which will be specified more in detail later on:

$$y_i^D = \frac{1}{n}\left(\frac{P_i}{P}\right)^{-\eta}\frac{Y^D}{P} \tag{2}$$

As standard in models of monopolistic competition, for an equilibrium to exist, $\eta > 1$ must hold (Blanchard and Fischer 1989, p. 377). The aggregate price level is given by:

$$P = \left(\sum_{j=1}^{n}\frac{1}{n}P_j^{(1-\eta)}\right)^{\frac{1}{1-\eta}} \tag{3}$$

Each single firm maximises its profits by choosing the price of its good given nominal wages W_i it has to pay and given the demand function it faces:[12]

$$\max_{P_i}\Pi_i = P_i y_i^D - W_i N_i \tag{4}$$

Maximising and solving for P_i yields:

$$P_i = \frac{-\eta}{(1-\eta)}W_i \tag{5}$$

3.3.   Aggregates in a large closed economy

If we now have an economy in which the general nominal wage level W is set by some monopoly union and is thus the same for all firms, we get for the aggregate price level P:

$$P = P_1 = ... = P_n = \frac{-\eta}{(1-\eta)}W \tag{6}$$

Thus, prices are proportional to the general wage level. Substituting (6) into (2) yields output and employment of each firm:

$$N_i = y_i = y_i^D = \frac{1}{n}\cdot\frac{(1-\eta)}{-\eta W}Y^D \tag{7}$$

Aggregating over all firms, we get aggregate output y and aggregate employment N:

---

[12] For computational details, see the appendix.

$$N = y = \frac{(1 - \eta)}{-\eta} \frac{Y^D}{W} \tag{8}$$

If now Y^D were a function of the real money supply M/P, the results from the SICCD approach would hold: Unions could induce prices to fall and thus the real money supply and aggregate demand to increase by restraining their wages. In consequence, real output and employment would also increase.

However, as I have argued above, the case for a significant real balance effect on aggregate demand is rather weak. Instead, aggregate demand here will be modeled as the sum of consumption and investment demand, consumption being a constant share c of the wage bill,[13] real investment j as a negative function of the central banks real short term interest rate r:[14]

$$Y^D = cNW + Pj(r) \tag{9}$$

Substituting (8) and (6) into (9) and solving yields for aggregate nominal demand:

$$Y^D = \frac{(-\eta)^2}{-(\eta + c(1 - \eta))(1 - \eta)} Wj(r) \tag{10}$$

Substituting (10) into (8) yields for aggregate real output and aggregate employment:

$$N = y = \frac{-\eta}{(-\eta - c(1 - \eta))} j(r) \tag{11}$$

Thus, real output and employment are independent from the nominal wage level. Instead, the propensity to consume, the elasticity of substitution between different goods in the economy (which Blanchard and Giavazzi (2000) interpret as the degree

---

[13] The basic results do not rely on the assumption that in this model all of the profits are saved. If we allow also entrepreneurs to consume part of their profits, the multiplier get more complicated, but the basic result of output and employment being independent of nominal wages remains intact.

[14] It is quite plausible to assume a given *real* amount of investment as a decision to invest is made for a certain project as a new building, a new machine and not for a nominal amount of investment. This assumes an absence of money illusion on behalf of investors.

of monopolisation) as well as the real interest level set by the central bank determine aggregate output and employment. The higher the propensity to consume, the higher output. The higher the degree of monopolisation, the lower output.

Real wages ϖ and aggregate real profits Π/P are given by:

$$\varpi = \frac{W}{P} = \frac{1-\eta}{-\eta} \tag{12}$$

$$\frac{\Pi}{P} = \frac{1}{\eta + c(1-\eta)} j(r) \tag{13}$$

Thus, also real wages and real profits are independent from the nominal wage level. Instead, the higher the degree of monopolisation, the lower real wages and the higher aggregate profits.

A change in nominal wages thus only changes prices, but leaves real wages, real profits, output and employment unchanged. As nominal wages do not have any influence on the level of employment, there is no tendency for a full employment equilibrium to be obtained. Instead, investment demand determines the level of unemployment. Thus, nominal wage restraint in this context is without consequences. Consequently, it is only rational for unions in large economies not to proceed this path further. A monopoly union thus would not engage in wage restraint.

