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**Working Paper**

## Minimum Wages and Employment: The Case of German Unification

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**Kiel Working Paper No. 1045**

**Minimum Wages and Employment:  
The Case of German Unification**

by

**Bernhard Heitger**

May 2001

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# **Minimum Wages and Employment: The Case of German Unification**

Abstract:

Analysis in terms of the two-sector open economy shows that in bringing the market economy to East Germany, West Germany seems to have disregarded important fundamentals. Premature formation of a currency union led to a substantial real appreciation of the East German currency. Premature implementation of the West German system of wage bargaining resulted in inappropriate minimum wage schedules. Both measures made East German production possibilities and employment decline.

Keywords: Minimum Wages, Employment, German Unification  
JEL classification: E24, P23

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## 1. Introduction

Only a few months after the fall of the Berlin wall the West German government offered East Germany immediate negotiations regarding monetary union conditional upon simultaneous economic reforms.<sup>1</sup> Although many academic economists expressed their reservations against a rapid formation of a currency union politics surpassed economics. The decision soon went in favour of a monetary union and the East German electorate voted for rapid unification with (rich) West Germany and for those parties of West Germany which were supposed to hold the purse strings.<sup>2</sup> Soon thereafter, on 1 July 1990, an economic, monetary and social union became effective and on 3 October 1990 – the day of German unification – the GDR ceased to exist.

The initial euphoria regarding unification led policymakers to also implement the West German system of wage bargaining in Eastern Germany. This policy resulted in ambitious wage schedules to provide a rapid "catching up" of eastern wages with the west; the rise in wages became effective and generally binding soon afterwards. In the public debate these wage increases were thought to be a matter of social justice and fair pay rather than of labour productivity (or of labour demand and supply) and resulted in large increases in eastern unemployment.

The aim of the present paper is to analyse the employment effect of these "operating" minimum wages. Since these wages became effective shortly after

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<sup>1</sup> A detailed record and evolution of the events is given in Sherman (1993). For surveys of German Unification see also Sinn and Sinn (1992), and Dornbusch and Wolf (1994).

<sup>2</sup> Sherman (1993: 10).

currency unification – which in fact was a huge appreciation of the East German currency – the employment effects of the minimum wages were mixed up with structural adjustment problems due to currency revaluation. To also account for this circumstance the minimum wage effects are analysed with the help of the two-sector model of a small open economy. This model builds on the work of Salter (1959) who was among the first in analysing real internal and external adjustment problems. Several economists since then have extended their research along these lines. For example, Dornbusch (1980) improved the model by combining real and monetary aspects.

In the next section the basic elements of the underlying two-sector model are briefly discussed and it is shown that real exchange rate changes and structural adjustments to internal and external imbalances are interrelated. This approach is then employed to analyse the impact of minimum wages. It is hypothesised that the minimum wages jeopardised East Germany's catching up with the West because they made the structural adjustment more costly and probably even not sustainable. At least, there is still the immense risk of having produced a modern German-type mezzogiorno with some workshops for robots in the East and an industrial super-agglomeration in the West – accompanied by rising tax burdens and reduced long-run economic growth for unified Germany. Conclusions are drawn in the last section. The results of this paper may be of some relevance to Korea if unification is to come. In the current debate on the "elusive" effects of minimum wages<sup>3</sup> the wage policy in the case of German unification may serve as another "natural experiment".

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<sup>3</sup> Cf. Card and Krueger (1995), Kennan (1995) as well as recent contributions in the American Economic Review (December 2000).

## 2. Theoretical Considerations

### *a. The Two-Sector Model*

In order to analyse the real adjustment problems of German unification the model of a small open economy is used, i.e. it is assumed that the terms-of-trade for this economy are given exogenously. The economy consists of two sectors: An international sector producing internationally traded goods under the "law of one price"; and a non-tradables sector, whose goods and services are not internationally traded. Thus, within the non-tradables sector domestic supply and demand must be balanced at any time. Except that only one of the two goods is internationally tradable, the usual basic assumptions of the standard two-goods-two-factors model of international trade theory apply.

