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East Germany in from the Cold: The Economic Aftermath of Currency Union

AT MIDNIGHT on June 30, 1990, German economic, monetary, and social union occurred: the mark of the German Democratic Republic was replaced by the deutsche mark; trade barriers were lifted; legal, tax, and social insurance systems were harmonized; and all existing barriers to capital and labor movements were removed. Within days a severe price-cost squeeze was apparent. East German producers could not profitably sell their goods at prices that buyers—East German, West German, or foreign—were willing to pay. Moreover, demand for domestically produced output fell as consumers diverted their spending toward Western products. As a result, there was a severe decline in output; unemployment and short-time hours rose rapidly. One of the worst and sharpest depressions in European history had begun. It continues unabated.

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This paper will document the basic facts of the depression: the behavior of output, employment, wages, prices, vacancies, and other macroeconomic aggregates. We then explore the twin reasons for the depression: producers cannot supply products at market prices and cover their short-run variable costs; and there were declines in the demand for domestically produced consumer and investment goods.

We examine the consequences of the price-cost squeeze for the goods, labor, and asset markets. In the market for goods, we calculate the fraction of East German conglomerates that are unable to sell their products at world market prices while meeting their variable costs. Our estimates are based on unique unpublished data, which give the mark expense that each major conglomerate in the GDR incurred in 1989 to earn a deutsche mark of foreign currency through trade with nonsocialist countries. We adjust these expense figures to take account of important changes that have affected the costs of East German firms since currency union. The adjusted data show that firms employing only 8 percent of the labor force were "viable" after union, in the sense that they could earn sufficient revenue to cover short-run variable costs in the absence of significant productivity improvements. These calculations undermine prior estimates of high productivity in socialist countries.

The second consequence of the price-cost squeeze has been the high incidence of unemployment and short-time work, a labor-market development that is expected to continue. In the state treaty authorizing

currency union, wages in mark were converted into deutsche mark at par. At the time of currency union, these wages were well above market clearing, so that firms could not profitably employ much of their labor. With this large, and growing, slack in the labor market, downward pressure on wages might have been anticipated. Instead wages climbed still higher in the wake of currency union as labor unions pressed for a schedule to attain wage parity despite the economic collapse in the East. For example, a pattern-setting contract signed in March with the metal workers' union, IG Metall, achieves parity in 1994. In arguing for higher wages, the unions have said that such wage hikes are needed to keep qualified Eastern workers from migrating to the West. We conducted a survey of East German workers in order to determine their propensity to migrate and the factors likely to influence their decisions. We found that few workers will migrate for higher Western wages; most prefer to work in the East in spite of the wage differential and most are prepared to wait for new jobs there if they become unemployed. They will accept jobs in the East that pay significantly less than those in the West. Thus the survey results suggest that the real cause of most migration will be the lack of Eastern jobs—not the wage differential. Higher wages will cause more migration by increasing unemployment than they will deter by closing the wage gap. Unless policies are undertaken to lower unemployment, a significant proportion of the population will migrate. Migration, then, together with investment, will eventually cure the Eastern unemployment problem.

We also examine the consequences of the price-cost squeeze for the Treuhandanstalt, the newly formed agency that holds the shares of former state-owned enterprises of the GDR in trust for the German government and is charged with privatizing them. The task has gone slowly. Bureaucratic problems and confusion over property rights account for some delays, but they are not the fundamental causes of the Treuhand's difficulties. The fundamental impediment to privatization is that the majority of East German firms have *negative* value if they are operated, since their costs exceed their revenue. Such firms can be sold for their real-estate or scrap value, but not to individuals or firms who will operate them. Currently the Treuhandanstalt is faced with a choice of either subsidizing or liquidating such money-losing firms.

At the present time the German government is offering subsidies to encourage investment spending in the East. They are also financing the

budget deficits of the Eastern *Länder* (states) to permit them to pay their bills and make needed infrastructure investments. Infrastructure investments are important because they constitute a precondition for private investment on a significant scale. Moreover, these job-creating investments are especially cheap at present. They enable individuals whose support would otherwise be provided by the government to support themselves. If a typical individual moves from unemployment to employment, the government budget benefits by an estimated 79.1 percent of his or her previous compensation because of reduced payments for unemployment compensation and increased revenue from social insurance and tax contributions.

So far, however, the package of policies that has been enacted fails to deal realistically with the questions of how to preserve existing jobs, how to speed new job creation, and how to make existing companies viable enough to be privatized. The major problem is that wages in the East are too high for most former state-owned enterprises to cover their costs. High wages also deter new investment. This creates an obvious need for governmental measures to close the gap between the high private cost of labor, caused by high Eastern wages, and the low marginal product of labor, caused by outmoded capital and technology. We propose a program of self-eliminating flexible employment bonuses (SEFEBs) to eliminate this gap. Our analysis shows that such a program would give many workers a chance to keep their jobs and would also raise the level of new job creation through faster private investment. According to our estimates, even deep wage subsidies (for example, an employment bonus equal to 75 percent of current wages) would have very low budgetary costs. They might even *reduce* budget deficits—largely for the same reason that infrastructure investment is not costly: the government is already committed to a high level of income support even if workers are unemployed. By making many Treuhand firms profitable, employment bonuses would permit their rapid privatization. Privatized firms will speed the transition to a modern economy by introducing Western management, technology, and work habits.

To promote these ends we propose two policies: a rapid infrastructure investment program and a program of employment bonuses. These policies address the twin East German problems of insufficient demand and a severe price-cost squeeze. Such programs are needed for the East German miracle to begin.

Finally, by way of introduction, we should emphasize that the focus of this paper is the economic situation in East Germany. Thus, only tangentially do we discuss the effects of currency union on the West German economy; we do not address at all the effects on the rest of Europe or on European integration. These other issues are important; they are not, however, the topic of this paper.[1]

Macroeconomics of Currency Union

In this section we describe the macroeconomic consequences of currency union for the product and labor markets and then address the issue of why output fell.

Output, Employment, Prices, and Wages

The most immediate and striking consequence of currency union was a depression in East Germany virtually without historic precedent. By December 1990 production of goods was about 46 percent of its 1989 level. As table 1 shows, much of this decline was concentrated in July 1990, the first month of union. During this month, industrial output in East Germany plunged 35 percent. The decline in output has been widespread, affecting every major industrial sector and virtually every commodity. Table 2 provides indexes of output for ten industrial sectors and shows that no sector escaped the East German depression. Disaggregated data on the production of selected commodities reveal dramatic examples of the severity of the depression: by December 1990 output of cement was 21 percent of its December 1989 level, bicycle output was 37 percent, cellulose was 25 percent, and pasta products were 27 percent.[2]

While direct measures of output provide clear evidence of a decline in the production of manufactured goods, no comparable output measures are available for other sectors of the economy. Employment figures, however, provide indirect evidence of substantial declines in economic

1. For an excellent survey of such issues see Lipschitz and McDonald (1990). Our analysis of the causes of the East German depression and our policy recommendations to alleviate it are close to those of Schmieding (1991).

2. *Monatszahlen*, December 1990, 3. Folge, pp. 30–34.

Table 1. Output, Labor Productivity, and Employment in East Germany, 1986–90

Period	Industrial output (1989 = 100)	Labor productivity (September 1989 = 100)	Employment[a] (in thousands)			
			Industry	Construction	Transportation and communications	Trade
1986	92.1	. . .	3,224	475	608	784
1987	94.8	. . .	3,212	470	613	786
1988	97.7	. . .	3,214	467	617	788
1989	100.0	. . .	3,193	460	619	784
1989						
Fourth quarter	. . .	. . .	3,153	454	615	783
October	100.6	101.2	. . .	. . .	. . .	. . .
November	98.6	100.2	. . .	. . .	. . .	. . .
December	97.6	99.7	. . .	. . .	. . .	. . .
1990						
First quarter	. . .	. . .	3,086	439	613	760
January	94.4	98.1	. . .	. . .	. . .	. . .
February	96.6	100.3	. . .	. . .	. . .	. . .
March	97.8	101.7	. . .	. . .	. . .	. . .
Second quarter	. . .	. . .	2,961	371	580	722
April	97.0	101.6	. . .	. . .	. . .	. . .
May	92.1	97.1	. . .	. . .	. . .	. . .
June	86.0	93.5	. . .	. . .	. . .	. . .
Third quarter	. . .	. . .	2,690	359	554	654
July	56.0	64.9	2,777	361	553	671
August	47.9	56.8	2,710	367	558	661
September	48.9	. . .	2,584	350	552	634
Fourth quarter	. . .	. . .	. . .	. . .	. . .	. . .
October	49.5	. . .	2,452	343	525	582
November	50.9	. . .	2,388	337	512	554
December	45.5	. . .	. . .	. . .	. . .	. . .

Sources: *Monatszahlen,* November 1990, pp. 16–18, and December 1990, 3. Folge, pp. 9–11 and 18.
a. The employment figures show the number of wage and salary workers.

activity outside of manufacturing. Table 1 shows the number of employ-ees, including short-time workers, in four sectors of the East German economy. By November 1990 the number of employees in industry, construction, transportation and communications, and trade had de-clined by 25, 27, 17, and 29 percent respectively, when compared to their 1989 averages. These employment declines substantially understate the decline in manhours worked because by November 1990, 20.1 percent of the work force had been placed on involuntary "short time" by their firms and were working roughly half of normal time.[3] Further, as table 1

3. German labor laws allow firms with temporary difficulties to introduce a program referred to as "short time"; Eastern firms have special leeway in placing employees on short time for longer durations until the end of 1991. See *Süddeutsche Zeitung*, January 10, 1991, p. 26. Workers on short time are paid roughly two-thirds of previous net wages

Table 2. Indexes of Output and Producer Prices by Industrial Sector, 1990

Index, 1989 = 100

Industrial sector	Index of industrial output				Index of producer prices[a]		
	May	July	October	December	May	July	August
Total industry	92.1	56.0	49.5	45.5	98.4	51.7	48.8
Energy[b]	85.9	52.9	58.9	71.8	105.1	97.6	98.1
Water supply[b]	101.0	93.2	91.1	96.4	122.2	122.8	126.2
Chemicals	85.5	61.8	47.3	46.3	99.0	31.3	31.9
Metallurgy	91.9	39.8	30.1	23.7	99.9	44.1	41.2
Building materials	102.8	61.8	33.9	22.6	100.6	80.1	78.5
Machinery and transportation equipment	101.3	70.7	61.8	60.0	103.5	66.1	61.8
Electronics	100.5	68.6	56.0	41.3	71.7	40.6	43.3
Light industry (excluding textiles)	88.4	48.9	47.7	39.4	102.9	51.2	52.0
Textiles	81.8	47.8	44.2	29.1	100.7	31.7	31.1
Food	90.0	40.8	45.1	43.4	91.4	60.4	53.9

Sources: Industrial output: *Monatszahlen,* December 1990, 3. Folge, p. 22. Producer prices: Statistisches Amt der DDR, "Indizes der Erzeugerpreise gewerblicher industrieller Produkte," Heft 6, July 1990, and Heft 8, August 1990.
a. Prices before July 1, 1990, are *Industrieabgabepreise* in mark of the GDR. These prices include product-specific taxes and subsidies levied at the producer level. Prices after July 1, 1990, are in deutsche mark.
b. Prices in these sectors continued to be set officially even after currency union.

shows, industrial output declined by more than industrial employment so that labor productivity in East German industry fell after currency union. If, as seems likely, this same pattern holds elsewhere, the employment declines in the nonindustrial sectors reported in table 1 understate the relevant output declines in these sectors as well.

As East German output has declined, substantial slack has developed in the labor market. The evolution of unemployment, short-time employment, and vacancies is reported in table 3. By February 1991 the unemployment rate had reached 8.9 percent and an additional 21.5 percent of the work force was on involuntary short time. This was not accompanied by an expansion of new job openings; rather, vacancies plummeted. By January 1991 vacancies stood at a mere 15 percent of their level a year earlier. The rising unemployment over 1990 was

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(68 percent for workers with children, 63 percent for those without) by the state. Many wage contracts in East Germany stipulate that the firm must also pay an additional 22 percent of the wage. Unemployed individuals who participate in training programs for at least 25 hours a week get 73 percent of previous net wages if they have children and 65 percent if they do not. It is commonly assumed that most short-time workers will ultimately become unemployed.

Table 3. The Employment Situation in East Germany, 1990–91

Thousands of workers, except where noted

	Unemployment		Short time		
Month	*Number*	*Rate*[a]	*Number*	*Rate*[a]	*Vacancies*
1990					
January	7.4	. . .	. . .	. . .	158.6
February	11.0	. . .	. . .	. . .	141.4
March	38.3	. . .	. . .	. . .	105.9
April	64.8	. . .	. . .	. . .	73.6
May	94.8	. . .	. . .	. . .	54.3
June	142.1	1.6	. . .	. . .	41.4
July	272.0	3.1	656.3	7.4	27.7
August	361.3	4.1	1,499.9	16.9	20.4
September	444.9	5.0	1,728.7	19.3	24.3
October	536.8	6.1	1,703.8	19.1	24.7
November	589.2	6.7	1,709.9	20.1	23.8
December	642.2	7.3	1,795.4	20.5	22.6
1991					
January	757.2	8.6	1,856.0	21.1	23.0
February	787.0	8.9	1,900.0	21.5	. . .

Source: *Monatszahlen,* December 1990, 3. Folge, p. 12; Bundesanstalt für Arbeit, *Arbeitsmarkt in Zahlen:* Aktuelle Eckdaten für das Beitrittsgebiet, January 1991, Nürnberg, p. 2; *Konjunktur Aktuell,* January 1991, Anhang II, p. 72.
a. The rates shown are the number of unemployed or short-time workers as a percent of the civilian work force.

accompanied by a fall in vacancies, with an almost perfect fit of unemployment and vacancies to an unshifting rectangular hyperbolic Beveridge curve.

The decline in East German output was also accompanied by equally large declines in East German producer prices. Beginning on July 1, 1990, East German firms were required to set prices for their goods in deutsche mark; before July 1, all prices had been quoted in mark. Firms in industries other than energy and water supply were given full discretion to set product prices. Table 2 shows the evolution of producer prices between May 1990 and August 1990 by industrial sector. As is apparent, firms used their new discretion to lower prices substantially—by almost 50 percent between May and July.

Although producer prices were roughly halved following currency union, the average of *consumer* prices remained almost unchanged through the end of 1990. Two main reasons were that rent, energy, and transportation prices in the consumer price index (CPI) were frozen and that retail food subsidies were removed, driving up the CPI food component even though food in the producer price index (PPI) declined

sharply. In January 1991 subsidies on energy were ended and those on transportation were eliminated. Table 4 provides a detailed breakdown of the behavior of the CPI before and after union.