3.4.   A small country within a currency union

However, what is true for EMU as a whole does not need to hold for a single small country within EMU. To cover this case with our baseline model, we have to relax the assumption of an overall wage level for all of the economy. Instead, we will assume that all but one of our n firms are covered by the monopoly union. Firm j is covered by a different union. This single firm could stand for one of the smaller economies of the Eurozone or alternatively for one sector of those smaller economies.[15] Starting from (5) and

---

[15] The results of this article would not change if the single country consisted of several firms for which one union sets wages as long as the firms have a combined weight small enough that the wages paid in these firms do neither significantly affect aggregate demand nor aggregate prices.

(2), we get the profit maximising output of firm j as a function of the wages in that firm:

$$N_j = y_j^D = \frac{1}{n} \left(\frac{-\eta}{1-\eta} \frac{W_j}{P} \right)^{-\eta} \frac{Y^D}{P} \qquad (14)$$

Assuming that firm j (the small country) is sufficiently small that changes in W_j neither significantly influence the price level P nor aggregate demand Y^D we see easily that the small single union can influence employment in its firm by varying the nominal wage demanded:

$$N_j = y_j = \frac{1}{n} \left(\frac{W}{W_j} \right)^{\eta} \frac{-\eta}{-\eta - c(1-\eta)} j(r) \qquad (15)$$

Thus, a small country in a currency union together with a large country for which a monopoly union sets the wage level has the possibility to influence its own employment and real wage by setting its nominal wage level just as it is assumed for all unions via the real balance effect in Soskice and Iversen (2000) or Coricelli, Cukierman, and Dalmazzo (2000). As we see, the larger the degree of substitution between different goods (or differently put: the smaller monopoly power) the less difference between the general wage level W and the wage level in firm j is necessary in order to achieve a given increase in employment.

In order to find out what the union actually does with this possible trade-off, we need to analyse the union's utility function. As it is standard in the literature, we assume that the union cares both about employment and the real wage paid. The utility function contains both the deviation of actual employment N_j from what the union perceives as full employment $\bar{N}_j$ and the real wage. γ_1 is the weight the union assigns to real wages and γ_2 the weight the union assigns to unemployment (assuming $\gamma_1 + \gamma_2 = 1, \gamma_1, \gamma_2 \geq 0$):

$$U^{union\text{-}j} = \gamma_1 \frac{W_j}{P} - \gamma_2 \left| \bar{N}_j - N_j \right| \qquad (16)$$

Analysing this utility function yields an local optimum exactly at the point where employment in the firm j equals the full employment goal of the small single union. Wages in this
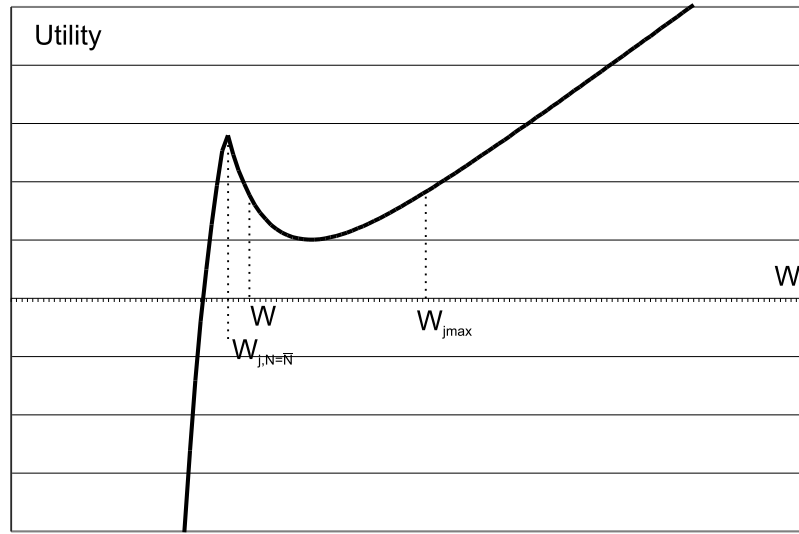
Figure 2: The single union's utility function

point are W_j^* (see figure 2). With rising wages, the union's utility first falls to a minimum and then starts to increase again.