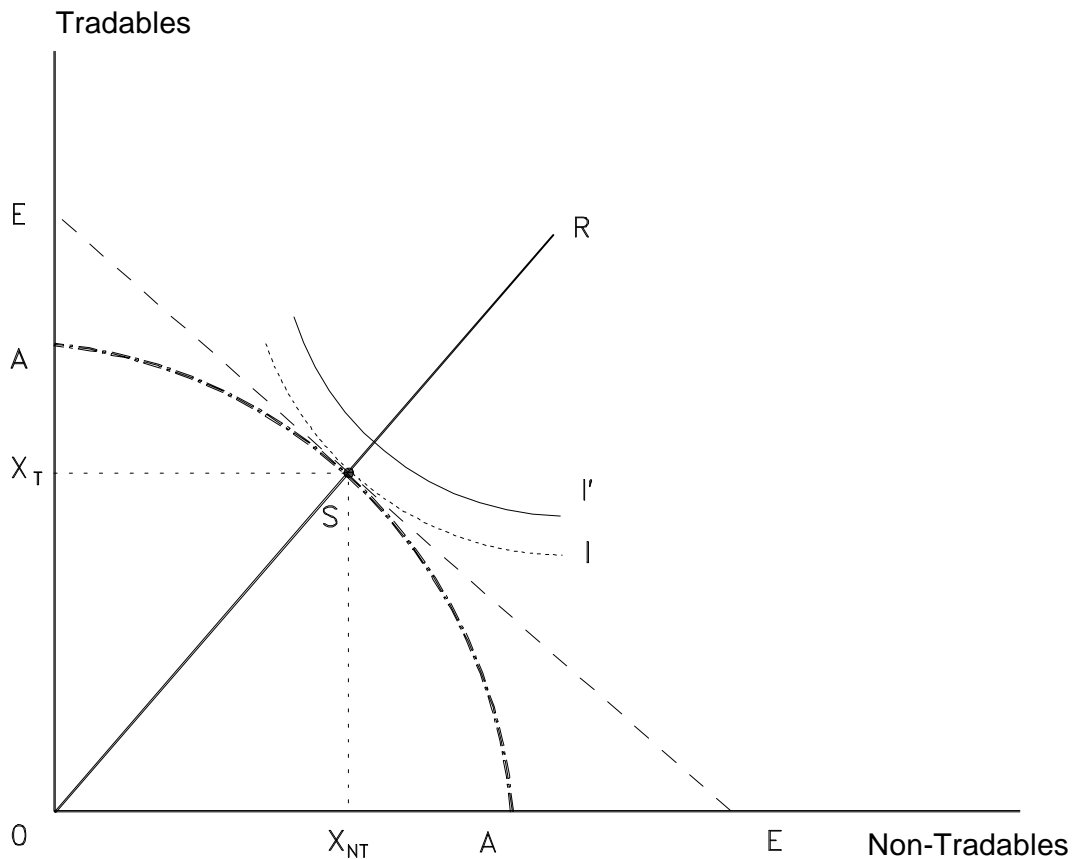
The supply side of the model in diagrammatic form consists of a transformation curve which gives the efficient subset of the set of all feasible production possibilities – where for a given output of one of the commodities the output of the other commodity is maximised (AA in Figure 1). It is assumed that the transformation curve is concave to the origin.<sup>4</sup> The demand side is given by a system of community indifference curves (I and I') which are assumed to be homothetic. The slope of the income and absorption line EE is equal to the price ratio between tradables and non-tradables. Due to the "law of one price" for tradables this ratio

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<sup>4</sup> I.e. constant returns to scale and different factor intensities are assumed.

has the "character of a real exchange rate".<sup>5</sup> Internal and external balance is only achieved, if the points of production and of absorption coincide.

Figure 1 — Internal and External Balance



Changes in the underlying supply and demand conditions lead to structural change which causes relative price changes between tradables and non-tradables. If there is e.g. a current account deficit with absorption higher than production a reduction in domestic absorption and a devaluation of the real exchange rate are necessary to achieve external and internal balance. In a system with flexible exchange rates these relative price changes lead to changes in the nominal

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<sup>5</sup> Bruno (1976).



exchange rate. With fixed nominal exchange rates, the price of tradables is fixed and the price of non-tradables has to bring about the adjustment.

*b. The Impact of Minimum Wages*

Despite the drastic decline in total production and hence in total generated income labour in the New Länder soon after unification began to claim a rapid catching up of wages to levels comparable with those in West Germany. Supported by their Western colleagues Eastern trade unions began to follow a high-wage policy irrespective of productivity increases and proved successful in the central wage negotiations. The main reason for this outcome seems to have been that one of the most important principles in the German system of collective wage bargaining was neglected: The principle, that the weights of the employers' association and of the trade unions should be balanced. Since the side of the employers was inadequately represented (with only "proxy" negotiators, i.e. former directors of East German firms), "in effect, the same party was initially sitting on both sides of the table".<sup>6</sup>