The divergent movements of producer and consumer prices led to divergent movements in real product and real consumption wages—the ratio of gross wages to product prices and the ratio of gross wages to the cost of living respectively. Because the treaty governing currency union specified that contractual wage and salary payments would be converted from mark to deutsche mark at par and because preexisting wage contracts remained unchanged in nominal terms while producer prices fell roughly 50 percent, real product wages approximately doubled in July 1990.[4] In contrast, real (gross) consumption wages rose only minimally during July. This characterization of real wage behavior, however, abstracts from the large changes in nominal wages that occurred during 1990 both before and after currency union. Table 5 tabulates average gross monthly wages for full-time workers by industrial sector. Nominal wages in industry rose almost 42 percent between the first quarter of 1990 and October 1990, with about 23 percent of this increase occurring prior to currency union.[5] As a consequence, real product wages in East Germany almost tripled between January 1990 and October 1990, while real (gross) consumption wages increased roughly 45 percent over this same period. Finally, in contrast to the 42 percent rise in nominal wages, net wages rose by only 22 percent through October 1990 according to our estimates.[6] The difference is due to the

4. The increase in real labor cost per manhour was even larger because employer contributions to social insurance rose from 12.5 percent of gross wages to 18.25 percent of gross wages in July.

5. This increase may be somewhat misleading because nominal wages do not include various wage premiums and fringe benefits, which may be very different after currency union.

6. No data are yet available on net wages after currency union. We estimate, however, that net wages as of October had risen about 22 percent. The adoption of the FRG tax code and social insurance system led to higher payroll tax deductions for Eastern workers: average income tax payments fell, but by less than social security taxes rose. A gross wage increase of roughly 10 percent was required to "compensate" Eastern workers for these changes. In addition, the marginal rate of taxation of approximately 20 percent is now considerably greater than the average rate of taxation of about 4.5 percent. Thus, percentage increases in net wages are considerably less than percentage increases in gross wages. Our estimate assumes identical treatment of Eastern and Western workers under the German income tax code. In February 1991 new tax allowances were granted in East Germany that raise net income slightly relative to these calculations.

Table 4. The Cost of Living for Private Households in East Germany, 1990–91

Index, 1989 = 100

Month	All items	Food, drink, and tobacco	Clothing and shoes	Rent and energy	Furniture and household goods	Health care products	Transportation and communications	Education and recreation	Other goods
1990									
May	98.3	100.9	89.0	100.0	96.0	92.3	100.2	106.4	90.5
June	87.9	97.4	51.7	100.0	84.8	88.5	93.4	88.3	92.6
July	94.5	115.4	57.5	100.0	74.5	119.4	85.2	88.5	99.0
August	94.9	111.9	59.9	100.0	74.9	121.4	89.2	90.9	102.0
September	96.6	111.4	64.4	100.0	76.3	122.6	89.8	95.2	105.1
October	98.2	112.2	66.9	100.0	76.6	123.4	92.5	99.6	105.3
November	98.1	112.4	68.1	100.0	76.6	123.7	90.3	99.2	104.6
December	99.1	113.8	69.5	100.0	77.5	126.6	89.1	100.2	105.3
1991									
January	106.4	114.9	69.3	157.8	78.8	127.5	96.2	102.6	154.9

Sources: *Monatszahlen*, December 1990, pp. 52–53, and January 1990, pp. 24–25; Statistisches Bundesamt, Mitteilung für die Presse, February 26, 1991.

Table 5. Monthly Wages by Industrial Sector, 1988–90[a]

Mark before July 1990, deutsche mark thereafter

			1990			
Industrial sector	1988	1989	First quarter	Second quarter	July[b]	October[b]
Total industry	1,041	1,072	1,089	1,205	1,335	1,545
Energy	1,202	1,229	1,228	1,385	1,454	1,798
Water supply	985	1,020	1,051	1,228	1,238	1,579
Chemicals	1,075	1,112	1,115	1,283	1,494	1,582
Metallurgy	1,116	1,140	1,132	1,335	1,352	1,547
Building materials	1,012	1,045	1,081	1,230	1,307	1,593
Machinery and transportation equipment	1,073	1,101	1,124	1,229	1,410	1,574
Electronics	1,045	1,069	1,091	1,195	1,367	1,502
Light industry (excluding textiles)	946	978	994	1,062	1,117	1,415
Textiles	943	978	994	1,048	1,069	1,401
Food	965	1,003	1,032	1,142	1,187	1,482

Source: 1988 and 1989: Statistisches Amt der DDR, *Jahrbuch, Arbeitskräfte und Löhne*, 1989, pp. 74–78; first and second quarter 1990: Statistisches Amt der DDR, "Arbeiter und Angestellte und deren Bruttolöhne nach Wirtschaftsbereichen und Sektoren im 1. Halbjahr 1990," Berlin, August 24, 1990, p. 6; July 1990 and October 1990: Gemeinsames Statistisches Amt, unpublished data.

a. The average gross monthly wage per full-time employee is shown.

b. Data for July and October 1990 are reported according to the sectoral classification used in the former GDR. Data for these same months reported according to the West German sectoral classifications are available in *Konjunktur Aktuell*, January 1991, Anhang II, p. 69.

high West German rate of social security taxation and the high marginal tax rate on income. This calculation omits, however, the possibly substantial real income gains that occurred when imported consumer goods, unavailable prior to currency union, became freely available. Estimates of the change in the cost of living, which are based on a fixed consumption bundle, omit the gains from this enormous increase in choice.[7]

In summary, tables 1 through 5 reveal the major consequences of currency union for output, employment, wages, and prices: output and producer prices each fell by roughly 50 percent while the cost of living remained virtually unchanged. The precipitous declines that occurred in output and prices were concentrated in July 1990—the month of currency union. Employment has declined and short-time work has

7. Collier (1985) estimated the magnitude of these gains at 13 percent of nominal income for a family of four in the GDR in 1977. Collier used household budget data and assumed identical preferences in the two Germanys in order to quantify the gap between effective and notional purchasing power caused by quantity constraints in the GDR.

increased significantly, albeit more gradually. As a consequence, pro-
ductivity had declined dramatically as of October 1990. Over 30 percent
of East Germans are now unemployed or employed on short time;
vacancies have all but disappeared. In spite of this, wages have increased
substantially and continue to rise.[8]

Why Did Output Decline?

According to the theory of comparative advantage, removing barriers
to trade in a small open economy like East Germany causes the prices
of tradable goods to attain equality with those prevailing in world
markets. As relative product prices change, profitability rises in sectors
with comparative advantage (that is, relatively low costs), providing an
incentive for expansion in output; the opposite happens in sectors with
comparative disadvantage.

If all factor prices, including wage rates, are flexible, no involuntary
unemployment occurs when free trade is instituted, even in the extreme
case in which labor and capital are completely immobile. Voluntary
unemployment will undoubtedly occur, however, as workers leave
declining sectors and move to expanding sectors in search of higher
wages, perhaps retraining in the process.[9]

The comparative advantage paradigm offers clear predictions con-
cerning the behavior of macroeconomic aggregates following a move to

8. Throughout this paper we rely on data collected in the former GDR, the accuracy
of which might be questioned. In many cases, secrecy in the former GDR led to sins of
omission rather than of commission in GDR statistics. For a discussion see Collier (1985,
pp. 134–40). Since March 1990, much previously unobtainable information has become
available.

9. This is the model that has been applied to unemployment in the United States by
Lilien (1982) and Davis (1987). The fraction of the labor force in various sectors in East
Germany is quite different from that in West Germany. The proportions of employment in
agriculture, manufacturing, construction, transportation and communications, and trade
in the GDR in 1989 were 10.8 percent, 43.7 percent, 6.7 percent, 7.6 percent, and 10.2
percent respectively, compared to 3.9 percent, 33.1 percent, 6.6 percent, 5.6 percent, and
13.0 percent in the FRG. See Schnabel (1990, table 2). It is likely that the East German
percentages will ultimately approach those in West Germany as the technology gap is
eliminated as a result of the similarity in factor endowments. Restructuring industry in the
East will also be necessary because employment is currently concentrated in extremely
large firms; 88 percent of GDR employees in industry in 1989 worked in firms with at least
500 employees, compared to only 38 percent of FRG employees in 1987. See Statistisches
Bundesamt (1990, pp. 118–19) and Statistisches Amt der DDR (1990, p. 161).

free trade: output and employment should expand in some sectors and contract in others. Unemployment should rise as workers leave contracting industries, but vacancies should also rise as new jobs are created in the expanding sectors; the Beveridge curve should shift outward. The predictions of the theory of comparative advantage have been grossly violated in the East German case. Output and employment have contracted in *all* sectors—not just in some. The Beveridge curve has not shifted outward; rather, the East German economy has moved along a fixed Beveridge curve.

The predictions of the theory of comparative advantage do not apply in the East German case for one overriding reason: wages in East Germany have been well above the full-employment, market-clearing level. A significant gap between actual and market-clearing wages existed at the time of currency union; since that time, nominal wages have continued to rise. For this reason, the advent of free trade on July 1 placed the majority of East German firms in a severe price-cost squeeze. Few firms producing tradable goods could cover their short-run variable costs at the wage rates prevailing on July 1, and this would have been the case even if they had been able to sell their goods immediately, in unlimited quantities at world prices. This has been the first cause of the current depression in East Germany.

The second reason for the swift decline in output was the sharp drop in demand for Eastern goods after currency union. Demand declined because East German consumers and firms diverted their spending away from East German consumption and investment goods toward previously unavailable Western products on a massive scale. It seems likely that total investment spending also declined. In 1991 exports to Council for Mutual Economic Assistance (CMEA) countries will also decline, depressing demand further. Even in the absence of any price-cost squeeze, such declines in demand would have reduced output in East Germany because most Eastern firms faced highly inelastic *short-run* demand curves for their goods in world markets. These firms, abandoned by their traditional customers, simply could not find enough new buyers quickly enough to avoid a significant slump in sales—even if their costs were at or below world prices. In addition, a number of miscellaneous factors, which are beyond the scope of this paper, such as the lack of compatibility of Eastern goods and Western standards, and environmental and safety problems, contributed to the decline in output.

The two major factors that account for the decline in output can be illustrated in the standard demand and supply framework shown in figure 1. The curve SS depicts the East German supply curve of a typical tradable good as a function of its producer price in deutsche mark following currency conversion at initial money wage rates. Assuming putty-clay technology, short-run average variable cost is constant at the level $\hat{p}$. At this minimum price, supply is perfectly elastic up to capacity, Y_f. The value of $\hat{p}$ depends critically on the value of the wage, which was, at least initially, proportional to the exchange rate of unity chosen to convert wage contracts denominated in mark into their deutsche mark equivalents.[10]

The curve LRD depicts the long-run demand curve for the typical tradable good. Long-run demand is assumed to be infinitely elastic at the world price p^*. In the situation depicted in figure 1, $\hat{p}$ exceeds p^*, so that the firm—in the absence of technological change, improved labor productivity, or new product design—must go bankrupt unless subsidized. At the wages prevailing at currency union, most East German firms faced bankruptcy—the situation illustrated in this figure.

The curve SRD depicts the short-run demand for the typical East German tradable good after currency union. It is not fully elastic because of difficulties in finding new customers on the part of firms and in switching suppliers on the part of customers. As drawn, the demand for the tradable good after currency union amounts to Y_1 at the long-run equilibrium price, p^*. Sales fall short of Y_f, capacity output, because East German consumers prior to currency union had been denied freedom of choice. When trade barriers were lifted, expenditures were diverted toward previously unavailable Western products. In order for firms to sell their capacity output in the short run, prices for Eastern goods would have had to fall below p^*, the long-run equilibrium level, to p_s in figure 1.

For most tradable goods, market equilibrium following currency union is illustrated by point E in figure 1: sales fall far short of capacity production, and deutsche mark prices are above the level required for full employment in either the short run (p_s) or the long run (p^*). The output decline, from Y_f to Y_0, can be conceptually decomposed into two

10. Assuming that different firms have different values of $\hat{p}$, the economy's aggregate supply curve is upward sloping rather than horizontal.

Figure 1. The Decline in Output of East German Tradable Goods

Producer
price (DM)
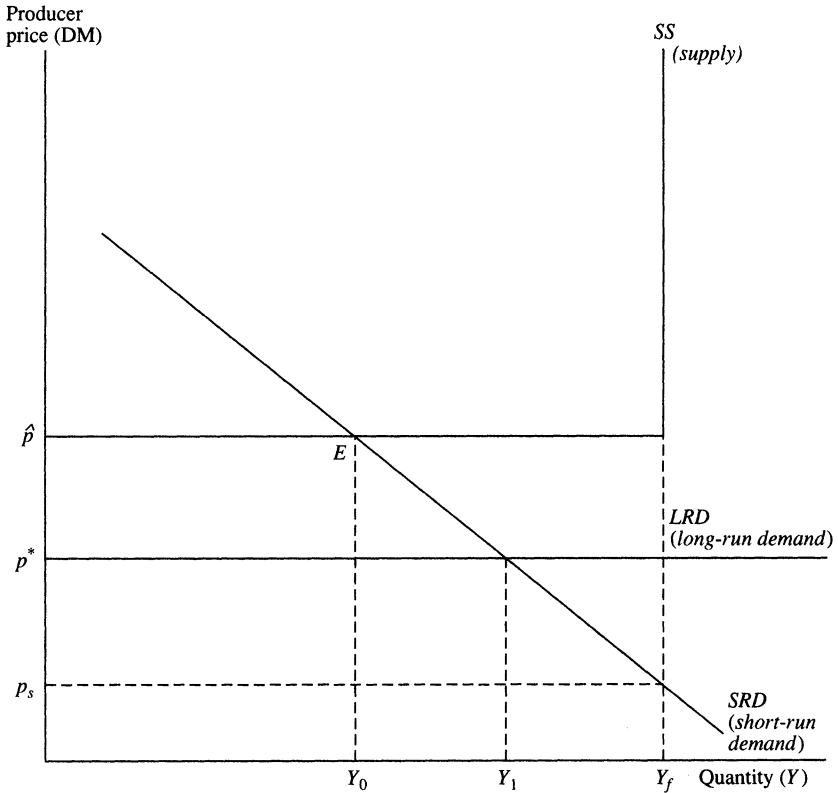
The distance between Y_1 and Y_0 is the change in quantity due to the price-cost squeeze. The distance between Y_f and Y_1 is the change in quantity due to the demand shift.

independent portions: the portion due to the demand switch away from East German products and the portion due to the price-cost squeeze. The distance $Y_f - Y_1$ represents the decline in output due to the demand shift. The distance $Y_1 - Y_0$ represents the decline in output due to the price-cost squeeze—the loss in sales that occurred because firms could not price their products competitively and still cover short-run costs. Because the Treuhandanstalt has thus far provided loans and subsidies that allow firms to sell their products at prices *below* short-run variable cost, the decline in output due to the price-cost squeeze has not yet fully materialized.