Maximising (16) and solving for W_j^* as a function of the general wage level (that is the wage set by the large monopoly union in the rest of the economy) yields:

$$W_j^* = \left(\frac{N}{n\bar{N}_j} \right)^{\frac{1}{\eta}} W \qquad (17)$$

The single small union's wage demand is an increasing function of the ratio between the employment $\frac{N}{n}$ it would experience had it chosen a wage equal the general wage level W and its employment target $\bar{N}_j$. As long as the general level of employment in the economy is below full employment, a possible equilibrium for this union would be this wage W_j^* below the general wage level. In terms of the European union experience, this equilibrium would represent the situation chosen by Ireland in the 90s or the Netherlands in the 80s. By undercutting the rest of the union's general wage level, those small countries manage to
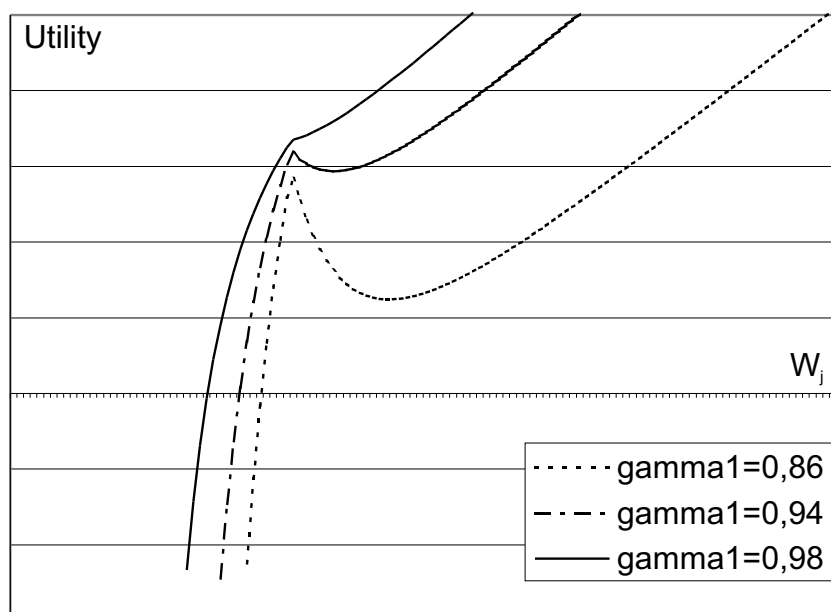
Figure 3: The single union's utility function with different weights for unemployment

increase their union's utility by approaching full employment.[16]

However, as can be seen in figure 2, the full employment point is a local maximum, but not a global one. As wages are increasing, utility raises again and reaches utility levels above the full employment utility as soon as wages are higher than W_j^M. Whether a union now strives for the full employment local utility maximum in W_j^* or for wages above W_j^M depends on two things: First, as we see in figure 3, the more the small single union cares about unemployment the higher is the wage necessary to reach the same utility level as in the full employment local maximum. Second, the union has to take into account the difficulties it will encounter to reach a wage level above W_j^M. As profits for the firm j (or, in an EMU context firms' profits in a single small country) are falling with increasing wages, the

---

[16] Note that this increased employment goes hand in hand with increased output. Part of above-average growth in small countries exercising wage restraint such as Ireland would thus be a consequence of wage restraint.

higher W_j^M the more difficulties will unions face when they try to get employers to agree on such high wages. At the same time, the more unequal the bargaining power is distributed between unions and employers (that is the stronger the unions' position), the greater the probability that a union will strive for a high real wage, low employment solution for their company j. In the context of EMU, the solution to the right of the general wage level W might provide an explanation why not all small countries in EMU got involved in *beggar-thy-neighbor* policies as the Netherlands and Ireland did. For those other countries one would then conclude that unions are either stronger than in the Netherlands or Ireland or that the specific union structure of the latter countries leads to a higher weight the unions assign to low unemployment. A final possible explanation for some countries' unions' failure to exploit the opportunity of beggar-thy-neighbor policies would be a lack of the ability to act strategically, e.g. due to specific union structures or lack of experience in dealing with the new currency union environment.