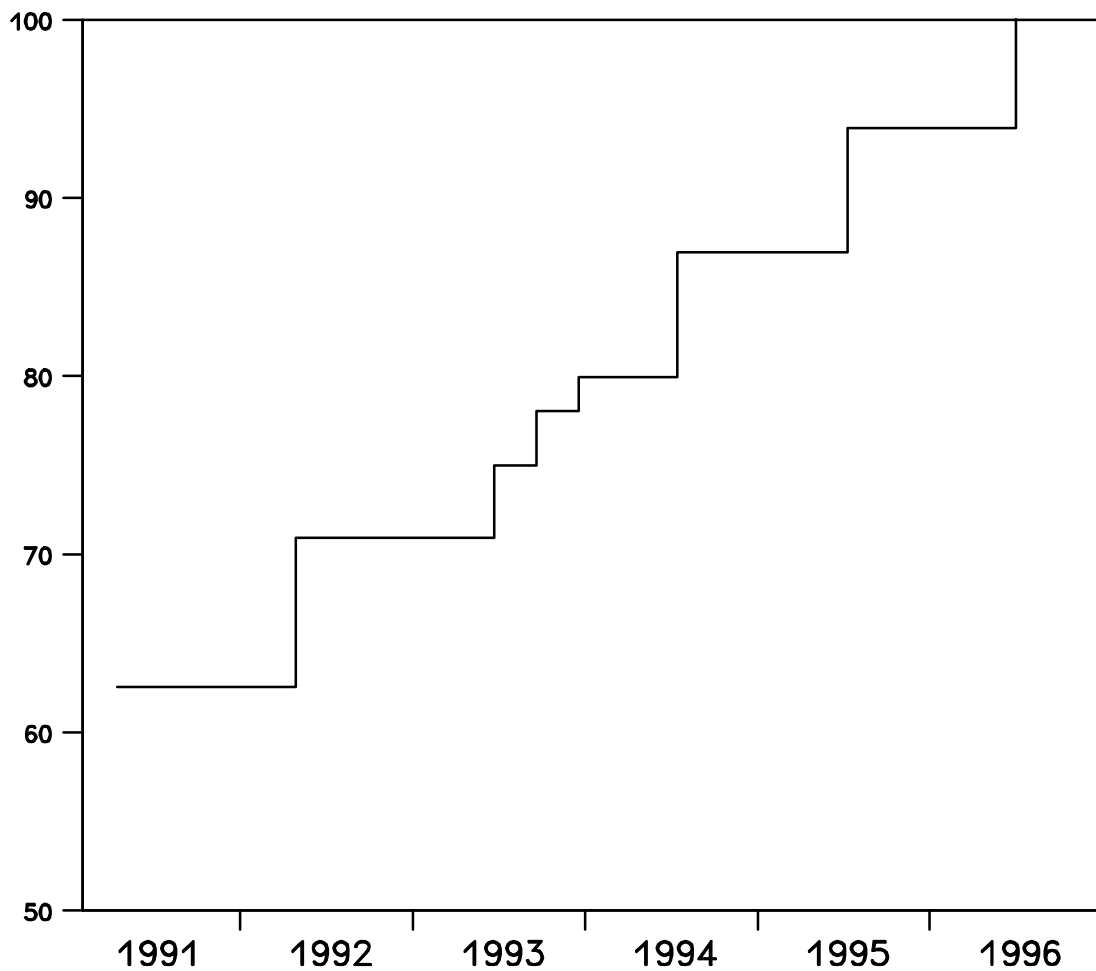
One of the results was an agreement of March 1991 for one of the most important industries – the engineering industry – in which it was decided that wage levels in the East should approach those of the West by April 1994 in a stepwise fashion. Although this initial agreement in the meantime was abandoned by the employers a new schedule of regular wage increases to catch up with West German levels became effective (Figure 2).

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<sup>6</sup> Sinn and Sinn (1992: 165).

At large this wage schedule may be taken as representative for the East German economy. As can be seen wages – irrespective of productivity developments – since spring 1992 up to 1994 were to be increased by 17.5 percentage points

Figure 2 — Minimum Wage Schedule in East Germany<sup>a</sup>, 1991–1996  
(per cent of West German Wage Level)<sup>a</sup>



<sup>a</sup> Engineering industries.

Source: Frankfurter Allgemeine Zeitung (1993), Greiner et al. (1994).

(relative to the West German wage level) and further increases were planned to achieve wage parity as soon as 1996.

This high-wage policy jeopardised East Germany's structural adjustment and especially East Germany's catching up in terms of real economic development. Within the two-sector framework the following conclusions can be drawn: Wage increases of the kind referred to above have – if they are generally binding – the character of minimum wages. In terms of the underlying two-sector model such real minimum wages result in a kinked production possibility curve (Figure 3).<sup>7</sup> With the binding real minimum wage in  $W$  the upper part of the production possibility curve is no more feasible. Instead, maximum production of tradables and non-tradables is restricted to a straight line ( $WA''$ ) which may also be called a "Rybczynski line" according to the theorem from which its form follows (cf. Heitger 1983: 44). Moving to the left along this line – for instance because of changes in domestic absorption – results in rising unemployment. To the extent that production in the labour-intensive non-tradables sector is reduced employees are dismissed who at the prevailing relative price (slope of the expenditure line  $E''E''$  in  $W$ ) will not be absorbed by the expanding tradables sector (because this sector does not use this factor of production intensively).<sup>8</sup> Production will eventually be at  $S''$  (i.e. unemployment rises) and domestic absorption at  $D''$  – i.e. there is an external imbalance financed by transfers from the West. In addition, the price of tradables relative to non-tradables is lower than it would have been in the case of no labour market distortions (point  $S'$ ). This change in relative prices of course is due to relative price increases for non-tradables, because the absolute price of tradables because of the currency union is fixed.