The Price-Cost Squeeze

This section documents that wages are in fact above market clearing. That is, at prevailing Eastern wages and world market prices most Eastern firms that produce tradable goods are unable to cover even their short-run costs of production. We later discuss the various factors that account for the behavior of wages.

Domestic Resource Cost of Foreign Exchange

We have obtained a data set, previously used for planning purposes by the government of the former GDR, that we can adjust to estimate the extent of the current price-cost squeeze in East German industry. We will also use these data to assess the current viability of Eastern industry under alternative assumptions about the evolution of wages and productivity. We consider a firm to be viable if the world price of tradable goods (p^* in figure 1) exceeds the short-run average variable cost of production at capacity ($\hat{p}$ in figure 1). If the short-run average cost curve is horizontal, as drawn in figure 1, viable firms earn positive quasi-rents and hence do not require subsidies to remain in business, although they may not operate at capacity if short-run demand is insufficient. Because viable firms may earn less than a competitive return on either existing capital or new investment, according to our definition, they may be unable to remain in business in the long run.

Planners in the GDR routinely tabulated the foreign currency proceeds from export sales to nonsocialist countries as well as the cost, at producer prices in mark, of the goods that were exported. They maintained such records for every *Kombinat* (conglomerate) that sold products outside the communist bloc. Our data measure the *domestic resource cost* of earning foreign exchange for 116 *Kombinate* in 1989. Alternatively stated, our figures give the total cost (plus any excess profit) in mark of earning a deutsche mark in world markets before currency union. Most *Kombinate* exported to nonsocialist countries (indeed, nonsocialist exports amounted to about 20 percent of GNP in 1989), and thus the data cover almost the entire industrial sector.[11] Comparable data are also

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11. With exports evaluated at the *Richtungskoeffizient* of 4.4 mark per deutsche mark, exports amount to about 22 percent of GNP. This coefficient is a shadow exchange rate used to value nonsocialist imports and exports in the GDR. We discuss the shadow

available for each of the 183 individual enterprises within these *Kombinate* that sold more than 10 million deutsche mark of goods in Western markets. Finally, our data set includes measures of the domestic resource costs of East German conglomerates in socialist trade—defined as the expenses incurred by East German firms per transfer ruble earned in CMEA sales.[12] The expenses incurred by East German firms in selling their products in world markets, when appropriately adjusted, provide a good measure of the viability of East German firms under free trade.[13] Prior to currency union GDR consumers were unable to "vote with their feet"; hence the prices paid by East Germans for products produced in the GDR serve as a poor gauge of what consumers would have been willing to pay if they had been free to choose Western goods. Similarly, the prices in CMEA trade are not useful because sales were politically negotiated. But the prices paid by customers in nonsocialist countries are an accurate reflection of their world market values under free trade. In this section we first present the unadjusted domestic resource cost data and then explain how they can be adjusted to yield a current measure of the short-run average variable costs and viability of East Germany's former state-owned enterprises.

Table 6 and figure 2 summarize the raw cost data. The average expense incurred in mark, per deutsche mark earned in nonsocialist sales, was 3.73 in 1989.[14] Alternatively stated, an index of the producer prices of

exchange rate in greater detail later in the paper. With exports evaluated at their export-weighted average domestic resource cost of 3.77 mark per deutsche mark, nonsocialist exports amounted to about 18 percent of GNP. See Statistisches Amt der DDR (1990, pp. 107, 277).

12. The *Kombinat* level data are unpublished data compiled by the East German planning ministry. Data on the domestic resource costs of individual firms exporting at least 10 million *Valutamark* of goods to nonsocialist countries are contained in Schreiber, Hendzlik, and Schmolinsky (1990). The numbers from these two sources are in approximate agreement. The domestic resource cost figures for each sector use weights based on employment shares in 1989. Figures on employment by *Kombinat* were obtained from the Staatliche Zentralverwaltung für Statistik, "Wichtige Kennziffern der Industrie Arbeits-ökonomische Kennziffern, Berichtszeitraum: 1.1 –31.12.1989."

13. In order to make up for lost domestic sales, Eastern firms will have to find new customers in these markets.

14. This figure is the employment-weighted average of the domestic resource costs of each *Kombinat*; the export-weighted average is slightly different, 3.77. Expense is measured as the value of output at producer prices (*Betriebspreise*), which are exclusive of product-specific taxes and the trade margins of the foreign trade companies. *Industrieabgabepreise* (IAP) include product-specific taxes.

Table 6. The Domestic Resource Cost of Earning Foreign Exchange in East Germany, by Sector, 1989 and 1990

| | | *Domestic resource cost of earning one:* | | | |
| | | *Deutsche mark* | | *Transfer ruble* | |
Industrial sector	*Share of employment*	*Unadjusted*[a]	*Adjusted*[b]	*Unadjusted*[a]	*Adjusted*[b]
Total industry	1.00	3.73	1.84	4.65	2.30
Energy	0.11	2.08	0.85	3.16	1.29
Chemicals	0.12	4.11	1.50	5.93	2.16
Metallurgy	0.07	3.22	1.35	7.43	3.11
Machinery and transporta-					
tion equipment	0.26	3.54	1.83	3.51	1.81
Machinery	0.15	3.59	1.85	3.62	1.87
Transportation equipment	0.10	3.46	1.79	3.35	1.73
Electronics	0.18	4.82	2.42	3.44	1.73
Light industry	0.24	3.74	1.72	5.69	2.62
Textiles	0.14	3.70	1.71	6.45	2.97
Furniture, toys, and other	0.05	4.22	1.95	4.55	2.10
Glass, ceramics, and paper	0.05	3.33	1.54	4.65	2.14
Food, drinks, and tobacco	0.02	4.09	2.93	8.00	5.73

Sources: Authors' own calculations using unpublished data from the government of the former GDR.

a. The unadjusted cost in each sector is the average expense in mark of earning a deutsche mark in trade with non-CMEA countries and a transfer ruble in CMEA trade in 1989. The numbers are the averages of *Kombinat*-level data by sector, weighted by each *Kombinat's* share of sectoral employment.

b. The adjusted cost is an estimate of the short-run average variable cost in deutsche mark of earning one deutsche mark in trade with non-CMEA countries and a transfer ruble in CMEA trade in October 1990. The adjusted expense is estimated by multiplying the unadjusted expense by one minus the adjustment factors in the sixth column of table 7. These factors approximate the percentage difference between domestic resource cost in 1989 and short-run average variable cost in 1990.

East German industrial exports (in mark) was over three times as high as an index of the producer prices (in deutsche mark) of comparable goods in Western markets.[15] Table 6 also presents domestic resource cost ratios disaggregated by industrial sector. The cost in mark of earning a deutsche mark varies significantly across sectors ranging from a low of 2.08 in the energy sector to a high of 4.82 in the electronics sector. An

15. In early 1990 the GDR publicly revealed, for the first time, the "shadow exchange rates" (*Richtungskoeffizienten*) used internally to convert deutsche mark, dollars, and transfer ruble into mark (also called *Mark Valutagegenwert* or "mark value equivalents"). See, for example, Haendcke-Hoppe (1990). These conversion rates were ministry "forecasts" of the expenses that East German firms would actually incur, on average, per deutsche mark (or per dollar, or per transfer ruble) earned in foreign trade. In contrast, our data measure the *actual* costs of earning foreign exchange. Firms with domestic resource costs in excess of the *Richtungskoeffizient* received export subsidies. It was not expected that all firms would cover their costs in producing for foreign markets. The official conversion rates in 1989 were 1 deutsche mark = 4.4 *Mark Valutagegenwert*; 1 U.S. dollar = 8.14 *Mark Valutagegenwert*; and 1 transfer ruble = 4.67 *Mark Valutagegenwert*. See Statistisches Amt der DDR (1990, p. 275). The publication of these numbers

Figure 2. The Domestic Resource Cost of Earning Foreign Exchange in Selected East German Industries, 1989[a]
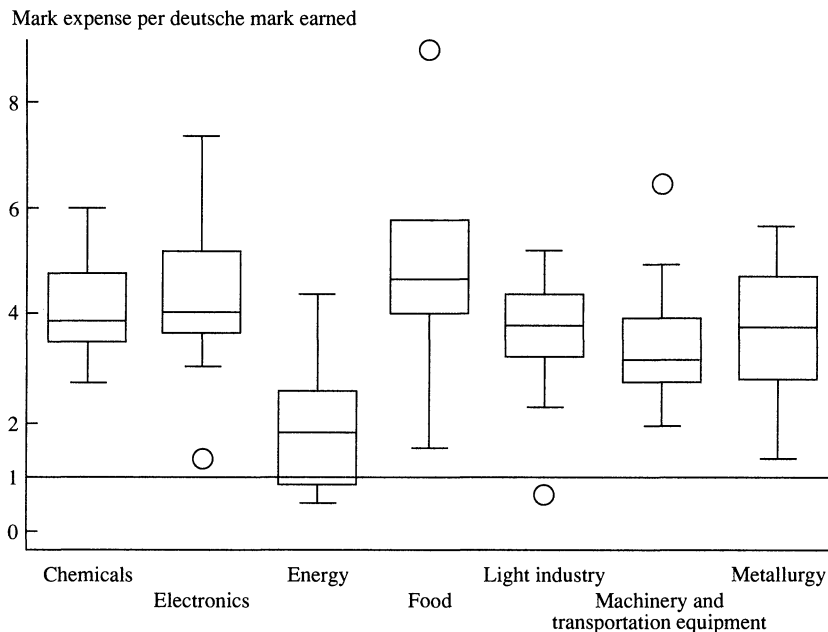
Mark expense per deutsche mark earned

Source: Authors' own calculations using unpublished data from the government of the former GDR.

a. The figure uses a box-and-whiskers diagram to display the univariate distributions of the unadjusted data. The box represents the interquartile range—that is, the box encompasses the middle 50 percent of the data. The line across the middle of the box denotes the median. The whiskers extend to 150 percent of the interquartile range rolled back to the first available data point. Observations that lie beyond the whiskers are considered outliers and are individually marked by bubbles.

enabled many riddles concerning East German trade to be solved and led to a reassessment of the magnitude of GDR trade with the West. It is now understood to be much larger than was previously thought. In the months preceding currency union, the availability of these conversion rates led Horst Siebert among others to a relatively pessimistic assessment of the viability of East German industry given conversion of wage contracts at par. Siebert argued for conversion of wages at two to one, with a subsequent adjustment to compensate for the rise in prices of subsidized products and for higher social insurance contributions. See Siebert (1990). Similarly, Renate Filip-Köhn and Udo Ludwig used the newly available conversion rates to estimate the deutsche mark value of GDR GNP by input-output methods. See Filip-Köhn and Ludwig (1990). Their assessment was by far the most pessimistic on record. Under their most optimistic set of adjustments, they estimated GDR GNP at DM 230 billion in 1988. The value of GDR GNP, calculated according to National Income Accounting conventions for 1988, is 345 billion mark; see Statistisches Amt der DDR (1990, p. 107). Implicit in this calculation is an estimate of the overall level of GDR

inspection of the enterprise-level data reveals that only a *single* firm in East Germany outside the energy sector—the State Porcelainworks of Meissen—had costs per deutsche mark earned of less than unity. The costs in the energy sector do not include the environmental costs resulting from the use of brown coal.

The sectoral averages presented in table 6 conceal enormous intra-sector variation in costs across *Kombinate* and individual firms. For example, in electronics, the Carl Zeiss Kombinat had an expense ratio of 3.66 mark per deutsche mark earned, while the Kombinat Mikro-elektronik needed to spend 7.17 mark per deutsche mark.[16] Within the Zeiss conglomerate, however, Zeiss Precision Instruments of Jena had costs of 2.37 mark per deutsche mark, while Pentacon of Dresden, the manufacturer of Praktica cameras, which exported over 40 percent of its output to the West, had expenses of 7.04 mark per deutsche mark earned in foreign sales. The liquidation of Pentacon within months of currency union reflects the predictive power of these cost ratios; the Treuhandanstalt said that Pentacon was losing money on every camera sold.[17] The enormous variation in costs across *Kombinate* is illustrated in figure 2, which uses box-and-whiskers plots to show the univariate distributions of expenses per deutsche mark for seven broad sectors.[18]

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to FRG prices of 1.5. In contrast, the Deutsches Institut für Wirtschaftsforschung estimated 1989 GNP at DM 286 billion. See *Wochenbericht* 46/90, 15 November 1990, p. 653. In performing their calculation, Filip-Köhn and Ludwig assumed that exports were "dumped" so that the relative prices of GDR exports to the West were far lower than the relative prices of GDR goods in the aggregate. Alternatively, they assumed that the relative productivity of the GDR versus the FRG in exports, which they computed to be at most one-third, was lower than elsewhere in the economy. In contrast, we assume that export prices adequately reflect the world market value of tradable industrial goods.

16. This *Kombinat* is losing DM 5 million every month and will have to lay off 70 percent of its workers. *Süddeutsche Zeitung*, November 8, 1990, p. 33.

17. "Stillegung bei Pentacon," press release of the Treuhandanstalt, Berlin, October 2, 1990. On the other hand, Meissen Porcelain has orders for more than two years' worth of output, and Mitsubishi made an offer to buy this firm, an offer that was rejected by the Trust. It was decided that the government of Saxony should retain ownership of Meissen Porcelain because of its cultural significance.

18. Available time series data on the *Richtungskoeffizient* and the domestic resource cost of earning foreign exchange in the GDR suggest a significant deterioration in the competitiveness of the East German economy during the 1980s. The *Richtungskoeffizient* rose from 2.4 over the 1980–84 period to 2.9 in 1985, 3.6 in 1986, 4.3 in 1987, and 4.4 in 1988 and 1989. See Siebert (1990). Available data for the 1985–89 period show the actual evolution of the overall domestic resource cost ratio: 1.87 in 1985, 3.42 in 1986, 3.87 in

Calculations of Short-Run Variable Costs

The domestic resource cost data must be adjusted to obtain a measure of the current viability of each *Kombinat*. A firm is viable, according to our previous definition, if its short-run average variable cost per deutsche mark earned is less than unity. Our raw data on the domestic resource costs measure *total* cost—fixed cost plus variable cost—plus any extraordinary profit per deutsche mark earned. Short-run average variable cost per deutsche mark earned, our measure of firms' viability, can be obtained from these data by adjusting for the differences between *total* cost plus extraordinary profit and *short-run variable* cost, and for differences in costs *before* and *after* currency union. To adjust for differences between total cost plus extraordinary profit and short-run variable cost, we remove all profits, interest, and depreciation in excess of repairs necessary for current operation. To adjust for differences in costs before and after currency union, we estimate the effects of changes in the tax structure, in the cost of imported intermediate inputs, and in wages. (We calculate the relevant adjustments at the sectoral level using information concerning the cost structure of each sector contained in the 1987 input-output table of the GDR.)