Recent changes in the wage bargaining process in EMU might also hint that unions and politicians to an increasing degree understand the importance of relative wage developments for employment and growth. In Belgium, for example, a 1996 law restricts wage increases to what is compatible with constant or improving competitivenes, de facto linking Belgian wages to wage developments in the other important Eurozone countries (Germany, France and the Netherlands). In this article's reading that would mean that the law keeps Belgian unions from trying to get to the high unemployment/high real wage point. In the Netherlands, a group of central union experts state at the beginning of every bargaining round the "appropriate" level of wage growth and up until 2001 every contract was officially sanctioned by the labour union board.[17]

---

[17] See for both cases Hancké (2002).

4.   Conclusion

The article has shown two things: First, if we loosen the assumption of a real balance effect to be at work in a macroeconomic model of monopolistic competition, real output, real wages and employment become independent from the nominal wage level. Instead, the nominal wage level only influences nominal variables as the price level. Consequently, a large monopoly union will not be able to influence employment by wage restraint. This feature might explain while wage restraint in Germany, the nominal wage level of which has a crucial impact on Euro-zone wages, did not lead to an improvement of the unemployment situtation. Moreover, taken for face value, this model's conclusion would be that unemployment is not a consequence of an excessive wage level, but of an insufficient aggregate demand.

Second, it has been shown that a union in a small country which is in a currency union with a large country actually *can* influence its real wage, output and employment level. As the currency union wide wage (and thus price) level is set by the large country's wage contracts, the small country can vary its real wage by altering its nominal wage. It can thus engage in a *beggar-thy-neighbor* strategy, not by nominal depreciation, but by undercutting the nominal wage level in the absence of an exchange rate.

These conclusion do not only explain why wage restraint did not bring much of an improvement in overall employment in Germany, it also explains why small countries in EMU did better in battling unemployment than the large ones: They just have an additional degree of freedom.

This casts a sad shadow on the future of European Monetary Union. If union structures do not converge, there will be some small countries which systematically strive for a lower real wage/higher employment solution by beggaring their neighbors and others who will constantly have an inflationary problem and high unemployment. Moreover, wage bargainers will not be able to change the unemployment problem as it is a problem of insufficient demand which is outside of their reach of control.

Acknowledgements

References

Bernanke, B. S., T. Laubach, F. S. Mishkin, and A. S. Posen (1999): *Inflation Targeting. Lessons from the International Experience.* Princeton University Press, Princeton and Oxford.

Betz, K. (2001): *Jenseits der Konjunkturpolitik. Überlegungen zur langfristigen Wirtschaftspolitik in einer Geldwirtschaft.* Metropolis, Marburg.

Blanchard, O., and F. Giavazzi (2000): "Macroeconomic Effects of Regulation and Deregulation in Goods and Labour Markets," mimeo.

Blanchard, O. J., and S. Fischer (1989): *Lectures on Macroeconomics.* MIT Press, Cambridge, MA, et al.

Blanchard, O. J., and N. Kiyotaki (1987): "Monopolistic Competition and the Effects of Aggregate Demand," *American Economic Review*, 77, 648–666.

Bundesbank (1974): *Annual Report.* Frankfurt.

——— (1995): *Die Geldpolitik der Bundesbank.* Deutsche Bundesbank.

Clarida, R., J. Gali, and M. Gertler (1999): "The Science of Monetary Policy: A New Keynesian Perspective," *Journal of Economic Literature*, 37, 1661–1707.

Coricelli, F., A. Cukierman, and A. Dalmazzo (2000): "Monetary Institutions, Monopolistic Competition, Unionized Labor Markets and Economic Performance," mimeo.

DIXIT, A. K., AND J. E. STIGLITZ (1977): "Monopolistic Competition and Optimum Product Diversity," *American Economic Review*, 67, 297–308.

DULLIEN, S. (2003): "The Interaction of Monetary Policy and Wage Bargaining in EMU. Determination of Employment and Output in an Endogenous Money System," Ph.D. thesis, Freie Universität Berlin.

EUROPEAN COMMISSION (1998): "AMECO – Annual Macroeconomic Database," Version 1998.

FELDERER, B., AND S. HOMBURG (1994): *Makroökonomik und Neue Makroökonomik*. Springer, Berlin et al.

HANCKÉ, B. (2002): "The Political Economy of Wage-Setting in the Eurozone," in *Wage Policy in the Eurozone*, ed. by P. Pochet, pp. 131–148. PIE-Peter Lang, Brussels.