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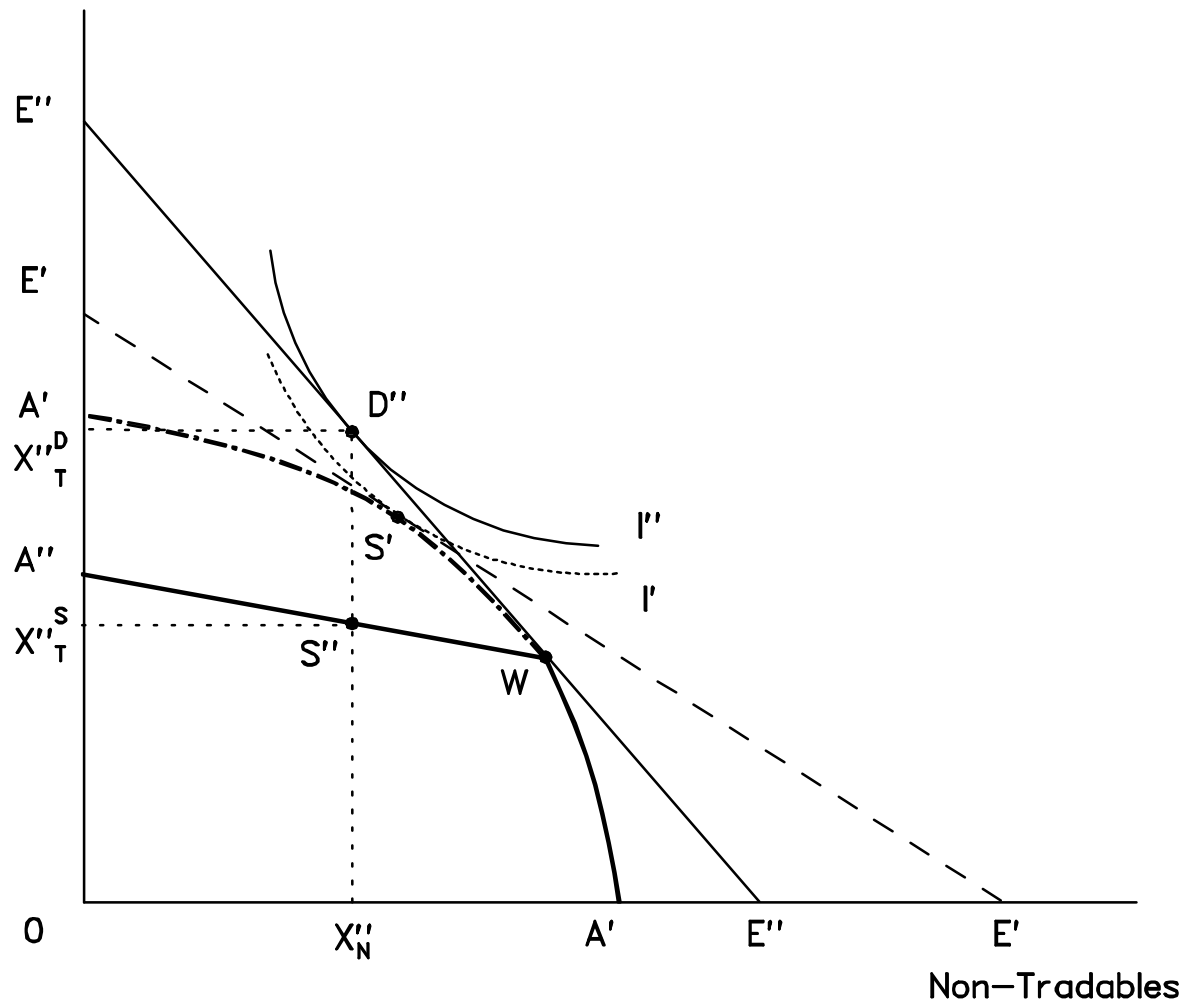
<sup>7</sup> Cf. Brecher (1974).

<sup>8</sup> This assumption is supported by calculations of the capital labour ratio for Germany. In 1995 the capital stock (tangible assets per employee) in the tradables sector was 300 027 DM while in the non-tradables sector (dwellings not included) it was only 235 550 DM.

In such a situation the economic authorities find themselves in a dilemma, because conventional absorption policy alone cannot solve the existing adjust-

Figure 3 — The Impact of Minimum Wages

Tradables



ment problems (cf. Heitger 1983: 44–47). An improvement of employment and longer-term external balance can only be achieved if minimum wages are suspended and relative price changes bring about the necessary structural adjustment. Figure 3 tries to clarify the adjustment mechanism. If the initial situation is characterised by external imbalance ( $S''-D''$ ) and internal balance, wage reductions will improve the production possibilities of East Germany, i.e. make

possible sustained increases in employment and income in both sectors. In addition, relative price changes will be necessary. If lower wages lead to full employment production will take place in  $S'$ , i.e. an excess supply of non-tradables and an excess demand for tradables will result. Thus, in addition to wage reductions relative price increases for tradables are necessary to achieve external and internal balance. In a small open economy a flexible exchange rate would care for such price adjustments. However, since the Eastern Länder did not try to pursue a sovereign exchange rate policy but instead chose to become part of a currency union with former West Germany nominal exchange rate changes as an instrument to change tradables prices are no more available. Thus, clumsy changes in (absolute) non-tradables prices have to ensure the necessary relative price changes to bring about the structural adjustment.