In the GDR, there was no important distinction between taxes, profits, and interest. They were different accounting names with no meaningful economic distinction given to different parts of the "surplus" earned by a firm. Therefore we shall lump together the adjustments for taxes (net of subsidies), profits, and interest payments. Taxes (net of subsidies), profits, and interest payments in the GDR, all of which entered domestic resource costs, were enormous: about 59 percent of value added in industry.[19] To compute short-run variable cost, we eliminate this entire surplus from the domestic resource cost figure and add in the relevant

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1987, 4.06 in 1988, and 3.77 in 1989. This substantial change in the *Richtungskoeffizient* and the domestic resource cost ratio reflects changes in the world price of petroleum, a significant GDR export, and Soviet oil, a major imported input. The cost of imported oil from the Soviet Union was a five-year moving average of the world price. Between 1980 and 1984, the ratio of the price of oil paid by the GDR to the Soviet Union to the world market price of oil doubled. In 1986 it doubled again, as Soviet prices peaked while world prices plummeted. In 1989 and 1990, this price ratio declined by 46 percent relative to its 1986 peak, permitting some decline in the domestic resource cost ratio of the GDR. These series are based on unpublished GDR data.

19. Statistisches Amt der DDR (1990, pp. 108–09).

taxes after currency union. These are employer contributions to social
security, which are higher now than they had been in the GDR. Our
adjustment intentionally excludes the value-added tax (VAT) and the
corporate income tax.[20]

The second important impact of currency union on variable costs in
East Germany stems from the changes that have occurred in the costs
of imported inputs. Currency union has led to a substantial reduction in
the costs of inputs from both nonsocialist and socialist countries. Prior
to the union, 22 percent of total material use in East German industry
had consisted of imported inputs.[21] Enterprises were charged 4.4 mark
per deutsche mark of imported inputs from nonsocialist countries and
4.67 mark per transfer ruble of imports from CMEA countries; these
numbers are simply the "shadow prices" (*Richtungskoeffizienten*) used
internally to price foreign goods. Since currency union, however, the
cost of a deutsche mark's worth of Western products has fallen from 4.4
to unity, leading to a substantial cost decrease. Further, the conversion
rate used to price both purchases and sales from socialist countries,
denominated in transfer rubles, was halved—from 4.67 mark per transfer
ruble to 2.34 deutsche mark per transfer ruble. This has also resulted in
a substantial cost reduction for Eastern firms, a reduction that will persist

20. The domestic resource cost numbers measure the value of GDR exports at producer
prices per deutsche mark of foreign exchange earned. Because foreign exchange earnings
in the former GDR were exclusive of any VAT paid abroad, short-run variable costs should
also be computed exclusive of VAT. East German firms that export abroad are now exempt
from VAT; currently for sales within Germany both revenue and cost will be higher by the
amount of the VAT. Because the corporate income tax is a levy on profits, it should not
be included in short-run variable cost. Interest does not enter short-run variable cost.
These debts could lead to bankruptcy, however, unless they are forgiven. Debts of GDR
firms were converted into deutsche mark at a two-to-one rate; the Treuhandanstalt is
making the interest payments on all old debt and in some instances the Treuhandanstalt
has agreed to forgive the principal as well. See, for example, *Frankfurter Allgemeine
Zeitung*, March 7, 1991, p. 16, and March 8, 1991, p. 15.

21. See Statistisches Amt der DDR (1990, pp. 108–09). While a precise geographical
breakdown of the sources of these inputs is unobtainable, it is known that 54 percent of all
imports into the GDR came from nonsocialist countries and the remaining 46 percent were
from socialist countries. Since 70 percent of all imports into the GDR were used as inputs
in industry, it is reasonable to assume that these same percentages approximately
characterize the sources of imported inputs as well. In performing the input-output
calculations reported in table 7, we have estimated the fraction of imported inputs in each
sector from the CMEA and non-CMEA countries through a variety of indirect means,
since this breakdown is unavailable in East German data.

if current deutsche mark prices for socialist imports continue to prevail after CMEA trade is switched from barter to hard currency.

Table 7 reports the results of input-output simulations quantifying the adjustments to domestic resource costs resulting from the radical changes in the fiscal system and in the pricing of imported inputs.[22] Input-output analysis takes intersectoral feedbacks into consideration in assessing cost reductions in each sector of the economy. Cost reductions that lead to lower prices in one sector reduce the costs of material inputs used by other sectors, thus permitting further price cuts elsewhere in the economy. We assume that producer prices will match short-run variable cost in each sector.[23,24]

The columns in table 7 report percentage adjustments in the domestic resource cost figures needed to estimate average short-run variable cost. The first column shows the adjustment resulting from the elimination of

22. We have made use of the recently published East German input-output table for 1987 to estimate the percentage difference between domestic resource cost before currency union and short-run variable cost after currency union. See Statistisches Amt der DDR (1990, pp. 108–09). Our analysis is modeled on the work of the Deutsches Institut für Wirtschaftsforschung (DIW), which has emphasized and estimated the scope for price cutting due to these cost reductions. In Deutsches Institut für Wirtschaftsforschung (1990), DIW presents a detailed analysis estimating the percent by which gross value added would be able to fall in each sector as a consequence of the fiscal reforms at currency union. In unpublished work, DIW used input-output methodology comparable to our own in order to estimate the potential reduction in producer prices that could occur in each sector. We are indebted to Bernd Görzig of DIW for providing us with the results of that analysis. The analysis that we report below makes use of similar methodology but also takes account of reductions in the costs of imported inputs due to currency union, which were not included in the DIW analysis. Michael Burda (1990) has also emphasized the importance of the scope for price cutting.

23. One shortcoming of the analysis is that we assume that after currency union East German enterprises continued to source their inputs domestically to the same extent as they did previous to union—an assumption that is undoubtedly unwarranted if the prices of those inputs have not fallen to competitive levels. A further limitation of our analysis is that it assumes that firms cut prices by the maximum amount possible, whereas, in fact, there is no incentive for further price cutting once prices have fallen to world levels.

24. It should be emphasized that the total-adjustment figures in table 7 are the amounts by which producer, and not consumer, prices can decline. In the GDR, enormous subsidies were given to transportation and basic foods, and some subsidies were provided in light industry, which caused consumer and producer prices to diverge. The imposition of the VAT will raise consumer prices in all sectors by 14 percent. Finally, a variety of new taxes imposed on alcohol, tobacco, and petrol will raise consumer prices in these sectors. Taking these factors into account, consumer prices should increase, not decrease, in several important sectors including food and transportation.

Table 7. A Decomposition of the Factors Contributing to the Difference between Domestic Resource Costs before Currency Union and Short-Run Variable Costs after Currency Union

Percent, except for elasticities

Sector	Adjustment in domestic resource cost by factor						Elasticity of short-run variable cost with respect to further wage increases	
	Reduction in profits, interest, and taxes	50 percent reduction in depreciation	Reduction in costs of imported inputs	10 percent wage increase[a]	Additional 32 percent wage increase	Total adjustment	Across the board	Own sector only
Total industry	-36.1	-4.8	-19.7	2.4	7.6	-50.6	0.66	0.51
Energy	-47.3	-10.0	-9.4	1.8	5.8	-59.1	0.61	0.42
Chemicals	-41.1	-4.3	-23.2	1.2	3.9	-63.5	0.46	0.24
Metallurgy	-30.9	-4.4	-29.6	1.6	5.2	-58.1	0.53	0.33
Building materials	-40.9	-5.1	-16.2	2.4	7.8	-52.0	0.69	0.47
Machinery and transportation equipment	-36.0	-4.2	-19.3	2.6	8.5	-48.4	0.70	0.54
Electronics	-39.8	-4.1	-17.2	2.7	8.6	-49.8	0.73	0.56
Light industry	-43.0	-3.8	-17.0	2.4	7.6	-53.9	0.70	0.52
Food	-18.4	-5.7	-20.3	3.8	12.3	-28.4	0.73	0.19
Agriculture and forestry	-31.6	-5.1	-11.6	4.0	12.8	-31.6	0.79	0.62
Transportation and communications	-29.3	-8.2	-12.2	3.5	11.4	-34.7	0.74	0.54
Construction	-36.6	-4.4	-12.6	3.5	11.4	-38.6	0.79	0.53

Source: Authors' own calculations using input-output analysis. See the text for a more detailed description of the cost changes brought about by currency union.
a. We estimate that because of increased payroll deductions after currency union, a 10 percent wage increase would have kept net wages constant.

the very high enterprise taxes (net of subsidies) and the interest burden on firms, coupled with an adjustment for increased employer contributions to social security in compliance with the West German system. For industry as a whole, the change in the system of enterprise taxation permits cost reductions averaging 36 percent. The second column assesses the effects of lower depreciation allowances. A 50 percent decline in depreciation allowances, leaving the remaining 50 percent of depreciation for current repairs, yields an almost 5 percent adjustment. The third column shows the effect of the reductions in imported input costs discussed earlier. This adjustment is substantial, giving rise to a 20 percent cost reduction in industry as a whole.

Wage movements have also exerted an important influence on costs. From the first quarter of 1990 to October 1990, wages rose by 42 percent. We estimate that a wage hike of roughly 10 percent would have been necessary to compensate workers for the net increases in payroll tax deductions (social security plus income tax) attendant upon currency union. A gross wage increase of this amount would have sufficed to leave net wages constant. The fourth column of table 7 shows the adjustment to domestic resource costs if wages had risen by only 10 percent. Since "surplus" was so large that wages were only a small fraction of costs to begin with, this adjustment is small—2.4 percent. The fifth column shows the impact of the further 32 percent increase in gross wages that occurred up through October 1990: not surprisingly these additional pay hikes have raised costs significantly.

Summing the first through the fifth columns we find that short-run average variable cost in East German industry after currency union was about 51 percent lower than the domestic resource cost of foreign exchange before currency union. This reduction in costs corresponds closely to the slightly more than 50 percent reduction in East German producer prices between May and August of 1990. The logic behind our calculations provides a simple explanation for these price cuts.

The final two columns of table 7 provide estimates of the percent, relative to *present* levels, by which each sector's short-run average variable cost would rise as a consequence of an additional 1 percent across-the-board wage increase for Eastern workers and of a wage increase of 1 percent only in the sector in question. The same figures can be used to assess the impact on sectoral costs of economywide and

sector-specific productivity improvements. Wage costs now constitute a much larger percentage of total costs in the East than they did before currency union. In consequence, each 1 percent wage hike will now raise short-run variable cost by roughly 0.66 percent. We will use these figures to estimate the sensitivity of the survival prospects of East German firms to further wage and productivity changes.

Viability of East German Industry

In order to gain perspective on the current viability of East German industry, it is necessary to compute short-run average variable costs. The sectoral adjustment factors in the sixth column of table 7 measure the percentage difference between short-run average variable costs per deutsche mark earned and unadjusted domestic resource costs. This measure can thus be used to estimate the current value of short-run average variable cost per deutsche mark earned for each sector and for each *Kombinat* within that sector. These *adjusted domestic resource cost* figures give our "benchmark" estimates of short-run average variable costs, in deutsche mark, per deutsche mark earned in world markets as of October 1990. These estimates thus provide a characterization of the current competitiveness of East German industry.[25] The third column of table 6 presents sectoral averages of adjusted domestic resource costs. The picture that emerges is dismal. Only the energy sector can cover its short-run costs.

Table 8 describes the distribution of adjusted domestic resource cost ratios across *Kombinate* in East Germany under our benchmark assumptions and several alternative scenarios concerning wages and productivity.[26] This table gives the cumulative number of conglomerates

25. The adjusted resource cost figures actually provide an underestimate of the short-run variable costs per deutsche mark earned. The reason is a technical one. The raw domestic resource cost figures measure producer prices at *Betriebspreise*, which are exclusive of any product specific taxes levied at the firm level. But the East German input-output table values goods at producer prices (IAP prices), which are inclusive of such taxes. Table 7 measures the percentage by which these IAP prices can fall. This overestimates the percentage by which the *Betriebspreise* can decline. Thus the picture that emerges here of the viability of East German industry is slightly overoptimistic.

26. We have adjusted each *Kombinat*'s domestic resource cost ratio by the relevant sectoral adjustment factor from table 7. Ideally, a separate adjustment factor should be computed for each enterprise and each conglomerate based on the relevant details of its own cost structure. Such an approach could be attempted using the more detailed input-output table (with 131 sectors) that is now available for the GDR.

Table 8. The Viability of East German *Kombinate* under Benchmark and Alternative Assumptions

Adjusted expenses per deutsche mark earned	Benchmark case[a]		Viable employment with across-the-board changes (percent)			
	Number of Kombinate[b]	Viable employment (percent)[c]	10 percent wage increase	10 percent productivity increase	50 percent labor cost subsidy	75 percent labor cost subsidy
< 0.25	2	0.4	0.4	0.4	1.9	2.5
< 0.5	7	2.5	2.5	2.5	4.9	10.6
< 0.75	10	4.9	4.9	5.2	14.5	36.6
< 1.0	14	8.2	7.5	12.3	36.6	77.2
< 1.25	27	19.9	17.5	26.8	69.3	89.7
< 1.5	46	37.5	33.3	46.7	82.7	96.2
< 1.75	66	55.2	49.9	63.4	90.7	99.5
< 2.0	86	73.9	64.1	78.1	96.1	99.8
< 2.25	96	81.8	77.1	86.7	98.5	99.8
< 2.5	105	87.2	83.9	89.8	99.4	99.8
< 2.75	107	90.8	89.8	91.2	99.8	99.8
< 3.0	108	91.2	90.9	96.3	99.8	100.0
< 3.25	111	96.3	91.3	96.3	99.8	100.0
< 3.5	111	96.3	96.4	99.6	99.8	100.0
< 3.75	114	99.6	96.4	99.6	99.8	100.0
< 4.0	114	99.6	99.6	99.8	99.8	100.0
< ∞	116	100.0	100.0	100.0	100.0	100.0

Source: Authors' own calculations as described in the text.

a. The benchmark case (as in the sixth column of table 7) assumes elimination of taxes, profits, interest, and subsidies to the firm; an increase in employer and employee contributions to social insurance to the West German level of 18.25 percent each; a 50 percent reduction in depreciation expense; savings on imported inputs as described in the text; and a 42 percent increase in gross wages.

b. The cumulative number of *Kombinate* with adjusted domestic resource cost ratios below the level indicated in column one is shown.

c. The percent of wage and salary workers in *Kombinate* with adjusted domestic resource cost ratios below the level indicated in the first column, as a fraction of the total number of wage and salaried workers in all *Kombinate* in the sample, is shown in the third through seventh columns.

and the percentage of employment at varying levels of competitiveness. Under our benchmark assumptions only about 8 percent of the industrial work force is employed in viable *Kombinate*, those with expense ratios below unity. As is apparent, the majority of firms currently have short-run variable costs between one and two deutsche mark per deutsche mark earned.