OECD (2002): *Employment Outlook*. OECD, Paris.

ROMER, D. (1996): *Advanced Macroeconomics*. McGraw-Hill, New York et al.

——— (1999): *Short-Run Fluctuations*. University of California, Berkeley.

——— (2000): "Keynesian Macroeconomics Without the LM Curve," NBER Working Paper No. 7461.

SOSKICE, D., AND T. IVERSEN (2000): "The Non-Neutrality of Monetary Policy with Large Price Setters," *Quarterly Journal of Economics*, 115, 265–284.

Appendix

A.   Basics

A.1.   The firms' maximisation problem

Substituting (1) into (4) yields:

$$
\begin{aligned}
\max_{P_i} \Pi_i &= P_i y_i^D - W N_i \\
&= P_i y_i^D - W y_i^D \quad\quad\quad\quad\quad (18) \\
&= (P_i - W_i)\frac{1}{n}\left(\frac{P_i}{P}\right)^{-\eta}\frac{Y^D}{P} \quad (19)
\end{aligned}
$$

Differentiating (19) with regard to P_i yields as an optimality condition:[18]

$$
\frac{1}{n}\cdot\frac{1}{P}\left(\frac{P}{P_i}\right)^{\eta}Y^D - \frac{1}{n}\frac{\eta}{P_i^2}\left(\frac{P}{P_i}\right)^{\eta-1}(P_i - W_i)\,Y^D = 0 \quad (20)
$$

$$
\begin{aligned}
\frac{P^{\eta-1}}{P_i^{\eta}} &= \eta\frac{P^{\eta-1}}{P_i^{\eta+1}}(P_i - W_i) \quad (21) \\
P_i &= \eta\,(P_i - W_i) \quad\quad\quad (22) \\
P_i &= \frac{-\eta}{(1-\eta)}W_i \quad\quad\quad (23)
\end{aligned}
$$

A.2.   Firms' profits

From (7) and (4), we get the profit for each firm:

$$
\begin{aligned}
\Pi_i &= (P_i - W)\frac{1}{n}\cdot\frac{Y^D}{P_i} \quad\quad\quad (24) \\
&= \left(1 - \frac{W\,(1-\eta)}{-\eta W}\right)\frac{1}{n}Y^D \quad (25)
\end{aligned}
$$

---

[18] This assumes, of course n being sufficiently large so that P_i only has a negligible effect on P.

$$= \left(1 - \frac{(1-\eta)}{-\eta}\right)\frac{1}{n}Y^D \tag{26}$$

$$= \frac{1}{n}\cdot\frac{1}{\eta}Y^D \tag{27}$$

Aggregating for the whole economy yields for aggregate profits:

$$\Pi = \sum\Pi_i = \sum\frac{1}{n}\cdot\frac{Y^D}{\eta} = \frac{Y^D}{\eta} \tag{28}$$

B. Aggregate Demand as a function of wages

B.1. Only Workers Consume

When we assume consumption as a share of the wage bill, we get nominal aggregate demand as a multiple of the general nominal wage level:

$$
\begin{aligned}
Y^D &= cNW + Pj(r) \\
&= cNW + \frac{-\eta}{(1-\eta)}Wj(r) \quad (29) \\
&= c\frac{1-\eta}{-\eta}Y^D + \frac{-\eta}{1-\eta}Wj(r) \quad (30)
\end{aligned}
$$

$$\Leftrightarrow \left(-\frac{\eta + c(1-\eta)}{-\eta}\right)Y^D = \frac{-\eta}{1-\eta}Wj(r) \tag{31}$$

$$\Leftrightarrow Y^D = \frac{(-\eta)^2}{-(\eta + c(1-\eta))(1-\eta)}Wj(r)$$

With aggregate consumption being a function of the wage bill such as depicted in (9), however, aggregate output y and aggregate employment N are independent from the nominal wage level:

$$
\begin{aligned}
y &= \frac{(1-\eta)}{-\eta W}Y^D \quad (32) \\
&= \frac{(1-\eta)}{-\eta W}\frac{(-\eta)^2}{(1-\eta)(-\eta - c(1-\eta))}Wj(r) \quad (33)
\end{aligned}
$$