If the minimum wages are not suspended the East German economy will be locked in a situation not uncommon to the one typical for a Soviet-type economy: Serious distortions may prevent production to take place on the (maximum) production possibility curve. In addition, such a situation may be rather stable for some time if the external balance, i.e. the distortion, is financed by public transfers from the West.<sup>9</sup> Sooner or later these transfers will result in a higher tax share of the German economy with the corresponding lower rates of economic growth. Thus, the type of unification chosen – with rapid catching-up of wages irrespective of productivity developments ("a sure recipe for unemployment" cf. Dornbusch 1993: 885) – turns out to be a rather costly procedure with an uncertain outcome.

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<sup>9</sup> E.g. in 1993 these transfers accounted for 60 per cent of the East German GDP (Fuest and Kroker 1993: 14).

### 3. Empirical Evidence

The above hypotheses imply that, according to the policies chosen, the international sector of the East German economy had to bear the brunt of an artificially created adjustment burden. In the present chapter it will be empirically demonstrated that this indeed was the case.<sup>10</sup>

The currency unification with an overall conversion rate of about 1:1 implied a drastic appreciation of the East German currency. It was estimated that the extent of the appreciation of East German wages in terms of units of the German D-Mark was about 400 per cent (Sinn, 1995: 406). In addition, the common currency with West Germany implied that the East German tradables sector suddenly had to operate under the "law of one price", i.e. East German tradables prices had to follow the international price trend of these goods.<sup>11</sup>

The development of sectoral prices in the early years after currency union is shown in Table 1. As can be seen the prices of tradable goods until 1994 could only rise by 2.5 per cent. In contrast prices for non-tradables rose by nearly 42 per cent. Accordingly, the index of the relative price of tradables (1991=100) fell to 72.2. This sectoral movement of relative prices meant a further appreciation of the East German currency which diverted resources away from the tradables sector.

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<sup>10</sup> To get data on structural developments within the two-sector model it was assumed that the tradables sector consists of agriculture, mining and manufacturing, while the other sectors of the economy form the non-tradables sector.

<sup>11</sup> When England was to return to the gold standard after World War I John Maynard Keynes warned about the economic consequences of Mr. Churchill. The matter of dispute was a currency appreciation in the order of about 10 per cent. See Keynes (1925).

Table 1 — Sectoral Price Movements in East Germany<sup>a</sup>: 1991–1994

Sector	1991	1992	1993	1994
Tradables	100.0	102.0	103.0	102.5
Non-tradables	100.0	122.4	136.1	141.9
Tradables/Non-tradables	100.0	83.3	75.7	72.2

<sup>a</sup>The tradables sector consists of agriculture, mining and manufacturing, while the other sectors of the economy form the non-tradables sector.

Source: DIW, IfW (1993), Statistisches Bundesamt (var. iss.), Statistisches Landesamt Baden-Württemberg (1995), — Own calculations.

The currency conversion and the following appreciation of the real exchange rate caused dramatic shifts in sectoral value added and employment (Table 2). Value added in the tradables sector in 1990–1994 was down nearly 43 per cent. The decline in the non-tradables sector was only 3 per cent.<sup>12</sup>

These shifts in sectoral output were accompanied by corresponding declines in employment. The sectoral decline in tradables in 1990–1994 was about 67 per cent, whereas employment in non-tradables declined by only 0.7 per cent. These developments led to a distinct shift in the output mix in the East German economy (Table 3). In 1994, only about one quarter of total value added was created in producing internationally tradable commodities. Accordingly, non-tradable commodities and services accounted for nearly three quarters of total output – distinctly more than in the much richer West German economy.

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<sup>12</sup> Contrary to popular belief, most economists analysing German unification do not cite the 1:1 monetary conversion as a mistake (let alone the major mistake) of German unification policy but rather substantially criticise wage policies, the principle of restitution, the handling of enterprise debt and general privatisation policies (Noland 1996: 11–14 and the literature cited). If these authors were right (and leaving the impact of wage policies for the moment aside), the breakdown in production and employment should have been across-the-board; i.e. no such clear structural pattern as the one revealed above should have emerged.

Table 2 — Sectoral Change in Value Added and Employment in East Germany:  
1990–1994 (per cent)

Sector	1990 <sup>a</sup>	1991	1992	1993	1994	1990–1994
	Value added <sup>b</sup>					
Tradables	–42.7	–36.3	–2.6	+8.2	+8.7	–42.6 <sup>c</sup>
Non-tradables	–18.4	–17.0	+11.9	+6.0	+8.5	–3.0 <sup>c</sup>
	Employment					
Tradables	–13.4	–24.5	–35.5	–15.8	–6.0	–66.7 <sup>d</sup>
Non-tradables	–9.7	+2.7	+0.8	+2.2	+3.9	–0.7 <sup>d</sup>

<sup>a</sup>Second half-year. – <sup>b</sup>In prices of 1991. – <sup>c</sup>End of first half-year 1994 (own estimate) compared with end of first half-year 1990. – <sup>d</sup>End of 1994 compared with end of first half-year 1990.

Source: Table 1. — Own calculations.