Table 8 also reports the impact of a 10 percent wage hike, above and beyond the 42 percent hike that had occurred through October 1990, and a 10 percent productivity increase. (The 10 percent productivity improvement yields the same results as a 20 percent productivity improvement with a 10 percent wage hike, the additional amount that has probably

occurred since October.) Such improvements in productivity can be expected. A survey conducted by the Ifo Institut für Wirtschaftsforschung in May 1990 to measure the extent of disguised unemployment in the GDR estimated it amounts to approximately 18 percent in industry and 15 percent in the economy as a whole. Practices that reduced productivity include widespread overmanning, political activities of workers, high absenteeism, frequent interruptions because of an absence of inputs, and excessive in-house production of inputs.[27]

The final two columns of table 8 present the results of simulations designed to assess the effectiveness of substantial cuts, of 50 percent and 75 percent, in total labor cost. Such cuts could be achieved through a policy of wage subsidies. As is apparent, subsidies to achieve reductions in labor costs of this magnitude would substantially raise the number of viable *Kombinate*—from 14 conglomerates hiring about 8 percent of the industrial labor force in the benchmark case, to 47 *Kombinate* hiring almost 37 percent of the industrial work force in the case of a 50 percent reduction in labor costs, to 88 *Kombinate* employing 77 percent of the industrial work force in the case of a 75 percent reduction in labor costs. In a later section we discuss the economic desirability of adopting deep wage subsidies.

At the time of currency union it was widely rumored that one-third of East German firms would go out of business. The microeconomic data that have been presented in this paper offer a far more pessimistic view of the likely viability of the East German economy. In the absence of massive productivity improvements or substantial subsidization, most Eastern industry will have to close down.[28]

27. See Vogler-Ludwig (1990, p. 7). These estimates of hidden unemployment take as given the state of technology, the extent of vertical integration, the product mix, the age of the GDR capital stock, and so on.

28. Prior to currency union the available information regarding conditions in the GDR led most analysts to adopt nervously optimistic forecasts concerning the viability of East German industry. The most influential study comparing GDR and FRG productivity prior to currency union was conducted by DIW for the Bundestag in 1987. Productivity—output per employee—in the East as of 1983 was judged to be approximately 52 percent that in the West, while wages per employee in the GDR were 35 percent of those in the FRG. See Bundesministerium für innerdeutsche Beziehungen (1987, pp. 390, 718). In 1989 average gross monthly wages and salaries per employee in the whole FRG economy amounted to DM 3,192; the comparable GDR figure for industry in the first half of 1990 was 1,110 mark. See Statistisches Bundesamt (1990, p. 566); the GDR wage figure is based on unpublished data provided to us by the Statistical Office in East Berlin. These figures imply that at a

The Price-Cost Squeeze and Exports

Indirect confirmation of the price-cost squeeze comes from the behavior of exports following currency union and the discussions that have taken place concerning export sales. The changes associated with currency union should have had little effect on the demand schedules of foreign buyers. Indeed, many foreign purchases were covered by long-term contracts. But an implication of the price-cost squeeze is that many Eastern firms should have realized losses if they filled such orders. It turns out that export sales, in real terms, declined much less dramatically than production: between July and November of 1990 total exports, excluding sales to West Germany, amounted to almost 89 percent of

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one-to-one exchange rate unit labor costs in East Germany would average 67 percent of the West German level. Given the similarity of relative productivity across sectors, even the sectors with the lowest relative productivity—construction materials, agriculture, and forestry—would have unit labor costs in East Germany approximately 15 percent below those in West Germany. Moreover, even the most pessimistic assessments before union placed GDR per capita GNP at 45 percent that of the FRG. For a survey of estimates, see Bundesministerium für innerdeutsche Beziehungen (1987, p. 480). (However, two days prior to currency union DIW published a revised estimate of GDR per capita income relative to the FRG of 40 percent. See *Wochenbericht*, 26/90, June 28, 1990.) Western estimates of prices in the GDR relative to those in the FRG indicated that the purchasing power parity exchange rate of the mark relative to the deutsche mark was close to unity: the cost of the consumption bundle of the typical East German household was judged to be slightly lower in mark in the GDR than in deutsche mark in the FRG. It was estimated that in 1985 a GDR consumer in a typical four-person employee household would pay 24 percent more in deutsche mark to buy its consumption basket in the FRG than that same basket would cost in mark in the GDR. See Bundesministerium für innerdeutsche Beziehungen (1987, pp. 516, 732–33). Similarly, the Bundestag's estimates of the price parities for industrial goods suggested that producer prices in mark in the GDR exceeded comparable deutsche mark prices by roughly 31 percent. Bundesministerium für innerdeutsche Beziehungen (1987, pp. 390, and 717–18). As we have shown, there was ample scope for prices to fall by this amount following currency union, even with wage contracts converted into deutsche mark at parity. With the benefit of hindsight, it is apparent that the market values of the outputs of centrally planned economies have been overestimated for one fundamental reason. Because socialist planning based targets on economic indicators, it was biased toward high values of those indicators and against unobservable characteristics such as product quality and variety that Western consumers value. These characteristics have been just as unquantifiable for Western analysts as for socialist planners, if not more so. In addition, Western valuation of Eastern products has been complicated by the fact that socialist economies made products that were not produced in the West. The Western production cost of these goods, which was the method used in the most careful studies to evaluate Eastern versus Western quality, would often far exceed their market value. See, for example, Sturm (1974) and Alton and others (1990).

their level during the same five months of 1989.[29] But there are many indications that firms are losing money on both socialist and nonsocialist exports and can only continue satisfying orders because the Treuhandanstalt has implicitly or explicitly subsidized the losses. If these bailouts end, many more firms will fail and the impact of the price-cost squeeze on output will be fully felt.

EXPORTS TO SOCIALIST COUNTRIES. Table 6 shows the domestic resource cost of CMEA exports in mark per transfer ruble earned before currency union and our estimates of their adjusted cost in deutsche mark per transfer ruble after union. (Before currency union these exports were 17 percent of GNP.) In industry as a whole, the domestic resource cost of exports per transfer ruble earned was 4.65 mark in 1989. After currency union we estimate that the short-run average variable cost of CMEA exports amounted to 2.30 deutsche mark per transfer ruble. Using *Kombinat*-level data, we find that before union 70 percent of export sales were "profitable" at the *Richtungskoeffizient* (shadow rate of exchange) of 4.67 mark per transfer ruble. The remaining exports required subsidies from the GDR government. After union the transfer ruble was valued at 2.34 deutsche mark. Under these new conditions, we estimate that roughly 20 percent of CMEA exports would be unprofitable and therefore require subsidies.

There is ample evidence that many Eastern firms *did* require subsidies to fulfill CMEA contracts after July 1, 1990. For example, Wartburg cars, which cost DM 14,400 to produce, were exported at DM 7,600 each.[30] The East German shipyards also incurred heavy losses on their CMEA exports.[31] These sales continued only because, under agreements

29. *Konjunktur Aktuell*, January 1991, Anhang II, p. 68. Sales to the CMEA bloc, denominated in transfer ruble, are converted into deutsche mark using the exchange rate of DM 2.34 per transfer ruble both before and after currency union. Available data suggest that most of the decline that occurred, at least through September, was in exports to nonsocialist countries. A breakdown of exports by region is available for July, August, and September in *Monatszahlen*, December 1990. During these three months, exports to the socialist countries rose by 8.5 percent when compared to the first six months of 1990. During the same three months, exports to the industrialized Western countries were 76 percent and exports to developing countries were 62 percent of their level during the first six months of 1990.

30. *Frankfurter Allgemeine Zeitung*, January 22, 1991, p. 15.

31. One estimate places the total losses of the shipyards since devaluation of the transfer ruble at DM 4.5 billion. *Die Zeit*, no. 46, November 16, p. 10.

signed with the Soviet Union, Germany pledged that Eastern firms would honor existing export contracts. Consequently, until January 1, 1991, the German government continued to pay subsidies to firms that had outstanding contracts but were unable to cover their production costs. With the elimination of most subsidies on January 1, many East German companies are feeling the pinch of the price-cost squeeze. Newspaper accounts indicate that unless subsidies continue, output will have to be cut in many sectors.[32] Even if export subsidies were to continue, CMEA exports are likely to decline in 1991 for a different reason: since January 1, all trade with CMEA countries has been denominated in hard currency rather than transfer ruble. Now that the Soviet Union and Eastern European countries have abandoned barter arrangements and are free to spend their hard currency earnings where they please, it seems quite likely that the demand for East German goods will decline, just as East German demand for CMEA products declined after currency union.[33] There are already indications that a major decline in trade with Eastern Europe will occur this year.[34]

32. In 1990, 1,500 firms received export subsidies for exports to socialist countries. These subsidies totaled DM 3.5 billion. In 1991 it is expected that only 149 firms will get subsidies, and the government expects to spend no more than DM 1 billion on them. *Süddeutsche Zeitung*, November 13, 1990. For example, the Treuhandanstalt has announced that the production of Wartburg cars will be discontinued at the end of March 1991 since it would cost DM 200 million to subsidize their production. *Frankfurter Allgemeine Zeitung*, January 22, 1991, p. 15, and *Süddeutsche Zeitung*, January 31, 1991, p. 37. In February, strikes hit all of the key shipbuilding centers, including Schwerin, Rostock, and Stralsund, as thousands of workers demanded that subsidies be continued rather than let money-losing companies be shut down. *The Wall Street Journal*, February 21, 1991.

33. Immediately after currency union East Germany canceled many orders from Poland, Czechoslovakia, Hungary, and Bulgaria. *Frankfurter Allgemeine Zeitung*, September 10 and 12, 1990. This made it difficult for these countries to pay for East German exports. It is anticipated that when trade is denominated in hard currency, the deutsche mark revenue will fall below the rate implicit in the current transfer ruble–deutsche mark exchange rate of 2.34. In shipbuilding, for example, it is estimated that 1 transfer ruble's worth of sales will be worth DM 1.56 in 1991, as compared with DM 2.34 prior to January 1, 1991, and 4.67 mark before currency union. *Frankfurter Allgemeine Zeitung*, November 19, 1990, p. 18.

34. For example, the foreign trade ministry of the Soviet Union was unwilling to sign contracts with East German firms after January 1, 1991, and a special negotiation involving the Soviet Prime Minister and the German Economics Minister resulted in the authorization of Soviet orders totaling only DM 9 billion for 1991. *Frankfurter Allgemeine Zeitung*, February 13, 1991, p. 17.

EXPORTS TO NONSOCIALIST COUNTRIES. In the case of CMEA exports, the subsidies of the Treuhand have been explicit and widely discussed. In the case of nonsocialist exports, subsidies have been implicit: sales have continued but losses have occurred; the losses have been "financed" by the Treuhandanstalt, which has guaranteed loans to firms unable to pay their bills. A case in point concerns a firm within the Robotron complex that had exported mechanical typewriters to the West. This firm continued selling abroad up through December 1990 when it announced that typewriter production would cease in January 1991 and the firm would fire the 1,000 workers that had been producing them. Typewriter sales had been unprofitable.[35] Similarly, it has been estimated that production of raw steel will probably fall by 45 percent during 1991 (it had already fallen 55 percent in 1990), in part because East Germany had been providing high subsidies to steel exports in order to obtain hard currency.[36]

In summary, we have argued in this section that a substantial portion of the output decline in East Germany has resulted from the price-cost squeeze. Stated differently, wages in East Germany are well above the full-employment, market-clearing level—and rising. East German wages are now about 50 percent of West German levels. West German wages exceed U.S. wages by approximately 20 percent; thus East German wages are about 60 percent of U.S. wages. While the skill of the East German labor force may justify such wages in the long run, they are simply too high for existing Eastern firms to operate profitably at present.

In this regard, it is instructive to compare the experience of Poland with that of East Germany. In Poland, trade was freed with a fixed exchange rate that has succeeded in producing a current account surplus. In July 1990 the average monthly wage in Poland, about DM 175, was roughly 13 percent of that in East Germany after one-to-one mark to deutsche mark conversion.[37] In 1989, however, Thad Alton estimated that GNP per capita in Poland was 47 percent of the GDR level.[38] Thus, a 3.6 mark–deutsche mark exchange rate would have been needed to yield the same ratio of wages to estimated per capita income in East Germany as prevailed in Poland.

35. *Frankfurter Allgemeine Zeitung*, December 7, 1990.
36. *Süddeutsche Zeitung*, February 5, p. 26.
37. PlanEcon (1990, p. 19).
38. See Alton and others (1990, p. 27).

The Collapse of Demand for East German Goods

Motorists at French double-track rail crossings are warned: "One train may hide another." The price-cost squeeze would have been sufficient to cause the East German depression; nevertheless, there is also another powerful reason for the output decline. Demand for domestically produced consumption and investment goods declined sharply; the level of investment probably declined too. In addition, a decline in exports to CMEA countries is apt to occur in the near future. (These shifts correspond to the distance labeled $Y_f - Y_1$ in figure 1.) The simple Keynesian multiplier model describes the determination of aggregate demand under present conditions in East Germany. We use this framework to explore the output and budgetary effects of government spending.

First we present a collage of statistics to indicate the behavior of consumption, investment, government spending, and imports in East Germany. (Export behavior was covered earlier.) Ideally, national income accounting figures would be used to compare expenditures before and after currency union. But such comparisons are treacherous because they necessarily entail the conversion of expenditures in mark into deutsche mark.[39] No official statistical series giving comparable pre- and post-union data is currently available.