$$y \quad = \frac{-\eta}{(-\eta - c(1-\eta))} j(r) \tag{34}$$

B.2.   Real Wages and Profits

In this case, real wages are a function merely of the elasticity of substitution between produced goods η

$$\varpi = \frac{W}{P} = W \left(\frac{-\eta}{1-\eta} W \right)^{-1} = \frac{1-\eta}{-\eta} \tag{35}$$

and real aggregate profits $\frac{\Pi}{P}$[19] a function of the elasticity of substitution between goods produced, the propensity to consume c and the real investment undertaken:

$$\frac{\Pi}{P} \quad = \quad \frac{1}{\eta} \frac{Y^D}{P} \tag{36}$$

$$= \quad \frac{1}{\eta + c(1-\eta)} j(r) \tag{37}$$

B.3.   Entrepreneurs as Consumers

The central result of output, employment and real profits being independent from the nominal wage level also holds when one assumes entrepreneurs to consume part of their profits. Aggregate demand then is given by the sum of consumption out of wages (with marginal propensity c_W), consumption out of profits (with marginal propensity c_Π) and investment:

$$Y^{D+} = \quad c_W NW + c_\Pi \Pi + P j(r) \tag{38}$$

$$= \quad c_W \frac{1-\eta}{-\eta} Y^{D+} + c_\Pi Y^{D+} + \frac{-\eta}{1-\eta} W j(r) \tag{39}$$

$$\Leftrightarrow \left(-\frac{\eta + c(1-\eta) - c_\Pi}{-\eta} \right) Y^{D+} = \frac{-\eta}{1-\eta} W \tag{40}$$

$$\Leftrightarrow Y^{D+} = \frac{(-\eta)^2}{-(\eta + c_W(1-\eta) - c_\Pi)(1-\eta)} W j(r) \tag{41}$$

---

[19] With Π being the sum of single firms' profits Π_i.

For real output, we get:

$$y^+ = \frac{-\eta}{(-\eta - c_W(1-\eta) + c_\Pi)} j(r) \tag{42}$$

Thus, when entrepreneurs consume part (or even all) of their profits, only the investment multiplier becomes larger.

C. Small Union vis-à-vis Large Union

C.1. Output and Wages

A single firms output changes when the wage it has to pay W_j changes while the general wage level W remains unchanged:

$$\frac{\partial y_j^D}{\partial W_j} = \frac{1}{n}\left(\frac{-\eta}{1-\eta}\right)^{-\eta}\Big[-\eta W_j^{-\eta-1}P^{\eta-1}Y^D$$

$$- (1-\eta)\frac{\partial P}{\partial W_j}P^{\eta-1}Y^D + \frac{\partial Y^D}{\partial W_j}W_j^{-\eta}P^{\eta-1}\Big] \tag{43}$$

With $\frac{\partial P}{\partial W_j} = 0$ and $\frac{\partial Y^D}{\partial W_j} = 0$, we get:

$$\frac{\partial y_j^D}{\partial W_j} = \frac{1}{n}\left(\frac{-\eta}{1-\eta}\right)^{-\eta}\Big[-\eta W_j^{-\eta-1}P^{\eta-1}Y^D\Big] < 0$$

By choosing the nominal wage, a single union can determine employment in its firm. For a given employment goal $\bar{N}$ we get from 14:

$$(W_j^*)^\eta = \frac{1}{n}\left(\frac{1-\eta}{-\eta}\right)^\eta P^{\eta-1}\frac{Y^D}{\bar{N}_j} \tag{44}$$

Substituting (6), using (10) and (11) and solving for W_j^* yields:

$$W_j^* = \left(\frac{1}{n}\cdot\frac{1-\eta}{-\eta}\cdot\frac{Y^D}{\bar{N}_j}\right)^{\frac{1}{\eta}} W^{\frac{\eta-1}{\eta}} \tag{45}$$

$$= \left(\frac{1}{n}\cdot\frac{\eta}{\eta + c(1-\eta)}\frac{j(r)}{\bar{N}_j}\right)^{\frac{1}{\eta}} W \tag{46}$$

$$W_j^* = \left(\frac{N}{n\bar{N}_j}\right)^{\frac{1}{\eta}} W \tag{47}$$