Table 3 — Sectoral Shares in Value Added in East Germany:  
1990–1994 (per cent)

Sector	1990 I	1990 II	1991	1992	1993	1994
Tradables	37.1	29.3	28.2	25.5	25.9	25.9
Non-tradables	62.9	70.7	71.8	74.5	74.1	74.1
Memo: West Germany						
Tradables	.	.	35.2	33.4	30.9	30.4
Non-tradables	.	.	64.8	66.6	69.1	69.6

Source: Table 1. — Own calculations.

These trends are in line with the above hypotheses about structural adjustment of the German currency union. To be sure, wage policies in the aftermath of unification have contributed to these trends in value added and employment, too. In order to prove this point, the changes in wages, prices and employment by sector



in the years of 1992, 1993 and 1994 have been calculated (Table A1).<sup>13</sup> From these calculations it can be seen that these changes exhibit a quite different pattern. There are sectors in which nominal wages rose quite substantially as well as sectors where the wage increase was very modest. The same holds true for the changes in prices and employment.

In order to test whether these changes in wages had a significant impact on employment a combined sectoral cross-section regression analysis using observations for the years 1992, 1993 and 1994 was carried out (Table 4). In this test the regression coefficients were estimated using standardised random effects generalised least squares (GLS) procedure, which is essentially ordinary least squares corrected for the fact that the three successive observations for each sector cannot be treated as independent random draws. The dependent variable was the percentage change in employment, the independent variable the percentage change in real product wages (i.e. nominal wages deflated by the value added price index). The regression (Equation 1) implies that a rise in the real product wage by one per cent resulted in a significant decrease in employment by 0.61 per cent. The estimate is statistically significant and explains more than two thirds of the variation in employment changes.

In addition, real product wages were split into their nominal wage and price deflator components (Equation 2). The results show that the decline in employment due to a rise in the nominal wage rate also depended on changes in the value added deflator: In the tradables sectors which only showed minor increases

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<sup>13</sup> The new series of the national accounts statistics begins in 1991. Since the following detailed analysis is based on percentage changes, the first available observation is for 1992, the year when operative minimum wage schedules became effective.

in prices the employment effects were relatively large, while in the non-tradables sectors, where prices rose, the negative employment effects were weak.<sup>14</sup>

Table 4 — Real Product Wages and Sectoral Employment in East Germany:  
1992–1994

Regression Equations <sup>a</sup>					$\bar{R}^2$	Obs	
(1) EMP =	1.00	-0.61	RPWAGE		.72	21	
	(0.28)	(-3.46)**					
(2) EMP =	-0.61	-0.54	NWAGE	+0.71	PRICE	.74	21
	(-0.13)	(-2.71)*		(2.56)*			

<sup>a</sup>Panel estimation by standardised random effects generalised least squares (GLS) using 1992, 1993 and 1994 observations. All variables calculated as changes in per cent. EMP, employees; RPWAGE, real product wage, nominal wages deflated by product prices; NWAGE, nominal wages; PRICE, product prices, calculated as implicit sectoral price deflators. t-values in parentheses; \*\* significant at <1 per cent, \* at <5 per cent. The coefficient of determination ( $\bar{R}^2$ ) refers to the unweighted statistics including random effects.

Source: Table 1. — Own calculations.

To further illustrate the underlying working mechanism the basic data on real wages and employment changes are given in Table A1. As can be seen, manufacturing and government services (and mining) had the highest increases in nominal wages in 1992, i.e. 40.8 and 36.3 per cent respectively. While prices in manufacturing only rose by 1.1 per cent in the same year, the price increase in government services was about 30 per cent. Thus the government service sector was able to pass on the most part of the cost increase. Employment only fell by 2.4 per cent. In contrast, manufacturing had to bear nearly the whole adjustment burden since employment fell by 34.1 per cent. The case of services is also remarkable. In 1992, in this sector nominal wages rose only slightly. With prices

<sup>14</sup> Thus the employment effects were dependent on the exchange rate system, too.

rising by about 26 per cent this sector was able to increase employment by about 27 per cent. Another interesting case is construction. In this sector nominal wages in 1992 rose by 20.4 per cent and the value added price deflator was up 18.4 per cent. Employment even increased by about 20 per cent.

Finally, the same types of regression were run for manufacturing industries. The regression results show (Table 5) that the elasticity of a change in the real product wage with respect to employment in this case is even higher (−0.85). The regression with nominal wages and prices as exogenous variables reveals that in the tradables sector there was no possibility of passing on the adjustment in form of higher output prices as the insignificant coefficient for this variable indicates. The regression equations explain nearly 90 per cent of the variation in employment declines in manufacturing.