Consumption and Imports

The Bundesbank (among others) had feared that currency conversion and trade liberalization might lead to an enormous surge in consumption. However, East Germans did not go on a spending spree following economic union on July 1. Household budget data collected by the Statistical Office in East Berlin show that the rate of saving out of

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39. The most widely cited GDR GNP statistics are those produced by the Deutsches Institut für Wirtschaftsforschung. The East German Statistical Office estimated GNP in 1989 to be 353.2 billion mark. Statistisches Amt der DDR (1990, p. 107). DIW estimated that the value of GDR GNP in deutsche mark prior to currency union was DM 285.7 billion, using an implicit exchange rate derived from the productivity estimates in the Bundestag report. See *Wochenbericht*, 7/91, February 14, 1991, p. 55. As we discussed above, this exchange rate gives a very high value of GNP in comparison with what is obtained from considering domestic resource cost figures.

household net income was 13.5 percent in September 1990 and 14.8
percent in October compared with 16.7 percent in the first five months
of 1990 and 12.7 percent in 1989.[40]

While there was no binge in overall consumption, residents of the
East substituted Western products for domestic goods on a massive
scale. The household budget data show that with the opening of trade,
Easterners took the chance to buy goods—especially cars and electrical
appliances—that had been unavailable or prohibitively expensive in the
GDR. The demand for these items surged in July and August. By
September they continued to account for 21 percent of the expenditure
of Eastern residents.[41] The switch toward Western goods also occurred
because the variety and quality of Eastern production had been low by
Western standards. Anecdotes of East-West quality differences abound,
affecting even cabbages, which allegedly contain more worms in the
East than in the West. Many observers say that along with the bad
products good ones have also been shunned.

Although no aggregate statistics are available that clearly quantify the
magnitude of this switch, its proportions have been evident. Within
weeks of economic union, most observers were astounded to find so few
goods of local origin in Eastern stores.[42] A survey of Eastern grocery
stores in September revealed high import penetration. The proportion
of Eastern products in retail sales amounted to 4 percent of the coffee
and cocoa, 6 percent of the chocolate, 12 percent of the fresh cheese, 24
percent of the sugar, 29 percent of the detergent, and 65 percent of the
margarine.[43] The West German Statistical Office reported that during

40. In June 1990, the month before currency union, there was a surge in household
saving: it amounted to 1,235 mark, or 39.5 percent of net income per household. Dissaving
occurred in both July and August. Nevertheless, the saving rate for the three months of
June, July, and August amounted to 9.6 percent of net income. *Monatszahlen*, December
1990, pp. 54–55.

41. *Monatszahlen*, December 1990, p. 55.

42. Aggressive Western retailers rapidly set up distribution outlets in the East after
July 1. An alternative hypothesis as to why there are so few goods of Eastern origin in the
stores is not that Eastern residents do not want them but rather that these Western retail
chains are not sourcing from the East.

43. *Süddeutsche Zeitung*, September 25, 1990. According to a recent report, however,
the food industry has begun to recover and East German products are making it back onto
the shelves. *Süddeutsche Zeitung*, January 31, 1991, p. 31. The disappearance of East
German products was not confined to foodstuffs. For example, it was reported that in the
Centrum Department Store in East Berlin almost no East German products were on the
shelves. A salesperson interviewed in a toy store indicated that Eastern products are

September 1990, DM 2.4 billion of goods were shipped from West to East Germany—a 277 percent increase over the same month in 1989.[44] These figures do not measure total purchases of Western goods by Eastern residents since their purchases made in the West are not included. Exceptionally strong growth in West Germany has been attributed by most observers, including the Bundesbank, to "the immense import pull exerted by the economy of the GDR after its western frontiers had been opened."[45] The Bundesbank cited this as one of the main reasons for the decline in the West German foreign trade surplus in August 1990 in comparison with the previous year. Moreover, it attributed to Eastern purchases made in the West very large increases in retail sales for food, drink, and tobacco, very strong growth in sales of electrical equipment and apparatus, and a "spate of orders" for domestic passenger cars in the six months before currency union.[46]

Investment

In 1989 gross investment in East Germany amounted to 77.0 billion *mark* (almost 22 percent of GNP).[47] In the first quarter after currency union investment was at an annual rate of 37.8 billion *deutsche mark*.[48] This probably represents a fall in real investment.[49] There was a significant rise, as was the case with consumption, in the imports of investment goods. In September 1990 shipments of investment goods from West to

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simply too expensive. *Frankfurter Allgemeine Zeitung*, December 10, 1990. A poll of Eastern firms found broad agreement with this conclusion: 75 percent thought that the quality and prices of their products have made it difficult to sell them. *Süddeutsche Zeitung*, October 22, 1990.

44. Data from the Statistisches Bundesamt show that monthly shipments of food rose to DM 651 million, investment goods to DM 972 million, and consumer goods to DM 224 million. Data for October through December 1990 show shipments at roughly the same level as in September 1990.

45. *Monthly Report of the Deutsche Bundesbank*, September 1990, p. 5.

46. *Monthly Report of the Deutsche Bundesbank*, September 1990, p. 30, and October 1990, p. 15.

47. Statistisches Amt der DDR (1990, pp. 110, 112). The investment figure is in constant 1985 prices. The 1989 GNP figure was 353.2 billion mark in constant 1985 prices.

48. *Quartals Bericht*, December 1990.

49. It is likely that the investment price index fell by less than 51 percent, so that real investment fell. Although the producer price index fell by 50.6 percent, investment is labor intensive and, as table 7 shows, the scope for price reductions in construction was lower—38.6 percent.

East Germany occurred at the annual rate of DM 11 billion.[50] We therefore conclude that domestic production of investment goods must have fallen considerably. This conclusion is corroborated by three other observations. In December 1990 output of cement in East Germany was about 21 percent of its December 1989 level. The number of completed dwelling units in 1990 was 32 percent lower than in 1989.[51] A November 1990 survey of firms in the construction sector showed that many more respondents considered business "bad" than "good" (the ratio of "bads" to "goods" was not quite as large as in industry, where output was at 50 percent of its 1989 level).[52]

The unsurprising decline in investment by as yet unprivatized firms in the East could conceivably have been offset by direct investment from outside East Germany.[53] In this regard, a survey of investment intentions is revealing. Private West German firms in 1991 were planning about DM 13.5 billion worth of investment (3 percent of total West German investment) in East Germany.[54] This level of investment may seem surprisingly low to readers of German newspapers, since there have been dramatic announcements of investments by large firms: for example, Volkswagen, DM 4.2 billion; Siemens, DM 1 billion; Mercedes Benz, DM 1 billion; IBM Germany, DM 200 million.[55] But these,

50. These data were provided by the Statistisches Bundesamt.

51. *Monatszahlen*, December 1990, 3. Folge, pp. 30, 38.

52. Ifo-Institut für Wirtschaftsforschung (1991).

53. For example, the possibility that new technologies imported from the West will become available following privatization gives Eastern managers good reason to wait to make new investments. Suppose that an old technology could earn a positive return but a new technology could make a return that is a multiple, β, of that return. At discount rate r, it would pay to wait to invest if the new technology is expected to be available in less than $\ln(\beta)/r$ years. If $\beta = 1.5$ and $r = 0.06$, it would pay to wait rather than to invest now if the new technology will be available in 6.75 years.

54. Neumann (1990, p. 10).

55. Volkswagen is investing DM 4.2 billion in East Germany (with 33 percent financed with government subsidies). The whole project is expected to create 35,000 jobs (including jobs at various parts suppliers). *Süddeutsche Zeitung*, October 20/21, 1990. Siemens already employs 15,000 workers in East Germany and plans to increase employment to about 25,000 to 30,000 while investing DM 1 billion. *Frankfurter Allgemeine Zeitung*, November 29, 1990. Mercedes is planning to spend DM 1 billion in building a new production site, which will be finished in 1994 or 1995. *Frankfurter Allgemeine Zeitung*, February 9, 1991, p. 14. IBM Germany is planning to invest DM 200 million in East Germany and create between 2,000 and 3,000 jobs. *Frankfurter Allgemeine Zeitung*, December 17, 1990. Opel has invested DM 27 million in a new assembly line, which will produce 10,000 cars a year and employ 200 people. It plans to expand production to 150,000 cars a year. There is considerable backward linkage to this project since Opel has signed

unfortunately, appear to be more the iceberg than its tip. While fully half of the firms in the poll planned some investment, most of this investment was small and consisted primarily of distribution facilities: the major reason firms wanted to invest in East Germany was "to be closer to the market." In the words of one German economist, "Given West German money, the East Germans only want to buy West German products. And Western industry is interested, naturally enough, first in selling products there, not in building factories and making them."[56]

One important reason for the slow pace of Western investment is Eastern wage costs, the problem emphasized throughout this paper. While wages in East Germany are lower than in West Germany, wages elsewhere, for example, in Greece, Portugal, and the rest of Eastern Europe, are lower still. In consequence, PlanEcon, a Washington consulting company, considered it "hardly a surprise that non-German investors were staying out of East Germany."[57]

Infrastructure investment supported by the federal government will in fact be more important than private investment by Western firms. Making estimates from the federal budget is difficult because not all expenditures are broken down between East and West. Estimates of government investment in East German infrastructure range from a low of DM 35 billion to a high of DM 55 billion.[58] At the minimum, these expenditures will include DM 6.5 billion for telecommunications;[59] DM 8.0 billion for the East German Reichsbahn; DM 3.4 billion for road construction;[60] and a DM 5.0 billion subsidy program for local investment in schools, hospitals, and retirement homes.[61]

Government Spending

Local government will be a significant contributor to the East German recession. The removal of high taxes and other governmental collections

contracts with 350 East German firms to supply parts. *Frankfurter Allgemeine Zeitung*, October 6, 1990.

56. Ferdinand Protzman, "Germans Lower Expectations on East's Economic Recovery," *The New York Times*, February 13, 1991, p. C2.

57. PlanEcon (1990, p. 2).

58. See *Süddeutsche Zeitung*, March 2/3, 1991, p. 13. *Frankfurter Allgemeine Zeitung*, March 2, 1991, pp. 1–2, and March 6, p. 1.

59. Neumann (1990, p. 10).

60. *Frankfurter Allgemeine Zeitung*, February 8, 1991, p. 13.

61. *Frankfurter Allgemeine Zeitung*, March 2, 1991, p. 1. The state and local governments may add to this from their own revenue sources.

at economic union has resulted in a loss of revenue for state and local governments. This loss has been partly compensated by contributions from the West, mainly from the federal government, of approximately DM 62 billion out of DM 97 billion in projected expenditures for 1991.[62] This contribution, however, is not sufficient to avoid significant layoffs. At the end of 1990 there were 1.7 million state and local employees, of whom 300,000 were in *Wartestand* (a "state of waiting"—roughly the public sector equivalent of short time). By the end of 1991 the Deutsches Institut für Wirtschaftsforschung (DIW) projects that only about 1.1 million will be employed with no one in the state of waiting.[63] These cuts are consistent with the October 1990 projections by the German labor ministry of a decline of 700,000 public employees.[64] In addition, the army will be reduced from its 178,000 troops in 1989 to 50,000.[65]

The Multiplier, Budget Cuts, and Infrastructure Investment

The German government is naturally preoccupied with limiting its spending in the East and controlling the budget deficits of the five new *Länder*. If spending in the East is curtailed, however, the sales and production of East German firms will fall even further. Moreover, as we will show, it will be almost impossible for the German government to achieve deficit reduction through spending cuts in the East. More importantly, such reductions, if achieved, could lower output dramatically. In other words, spending increases undertaken now will not be

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62. *Wochenbericht*, 10/91, table 1, p. 92. We have added to DIW's estimates of DM 35 billion from the Unity Fund and a DM 10 billion contribution from "other" governments DM 5 billion from VAT collections and DM 12 billion from recently announced federal subsidies to municipal governments. The VAT collections were included in tax collections but the DM 12 billion in subsidies were not. Although the subsidies are earmarked for special programs, we have not altered the DM 97 billion of expenditures because it is likely that the *Länder* and municipalities will use these funds for programs that are already budgeted in light of their anticipated deficits.

63. We are grateful to Rudolf Zwiener of DIW for making available these projections as well as for clarifying the budgetary data.

64. *Frankfurter Allgemeine Zeitung*, September 25, 1991. In 1989 total civilian employment in the state sector, including health, schools, culture, communal activities, and social services amounted to about 1.8 million workers. Statistisches Amt der DDR (1990, p. 125). This figure does not include workers in local transportation and waterworks.

65. Terence Roth, "Most East German Soldiers are Fading Away as Reunification with a Former Enemy Nears," *The Wall Street Journal*, September 10, 1990, p. A10.

very costly from the perspective of either social welfare or the budget. The policy implications are straightforward: reductions in spending in East Germany should be avoided at the present time and needed infrastructure investments—especially those using local factors of production and locally produced intermediate inputs intensively—should be undertaken as soon as possible, while unemployment remains high. These implications follow from the simple Keynesian multiplier model, which provides a good approximation to the determination of output and deficits in the current depression. The simple "Keynesian Cross" model is relevant in analyzing the consequences of spending changes in East Germany because interest rates, exchange rates, and prices can all be considered fixed. Interest rates and exchange rates are fixed because they are determined outside East Germany; prices are fixed because they have already fallen to average short-run variable costs ($\hat{p}$ in figure 1) or below; as we show later, there is an elastic supply of labor at the current wage.

The model we have in mind is straightforward. Income (Y) is the sum of consumption (C), investment (I), government spending (G), and exports (X) less imports (M). Output is produced by labor (N) according to the production function $Y = N/b$. There is a transfer to the unemployed, $TR = \theta(1 - t - \gamma) w (L - N)$, where w is the East German wage, t is the average income tax rate, γ is the rate of both employer and employee contributions to social insurance, L is the labor force, and θ is the net replacement ratio due to unemployment benefits. Consumption depends on disposable income: $C = C_0 + c[(1 - t - \gamma) wN + TR]$, where c is the marginal propensity to consume out of disposable income. Imports have consumption, investment, and government components, so that $M = M_0 + m_C C + m_I I + m_G G$. Investment, government spending, and exports are autonomously set at I, G, and X respectively.

The equilibrium level of income in this model is $Y = \alpha A$, where

$$A = (1 - m_C) [C_0 + \theta c (1 - t - \gamma) wL] + (1 - m_I) I$$
$$+ (1 - m_G) G + X - M_0$$

is autonomous spending on domestic output and α is the multiplier. The multiplier is $\alpha = 1/[1 - (1 - m_C) c (1 - t - \gamma) (1 - \theta) bw]$. Taking reasonable benchmark parameters of $\theta = 0.68$, $t = 0.045$, $\gamma = 0.1825$, $m_C = 0.5$, $c = 0.85$, and $bw = 0.65$ (the approximate value of labor's share in East Germany at the present time); the multiplier is extremely

low: $\alpha = 1.073$. With reasonable parameter values, the multiplier is low because consumption of domestic goods varies remarkably little with the level of output. This is due to the high marginal propensity to import and the existence of unemployment compensation, which automatically stabilizes workers' real income.

The model can be used to approximate the impact of changes in government spending on the overall East German budget deficit. We define the East German budget deficit broadly as the difference between the outlays and the receipts of *all* governmental entities in East Germany, including the federal, *Länder*, and local governments, the social insurance funds, and the Treuhandanstalt. It is this aggregate deficit that must ultimately be financed by West Germany. Although the budget of each governmental entity is now determined separately and decisions are taken independently, there are obvious spillovers between the activities of one entity and the receipts or expenditures of others.

The revenue accruing from economic activity in East Germany consists of the net surpluses (or deficits) of the former *Kombinate* that are owned by the Treuhandanstalt. These amount to $[Y - w(1 + \gamma) N]$. In addition, there is income tax revenue amounting to twN and social insurance contributions of $2\gamma wN$. Total outlays consist of government purchases, G, and transfer payments, as defined above. In this model, the increase in the budget deficit caused by a one deutsche mark increase in government spending (or investment) is

$$1 - \alpha (1 - m_G) [1 - (1 - \theta)(1 - t - \gamma)bw].$$

Using the previously assumed benchmark parameters, a one deutsche mark increase in government spending raises the deficit by only 0.099 deutsche mark if the marginal propensity to import out of government spending is zero. If $m_G = 0.2$, the impact on the deficit amounts to 0.279 deutsche mark; and with $m_G = 0.5$, this impact rises to 0.550. The clear implication of this model is that projects that call for higher government spending in East Germany and that have low import content can now be undertaken at low cost to West German taxpayers. Such spending creates jobs now, when idle labor is available to work, and also has long-run payoffs. The budgetary cost of government spending is low for two major reasons. First, the new spending creates jobs; employed workers pay income taxes and contribute to social insurance rather than drawing unemployment compensation. Second, the spending creates additional

revenue for the firms, creating profits for the Treuhandanstalt or, more realistically, reducing the subsidies.

The rocketing East German budget deficit has produced numerous calls for spending cuts in the East in order to control the costs of economic union to West German taxpayers and to reduce the associated deficit spending in East Germany.[66] The model also shows that such attempts could prove costly for Eastern output and employment. If East German spending is adjusted to hit a fixed deficit target, a one deutsche mark reduction in the deficit brought about by spending cuts could take a heavy toll on output. The magnitude of this burden depends on the fraction of government spending for Eastern goods. A one deutsche mark reduction in the deficit due to lower government spending lowers output by $(1 - m_G)/[m_G + bw\,(1 - \theta)(1 - t - \gamma)(1 - m_G - c(1 - m_C))]$. With $m_G = 0$, this output multiplier is 10.82. With higher values—0.2 and 0.5—for m_G, the impact on output drops to 3.07 and 0.98 respectively. That is, when the marginal propensity for government to spend on imported goods is low, enormous expenditure cuts and East German output reductions are required to lower East German budget deficits. The deficit is difficult to reduce because spending cuts directed at East German products swell the unemployment rolls, raising unemployment compensation payments and reducing the profits (or raising the required subsidies) of companies held by the Treuhandanstalt. Since the reduction in the deficit is so small when the spending cuts are directed at Eastern goods, the cuts required to lower the deficit are extremely large, as is the associated decline in Eastern employment and output.[67,68]

66. The Bundesbank has been particularly concerned about the likely magnitude of the public sector borrowing requirement (PSBR). By early November 1990 forecasts of the 1991 PSBR reached DM 140–150 billion, or 4.5 to 5 percent of GNP. During the fall, the Bundesbank began to put strong pressure on the government to limit deficit financing by raising interest rates. See, for example, *Financial Times*, November 5, 1990, p. 16.

67. Alternatively stated, West German financing of the Eastern budget deficit provides a capital inflow, permitting the East to run a current account deficit. If the West insists East German budget deficits be cut, thus reducing the capital inflow into the East, the East's current account deficit must correspondingly decline. This implies that output must fall until the induced decline in imports resulting from lower East German consumption and from lower government expenditure matches the decline in permissible deficit spending. Large output declines are likely to be necessary for such deficit spending targets to be achieved.

68. There has been great concern in Germany that large fiscal deficits incurred on behalf of the East will lead to higher German interest rates and an appreciation of the deutsche mark. The legitimacy of this concern depends on the cause of the deficit. For

Developments in the Labor Market

The dramatic decline in output after currency union was accompanied by a substantial growth in unemployment (either overt unemployment or involuntary "short-time" work); employment also declined sharply, though not to the same extent or with the same speed as output.[69,70] As of February 1991, about 30 percent of the labor force was either unemployed or on short time; vacancies in January 1991 stood at about 15 percent of their January 1990 level. These developments are summarized in tables 1 and 3.

The existence of such substantial labor market slack could be expected to produce downward pressure on real wages. However, consumer prices have remained relatively stable throughout the period, and nominal wages have risen dramatically. Eastern wages began to rise during the early spring of 1990, and the growth in wages continued after July 1. These increases (reported in table 5) amount to 42 percent of gross wages for full-time industrial workers between the first quarter of 1990 and October 1990.

Despite these increases, Eastern wages are still roughly 50 percent below Western wages.[71] High Eastern unemployment accompanied by

example, if CMEA orders from East Germany decline in 1991, Eastern output will fall further and unemployment will rise. Additional unemployment of 100,000 workers for a year would automatically raise unemployment compensation benefits by about DM 946 million, assuming an average wage of DM 1,500 a month. Income tax receipts and contributions to social security would fall by about DM 738 million. At fixed Eastern expenditure levels, the Eastern deficit would rise. Such "passive" deficits, however (unlike those resulting from deliberately stimulative "active" fiscal policy), do not result in any demand stimulus (a rightward shift of the *IS* curve), which would cause interest rates to rise.

69. Three sources accounted for most of the decline in employment since the fall of 1989. First, unemployment (as a fraction of the labor force) rose from zero to 7.3 percent in December; second, migration flows (mostly to West Germany) reduced the labor force by about 6 percent; third, about half a million workers (6 percent of the labor force) accepted an early retirement option offered to workers at least 57 years of age (Klodt [1990b]). The East German labor force was also reduced by the discharge of 270,000 working old-age pensioners and 100,000 foreign workers (mainly Vietnamese). See Deutsche Bank Economics Department (1991a).

70. The dramatic decline in productivity was unexpected, at least in part because labor productivity increased following the West German currency reforms of 1948.

71. In 1989 average gross monthly wages and salaries per employee in the FRG were DM 3,192. The comparable figure in the GDR in the first half of 1990 was 1,110 mark, or

a large East-West wage differential provides strong incentives for migration. While it is clear that migration will contribute significantly to the reduction of Eastern unemployment over the long run, we will show that it will occur sufficiently slowly to make a relatively small contribution to lowering unemployment over the next several years.

In this section we explore issues that affect the Eastern labor market, focusing on the key questions of migration and the rise in wages since currency union. Many of our results are based on surveys we conducted in February 1991 in East Germany. One of our surveys consists of 210 personal interviews of individuals, who were arbitrarily approached in cafeterias, shopping areas, and train stations in Dresden, Leipzig, Magdeburg, and Rostock. These individuals were at least 16 years old, had grown up in the former GDR, worked during the previous year, and were currently in the labor force. They were asked a series of questions about their perceptions of labor market opportunities in East and West Germany, their migration intentions, and their opinions concerning wage developments in the East since currency union. In addition, 45 identical surveys were administered, mainly to unemployed people, at employment offices in East Germany. We also distributed 1,000 surveys that could be answered and mailed to the United States; we have received 301 admissible written responses. Finally, a variant of the survey was administered in person to 107 students at universities in Dresden, Leipzig, and Magdeburg; the students had grown up in the former GDR and planned to seek employment after graduation. University students are of special interest because they tend to be extremely mobile and highly skilled.[72,73]

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about 35 percent of the 1989 FRG figure. Wage increases during 1990 have reduced this differential to approximately 50 percent. However, the gross wage differential overstates the real wage gap between East and West Germany because rent is highly subsidized in the East. In July 1990 the typical four-person household in East Germany spent DM 55 a month on rent; in contrast, the typical four-person household in West Germany spent DM 694 a month in 1989. See Statistisches Amt der DDR (1990, pp. 319, 479). It is estimated that living space per inhabitant in the GDR was 25 square meters in comparison with 35 square meters in the FRG. See Melzer (1989, p. 95). East German rent per worker will rise by DM 441 a month for a family of four if rentals per square meter are adjusted to Western levels. For a two-worker household earning DM 1,500 per earner per month (assuming a *marginal* payroll tax rate of 0.3825), gross wages would have to rise by 23.8 percent to compensate Eastern workers for higher rents.

72. The personal surveys were conducted by Helga Hessenius, Daniel Gross, and Thorsten Wassermeyer. Mail surveys were distributed in housing blocks in Dresden,

Migration

Free labor mobility was enshrined in the state treaty, though there had been much migration before economic union. Table 9 presents monthly migration flows between East and West Germany since October 1989. Much of the influx occurred during late 1989 and early 1990, before East Germans knew that unification would occur; many migrants were taking advantage of what was viewed as a potentially short window of opportunity. When it became clear that the migration option was permanent, flows fell to lower levels.

Annual migration flows during 1989 and 1990 amounted to about 2 percent of the East German population.[74] These flows are large, but they are not without historical precedent. From 1950 to 1959, 2.6 million individuals migrated from the GDR and other Eastern European countries to the FRG.[75]

Leipzig, Magdeburg, Rostock, Jena, Chemnitz, Gera, Erfurt, and Eisenach. Participants were asked to respond only if the household contained a member of the labor force who had worked during the previous year. Of the 327 responses that were received by March 23, 301 were admissible. The mail survey was identical to the personal (nonstudent) survey in all respects but one: in the personal survey, respondents were asked to "agree, partially agree/partially disagree, or disagree" with a number of statements. In the corresponding questions in the mail survey, respondents were given the additional option of agreeing or disagreeing strongly. A trial version of our survey was conducted in late January; the data from this initial attempt were used to revise the survey and have not been directly used as data.

73. Our nonstudent survey was not a random sample of the East German labor force. For example, we undersampled rural residents and women and oversampled individuals with higher than average education and training. We intentionally oversampled unemployed individuals. The following numbers provide a comparison of the incidence of various demographic characteristics in the actual GDR labor force in 1988 and in our sample (actual/sample): percentage of men (51.1/62.1); percentage under 25 years old(12.9/13.5); percentage of 25–34 year olds (26.2/22.8); percentage of 35–44 year olds (21.5/28.6); percentage of 45–59 year olds (33.1/32.7); percentage of 60–64 year olds (4.6/2.2); percentage over 65 years old (1.7/0.0). The following concern educational characteristics: percentage who attended college or university, *Hochschule* (7.3/14.6); percentage with vocational or technical training, or occupational certificate, *Meister* or *Fachschule* (16.4/28.3); percentage with an apprenticeship, *Abgeschlossene Lehre* (55.3/45.0); percentage with no apprenticeship, *keine Berufsausbildung* (20.9/11.6). See Statistisches Amt der DDR (1990, pp. 128–29) and Institut der deutschen Wirtschaft (1990, p. 116).

74. Migrants from the East in 1988 (the last year for which the relevant data are available) were younger than the West German populace, with fewer housewives (1.3 percent versus 23.9 percent) and retirees (14.2 percent versus 21.6 percent). See Bundesanstalt für Arbeit (1991).

75. *Wirtschaft und Statistik*, November 1989, pp. 582–90.

Table 9. Migration between East and West Germany, 1989–90

Number of people

	Eastern estimates[a]				Western estimates[b]	
Month	Outflow in 1989	Inflow in 1989	Outflow in 1990	Inflow in 1990	Inflow in 1989	Inflow in 1990
January	. . .	. . .	41,413	593	4,627	73,729
February	. . .	. . .	45,062	151	5,008	63,893
March	. . .	. . .	44,094	71	5,671	46,241
April	. . .	. . .	24,052	136	5,887	24,615
May	. . .	. . .	13,940	265	10,642	19,217
June	. . .	. . .	13,616	437	12,428	10,689
July	. . .	. . .	27,323	353	11,707	. . .
August	. . .	. . .	24,537	581	20,959	. . .
September	. . .	. . .	18,150	688	33,255	. . .
October	34,308	61	. . .	. . .	57,024	. . .
November	70,868	176	. . .	. . .	133,429	. . .
December	54,200	494	. . .	. . .	43,221	. . .

Sources: Eastern measurements are from *Monatszahlen,* December 1990, p. 4. Western measurements are from Bundesanstalt für Arbeit (1991, table 5).

a. Eastern outflow figures give the number of individuals from the East who gave notice of departure to the West. Eastern inflows are the number of individuals who gave notice of their arrival from the West. These figures exclude outflows and inflows to and from foreign countries.

b. Western inflows are the number of individuals from the GDR who registered upon their arrival in the West. Since currency union in July 1990, migration has been treated by the West as internal migration.

If migration continues at its current pace, it will be a significant factor in the long-run reduction of Eastern unemployment, but insufficient to eliminate Eastern unemployment quickly. In January 1991 there were 2.6 million unemployed and short-time workers in the East. With migration at its peak 1989 annual rate of 344,000 and with 64.4 percent of the migrants employed, it would take over 11 years to eliminate the current unemployment and short time in the East through migration alone.[76] Since much of this future migration will be caused by high unemployment, as we shall demonstrate, it will not occur so rapidly as to keep unemployment low.[77]

76. This figure is the premigration labor force participation rate of 1988 migrants. See Bundesanstalt für Arbeit (1991, table 1).

77. Commuting will also contribute to the solution of the unemployment problem. Estimates of the number of commuters in 1990 vary from 100,000 to 300,000. Commuting is especially concentrated around Berlin and areas like Eisenach and Magdeburg, which are relatively close to the border. Commuting is likely to rise as Eastern unemployment continues and closer ties with the West are attained. It is of interest to record the number of workers who live within relatively easy commuting distance of the West. In 1989, 697,100 people worked in East Berlin; 548,700 worked in Potsdam (close to Berlin); 293,900 worked in Schwerin (at the western end of Mecklenburg-Western Pomerania); 654,100 worked in the Magdeburg region; and 648,400 worked in the Erfurt region, which includes Eisenach. See Statistisches Amt der DDR (1990, pp. 67, 85, 89, 93).