Table 5 — Real Product Wages and Employment in East German  
Manufacturing: 1992–1994

Regression Equations <sup>a</sup>	$\bar{R}^2$	Obs
(1) EMP = 0.45    −0.85    RPWAGE (−0.16) (−15.45)**	.87	82
(2) EMP = −0.95    −0.88    NWAGE    +0.19    PRICE (0.32) (−15.73)**                    (0.55)*	.88	82

<sup>a</sup>Panel estimation by standardised random effects generalised least squares (GLS) using 1992, 1993 and 1994 observations. All variables calculated as changes in per cent. EMP, employees; RPWAGE, real product wage, nominal wages deflated by product prices; NWAGE, nominal wages; PRICE, product prices, calculated as implicit sectoral price deflators. t-values in parentheses; \*\* significant at <1 per cent. The coefficient of determination ( $\bar{R}^2$ ) refers to the unweighted statistics including random effects.

Source: Statistisches Bundesamt (var. iss.). — Own calculations.

#### 4. Conclusions

Bringing the market economy to a formerly centrally-planned economy the economic authorities of the Federal Republic seem to have disregarded at least two important economic fundamentals. The first neglected fundamental was the immediate formation of a currency union with an exchange rate of about 1:1 between a highly developed high-productivity market economy and a low-productivity former centrally planned economy was a substantial real appreciation of the East German exchange rate. Instead, from a purely economic point of view the East German economy, because of the obsolescence of her capital stock after trade liberalisation, should have been given the chance to devalue. A free exchange rate would have been the proper instrument of a market economy to restore her international competitiveness. In addition, a free exchange rate would have facilitated the necessary structural change, especially with respect to tradables and non-tradables.

The second economic fundamental which was disregarded refers to the labour market. The early implementation of the West German system of wage bargaining in East Germany seems to have been inappropriate and has led to real wage increases irrespective of productivity developments. In addition, minimum wage schedules had a substantial negative impact on employment and prevented production taking place on the (maximum) production possibility curve.

To cope with both of these shortcomings the economic authorities have referred to huge transfers from West to East. But as the current analysis shows transfers alone cannot solve the fundamental problems caused by distortions in the form of minimum wages and an overvalued currency. Instead, this policy turns out to have been a rather costly procedure for both parts of Germany.

## Appendix

Table A1 — Changes in Sectoral Employment, Wages and Prices in East  
Germany<sup>a</sup>: 1992–1994

	Employees	Real Product Wage	Nominal Wage	Value Added Deflator
	– 1992 –			
Agriculture	–34.3	8.1	10.8	2.7
Mining and Energy	–24.5	32.9	36.8	3.9
Manufacturing	–34.1	39.7	40.8	1.1
Construction	20.1	2	20.4	18.4
Trade and Transportation	0.8	19.2	28.3	9.1
Services	26.9	–24.0	1.7	25.7
Government	–2.4	6.6	36.3	29.7
	– 1993 –			
Agriculture	–17.7	36.3	22	–14.3
Mining and Energy	–19.3	4.4	11.3	6.9
Manufacturing	–14.9	8.5	10.5	2
Construction	13.5	0.4	9.7	9.3
Trade and Transportation	–1.9	16.5	18.4	1.9
Services	8.1	–6.7	14.7	21.4
Government	–4.1	7.9	15.5	7.6
	– 1994 –			
Agriculture	–2.6	9.5	5.3	–4.2
Mining and Energy	–16.2	4.7	5.2	0.5
Manufacturing	–5.4	16.2	15.9	–0.3
Construction	11.1	2.2	6.4	4.2
Trade and Transportation	0	–1	3.2	–0.2
Services	8.4	–2.3	4.1	6.4
Government	–0.6	–1.6	2.6	4.2

<sup>a</sup>Changes in per cent. Real product wages are nominal wages deflated by the value added deflator.

Source: Table 1. — Own calculations.

Table A2 — Changes in Manufacturing Employment, Wages and Prices  
in East Germany<sup>a</sup>: 1992–1994

	Employees	Real Product Wages	Nominal Wages	Value Added Deflator
	– 1992 –			
Petroleum Refining	–36.7	29.1	32	2.9
Stone Goods	–37.4	64.4	66.7	2.3
Iron and Steel	–52.1	34.2	29.5	–4.7
Non-ferrous Metals	–59.4	61.7	57.3	–4.4
Foundries	–52.2	52.4	50.9	–1.5
Drawing Mills	.	.	.	3.1
Chemicals	–43.6	56.5	57.5	1
Wood	–45.8	52.6	50.7	–1.9
Pulp, Paper, Paperboard	–48.1	52.3	44.8	–7.5
Rubber Goods	–55.4	57.5	56.9	–0.6
Steel Mill Products	.	.	.	–1.7
Structural Engineering	–13.6	35	36.1	1.1
Mechanical Engineering	–48.1	51.3	51.9	0.6
Road Vehicles	–49.9	.	70.1	.
Shipbuilding	–39.6	.	33.4	.
Aircraft, Aerospace	.	.	.	.
Electrical Machinery	–54.8	73.2	72.3	–0.9
Precision Mechanics, Optics	–61.2	.	.	–1.2
Metal Products	–51.8	71.9	72.8	0.9
Electronic Data Processing Equipment	–72.8	.	54.2	.
Musical Instruments, Toys	–58.2	56.8	55.7	–1.1
Precision Ceramics	–36.6	38.5	46.7	8.2
Glass, Glass Products	–44.2	32.3	34	1.7
Wood Products	–40	40.8	42.8	2
Paper and Paperboard Products	–48	62.2	62.1	–0.1
Printing	–21.4	36.2	40.8	4.6
Plastic Products	–25.6	63.7	58.1	–5.6
Leather	–55	49.5	48.1	–1.4
Leather Goods, Shoes	–69	79.9	76.4	–3.5
Textiles	–67.8	77.7	80.5	2.8
Clothing	–62.6	51.9	57.2	5.3
Food and Beverages	–36	36.6	39.7	3.1
Tobacco	–32.5	37.9	45	7.1

Table A2 (cont.)

	Employees	Real Product Wages	Nominal Wages	Value Added Deflator
	– 1993 –			
Petroleum Refining	–34.1	18.1	20.7	2.6
Stone Goods	1.6	19.9	20.7	0.8
Iron and Steel	–42.9	36.3	35.8	–0.5
Non-ferrous Metals	–28.2	23.6	21.2	–2.4
Foundries	–23.1	21.1	20.1	–1
Drawing Mills	–32.9	41.8	38.8	–3
Chemicals	–25.8	22.1	20.5	–1.6
Wood	–30	27.6	28.2	0.6
Pulp, Paper, Paperboard	–28	33	22	–11
Rubber Goods	–29.6	21.3	26	4.7
Steel Mill Products	.	.	.	–1.6
Structural Engineering	3.9	14.9	14.8	–0.1
Mechanical Engineering	–33.4	26	27.3	1.3
Road Vehicles	–5.4	.	20	.
Shipbuilding	–19.7	.	22	.
Aircraft, Aerospace	.	.	.	.
Electrical Machinery	–20.9	30.4	30.9	0.5
Precision Mechanics, Optics	–24	.	.	1.7
Metal Products	1.9	22.6	22	–0.6
Electronic Data Processing Equipment	–61	.	50.2	.
Musical Instruments, Toys	–25.6	20.3	23.1	2.8
Precision Ceramics	–21.7	13.1	15.6	2.5
Glass, Glass Products	–20.1	19.8	21.7	1.9
Wood Products	–15.7	19.6	22	2.4
Paper and Paperboard Products	–7.8	25	24.7	–0.3
Printing	–25.3	3.2	13.9	10.7
Plastic Products	17.4	22.9	21.4	–1.5
Leather	–57.9	17.2	17.5	0.3
Leather Goods, Shoes	–49.6	23.1	22.8	–0.3
Textiles	–30.2	20.2	20.3	0.1
Clothing	–41.6	20.1	20.8	0.7
Food and Beverages	–15.4	20	18.9	–1.1
Tobacco	–14.7	20.5	24	3.5

Table A2. (cont.)

	Employees	Real Product Wages	Nominal Wages	Value Added Deflator
– 1994 –				
Petroleum Refining	–21.2	6.1	13.5	7.4
Stone Goods	8.9	12	12.1	0.1
Iron and Steel	–28.3	31.5	32.9	1.4
Non-ferrous Metals	–10	7.4	18	10.6
Foundries	–18.3	26.4	26.5	0.1
Drawing Mills	–19.4	10.6	13.8	3.2
Chemicals	–23.4	10.9	13.1	2.2
Wood	3.2	15.9	13.5	–2.4
Pulp, Paper, Paperboard	–19.5	9.6	16.9	7.3
Rubber Goods	–8.9	14.9	17	2.1
Steel Mill Products	–5.3	18.2	18.3	0.1
Structural Engineering	–1.8	16.5	17.1	0.6
Mechanical Engineering	–19.1	23.4	24.6	1.2
Road Vehicles	–4.6	.	18.9	.
Shipbuilding	–12.4	.	23.5	.
Aircraft, Aerospace	.	.	.	.
Electrical Machinery	–2	21	19.6	–1.4
Precision Mechanics, Optics	–10.6	34.1	34.1	0
Metal Products	–4	14.1	13.1	–1
Electronic Data Processing Equipment	.	.	.	.
Musical Instruments, Toys	–1.3	8.6	11.4	2.8
Precision Ceramics	–18	16	16.8	0.8
Glass, Glass Products	–6.7	17.3	17	–0.3
Wood Products	–1.7	9.9	11	1.1
Paper and Paperboard Products	6.9	12.9	15.3	2.4
Printing	1.7	4.6	12.5	7.9
Plastic Products	29.9	11.9	10.8	–1.1
Leather	–42.1	12.6	15	2.4
Leather Goods, Shoes	–15.4	19.1	19	–0.1
Textiles	–12.2	10.1	10.8	0.7
Clothing	–6.2	9.2	7.1	–2.1
Food and Beverages	0.7	8.5	8.4	–0.1
Tobacco	–3	12.7	13.3	0.6

<sup>a</sup>Changes in per cent. Real product wages are nominal wages deflated by the value added deflator. Calculation of wages in precision mechanics industry led to abnormal values (1992: 274 per cent; 1993: –42 per cent) possibly due to data errors in the official statistics; both observations have been dropped from the current sample.

Source: Table 4. — Own calculations.



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