Table 10. Survey Answers Concerning Migration and Employment Conditions in East and West Germany for Various Subgroups of the East German Population

Responses of those answering question, in percent

			Nonstudents					
Survey item		*All*	*Employed*	*Unem-ployed*	*Short-time*	*Female*	*Under 31*	*Students*
Number of respondents		556	460	96	99	211	144	107
Migration scale[a]								
0		22	21	29	16	32	13	3
1–2		16	16	15	21	16	9	3
3–4		19	20	13	19	17	21	25
5		29	30	24	25	24	32	48
6–7		7	7	7	11	4	14	13
8–10		8	7	12	8	7	10	9
Willing to wait for Eastern job paying current wages[b]		85	86	85	91	88	80	75
Median wait time (months)[c]		6	6	6	6	6	6	6
Would then try to work in West[d]		11	11	15	13	7	14	28
Expected percent change in wages if work in West[e]		154	145	199	143	154	151	118
Hard to find a job in the West[f]	Yes	65	66	61	69	73	55	. . .
	No	35	34	39	31	27	45	. . .
Expect to lose my Eastern job[g]	Agree	28	28	. . .	65	28	38	. . .
	Disagree	39	39	. . .	9	37	37	. . .
Hard to find a new job in the East[h]	Agree	73	73	78	86	73	64	51
	Disagree	15	14	22	4	13	22	12

(Continued)

There are three major findings of our survey. First, the great majority of people are reluctant to migrate and do not anticipate doing so. Second, the minority of people who consider it very likely that they will migrate is large enough that the size of future migration from East Germany is apt to resemble what has occurred since September 1989. Third, a significant fraction of East Germans consider migration a serious option and could be pushed into moving. Wage differentials will not induce them to move, but lack of work for a sufficiently long period will drive them to it. The answers to survey questions concerning migration and employment conditions are summarized in table 10.

Table 10 (*continued*)

			Nonstudents					
Survey item		*All*	*Employed*	*Unem-ployed*	*Short-time*	*Female*	*Under 31*	*Students*
Expect wages in the								
East to rise quickly[i]	Agree	46	52	19	37	47	35	44
	Disagree	31	26	59	29	29	42	27
Willing to accept up to a 20 percent								
wage cut[j]	Agree	28	32	25	13	30	17	. . .
	Disagree	59	48	70	75	57	78	. . .
Wouldn't be welcome								
in the West[k]	Agree	44	45	40	42	48	35	21
	Disagree	27	26	32	25	22	33	45

Sources: Authors' own surveys of 556 nonstudents and 107 students in East Germany in February 1991. The results for students, which are reported in the last column, were gathered from comparable questions in the special student survey with appropriate changes in wording as described in the text. For several questions the respondents were asked to agree, partly agree–partly disagree, or disagree with a given statement. In the mail sample, they could also agree strongly and disagree strongly. The percentages who agree or disagree in the table include those who agree strongly or disagree strongly, respectively.

a. The migration scale refers to a scale from 0 to 10, where 0 means "I am not going to work in West Germany under any condition", and 10 means "I am definitely going to work in West Germany."

b. "Imagine the following situation: (If employed: You are unemployed and) you learn that new, secure jobs will be created in East Germany which pay wages comparable to your old (current) job. If you can be reasonably certain that you will be offered a job, would you be prepared to wait for this job?"

c. "How many months would you wait?"

d. "What would you do next?"

e. "By what percent would your wages change if you worked in West Germany?"

f. "Do you think it would be difficult or easy to find a job in West Germany?"

g. "If I stay in East Germany I will probably lose my job."

h. (If employed: If I lose my current job) "it will be difficult to find a (new) job in East Germany."

i. "If I keep my current job (or, if unemployed, find a new job) in East Germany I think that my wages will increase quickly."

j. (If employed: If I lost my current job) "I would be prepared to accept a new job here in East Germany paying up to 20 percent less than my old (current) job."

k. "I don't think that I would be welcome in West Germany."

To gauge the chances of migration, we asked respondents to rate their chances of working in West Germany on a scale of 0 to 10.[78] Zero meant "I will not work in West Germany under any circumstances." Ten meant "I will definitely work in West Germany." We shall loosely refer to this scale as the "migration" scale, but, because working in the West is not synonymous with living there, we also asked respondents whether they might commute to the West. Commuting was particularly important for those who indicated a high intention of working in the West. Eight percent of respondents rated themselves 8, 9, or 10 on the scale, and

78. The survey statistics reported in the text pertain to the merged sample of 556 observations, which consist of the 255 personal interviews and the 301 admissible mail surveys. The statistics pertain to nonstudents unless otherwise specified.

thus gave a clear indication of their intention of working in the West. Of these, 54 percent indicated that they might commute to jobs in the West rather than live there. Thirty-eight percent of respondents rated themselves 0, 1, or 2 on the migration scale; these respondents gave clear indication of their intention to stay in East Germany. The remainder of the sample—a clear majority—gave answers between 3 and 7. Twenty-nine percent rated themselves at 5. In the opinion of our interviewers, such scores indicate that working in the West is an option for our respondents, one which they understand and, if driven to it, will choose. Respondents' answers are *not* proportional to their subjective probability of working in the West. Many of those who scored themselves as 5 on our scale gave other indications of their strong attachment to the East, suggesting that migration would be a last resort. On the basis of the migration scale, students were the most willing to migrate, with an average response of 4.9; both employed and unemployed respondents averaged 3.5.[79,80]

An important indication that East Germans are reluctant to move appears in their expressed willingness to wait for jobs to appear in the East that are comparable to those now available. We asked nonstudents who were unemployed: "Imagine the following situation: you learn that new, secure jobs will be created in East Germany which pay wages comparable to your old job. If you can be reasonably certain that you will be offered a job, would you be prepared to wait for this job?" We asked the same question to employed respondents, asking them first to imagine that they had lost their current job. Eighty-five percent of all nonstudents said they would be willing to wait for such a job. When asked how long they would wait the median answer was six months. When asked what they would do next only 11 percent of those who would wait indicated any intention of looking for work in the West. More (14 percent) said they would begin retraining. Many others said they would look for different jobs in the East or "wait some more [*sic*]". Nor did most of the

79. The standard deviation of this estimate is 0.1. The existence of nontrivial sample selection bias probably means that this figure overstates mobility, since women (who are underrepresented) gave lower scores than men and we have excluded nonparticipants in the labor market (who have tended not to migrate).

80. Our results are broadly consistent with the findings of a recent poll carried out by the Emnid Institute for *Der Spiegel*. In that poll, 71 percent of East Germans indicated that they would stay in East Germany no matter what; 22 percent said they would probably stay; 5 percent would probably go West; and 1 percent would definitely migrate. "Hunderttausende ab in den Westen," *Der Spiegel*, March 18, 1991, pp. 50–57.

15 percent of respondents who indicated that they would not wait *for the job we described* indicate that they would work in the West.[81]

This reluctance to move was similarly clear for university students, who, as the migration scale confirmed, are much more mobile than the population at large. Eighty-nine percent of students said that they would prefer to work in the East if they were offered jobs with comparable wages and working conditions in both the East and the West. We asked this group: "Suppose that you have tried to find a job in East Germany but were not successful. You find out that new, secure jobs will be created in East Germany which will pay wages comparable to those *now* prevailing in the East. If you are reasonably certain that you will be offered one of these jobs, would you be willing to wait for that job?" Seventy-five percent of those asked indicated that they *would* be willing to wait for these Eastern jobs that they think pay less than half those in the West. Furthermore the average length of time they would wait is fairly long. The median wait is six months.[82] Finally, it should be emphasized that for both students and nonstudents, the willingness to wait for a job in the East is just as high for those who think they can find work easily in the West as for those who think that it would be difficult.

We attempted in a number of ways to gauge the sensitivity of migration to wage differentials. We find no systematic evidence that wage differentials on their own are an important driving force for migration. Our respondents are well aware of the differences in wages that prevail. They expected, optimistically, that they would receive a 154 percent wage increase if they worked in the West. (We estimate the monthly gross income differential at 100 percent.)[83] Nevertheless, in spite of these

81. Of the 15 percent of respondents who said they would not wait for a job identical to their old one at their old wages, only 21 percent rated their chance of migrating as 7 or higher. The unemployed individuals who said they would not wait gave a mean migration score of 4.3.

82. Students may be impatient to find jobs because they do not have the financial resources that nonstudents may enjoy, such as savings or access to unemployment benefits.

83. The wage gap is larger for more skilled members of the labor force since the wage distribution in East Germany was highly compressed. For example those with college degrees (*Hochschulabschluß*) in the East earn wages 54 percent more than those with no apprenticeship training (*Ohne Berufsausbildung*), while, in the West, college graduates earn double. Similarly the average wage of managers and consultants in the East with college degrees is 85 percent higher than the average wages of those without special training in retail trade; the comparable wage gap in the West is 182 percent. See *Wochenbericht*, 32/90, August 9, 1990, table 1, p. 443.

differentials, the vast majority of respondents do not care to move. In regressions attempting to explain the migration propensity, as measured by the migration scale, we found no economically significant correlation between expected wage gains and self-score on the migration scale.

To investigate the possibility that the current wage differential has little effect on migration because it is expected to be eliminated rapidly, we asked employed individuals to agree or disagree with the statement: "If I keep my current job, I expect that my wages will rise quickly." Unemployed individuals were asked to respond to the analogous statement: "If I stay in East Germany and find a new job, I think that my wages will rise quickly." Only 46 percent of respondents agreed or agreed strongly with this statement. Thirty-one percent disagreed or disagreed strongly. In addition, the willingness to migrate was uncorrelated with wage expectations, even when attention is confined to those who think it would be easy to obtain work in the West, suggesting that wage differentials are not an important factor governing migration decisions. We consider it additional evidence that both employed and unemployed respondents are willing to wait for a job in the East that offers wages identical to those in their current or previous job, rather than look for a job in the West that they think offers more than double the pay. The wage differential may attract some, but not the vast majority.

People may, however, be pushed to the West by lack of available jobs. Respondents in our survey were fully aware of the prospects of job loss and the difficulties that they would face in finding new work in the East. Seventeen percent of our sample were already unemployed. Twenty-two percent of those employed were on short time. Of the employed respondents only 39 percent disagreed with the statement "If I stay in East Germany I will probably lose my job." Twenty-eight percent agreed or strongly agreed, and the remaining 33 percent partly agreed and partly disagreed. The great majority (73 percent) of employed people feared that if they lost their job it would be difficult to find a new one in the East. Similarly, 78 percent of the unemployed felt that a new job would be difficult to find. In these circumstances, migration becomes a possibility that must be entertained. As the ratings given on the migration scale indicate, the majority of individuals *have* entertained this possibility. This explains why 62 percent of the sample rated themselves above 2 on the migration scale in spite of clear indications that they would prefer to stay. Uncertainty about the odds of obtaining

Eastern work in the future will make migration more likely. For example, while 75 percent of the students who preferred working in the East at equal pay were willing to wait for a job in the East if it was reasonably certain that one would materialize, this number fell to 35 percent if the prospect of getting such a job was only 50 percent over the course of a year. Older people seemed less willing to migrate in response to job uncertainty, as indicated by the small number of individuals who told us they would work in the West following the wait for a job that, in the end, did not materialize.

At least initially, unemployment will not push previous jobholders to migrate because German unemployment benefits are fairly generous. For the first year of unemployment, benefits are 68 percent of terminal net wages for those with children and 63 percent for those without; these benefits decline to 58 and 53 percent respectively after one year.[84] They do not, however, last indefinitely. After two years they are replaced by welfare payments at the same level. But welfare is means tested and is not granted if a spouse is employed or receiving either unemployment compensation or welfare benefits. Since most prime-aged, married-couple households in East Germany have two earners, a two-year spell of unemployment threatens an ultimate reduction in family income of one-half if the spouse is employed and more than two-thirds if both are unemployed.[85] As a result, East Germans cannot expect to remain unemployed for very long periods living on their unemployment benefits at more or less their previous standard of living. If jobs continue disappearing at present rates, and new jobs do not materialize, migration will become a necessity.

Thus far, East Germans who have migrated and looked for work have quickly found it in the West—more quickly than the West German unemployed. Between July 1989 and June 1990, 538,000 GDR citizens migrated to West Germany. If one assumes that the West German unemployment durations structure applies to unemployed migrants and that previously employed migrants who did not enter training would be seeking jobs, one would predict unemployment for migrants in June 1990

84. Deutsche Bank Economics Department (1990, p. 50).

85. Participation rates were higher in the GDR (around 53 percent of the GDR populace is employed versus 48 percent in the FRG), especially for women (50 percent for the GDR versus 40 percent for the FRG).

of 138,700.[86] In contrast the actual unemployment of migrants in that month was 84,000.

Nevertheless, it is important to realize that the first migrants do not represent a random sample of the Eastern populace, since the decision to migrate is voluntary. People with unusual initiative or transferable skills were more likely to migrate in the early stages. A random selection of the East German population would probably not have found jobs so quickly.[87]

Although average education levels in East Germany are high, studies of migrants have also shown that many were underprepared for work in the West, especially for using Western technology. Those who found it especially difficult were engineers, service sales people, and cashiers.[88] The difference between the East and West is epitomized, although exaggerated, by the coal shoveling jobs held by some of our survey interviewees in Saxony. They were understandably puzzled why they should be asked the survey question: "Do you think that it would be easy or difficult to find a job in West Germany?"[89]

Our survey sought to determine more generally whether East Germans thought it would be easy or difficult to obtain work in the West. A small majority of the survey respondents thought it would be difficult to find work in the West. For instance, 66 percent of employed respondents and 61 percent of unemployed respondents stated that it would be hard

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86. We calculated the exit rates from unemployment by cohort of entry using Salant's method. See Salant (1977, pp. 39–57). We assumed 64.4 percent of migrants would be seeking jobs. This is the rate of prior employment of those who migrated in 1988. For the estimate of unemployment, we conservatively assumed that no migrants who entered training would seek jobs before June 1990. We assumed that 16.0 percent would enter training. This is the ratio of those who entered training in 1990 relative to an estimate of all migrants for 1990, which extrapolates the March to June rate for the rest of the year. See Bundesanstalt für Arbeit (1991, table 23).

87. It is also likely that migrants moved to areas of West Germany where jobs were relatively plentiful rather than to regions with high unemployment.

88. See Klodt (1990a, p. 83).

89. Our survey takers interviewed counselors at the employment service of the Bundesanstalt für Arbeit in Dresden, Leipzig, and Magdeburg. These counselors reiterated that the specific skills of East German workers often fail to match the requirements of Western jobs, giving examples similar to those noted in the text. They believed that significant numbers of East Germans in the West had failed to pass an initial three-week trial employment period. A substantial number of workers arriving from the East have sought additional training to upgrade their skills.

to find work in West Germany; 76 percent of those who thought it would be hard also thought it would be difficult even if they changed occupation.

In our surveys, we also inquired about a wide variety of factors that might be expected to affect mobility. We found that one of the most important reasons for staying in the East was the proximity of family and friends; 78 percent of nonstudents and 54 percent of students agreed that "It is very important for me to continue living close to my family and friends here in East Germany." Furthermore, individuals who reported that they did not have many friends or relatives in West Germany were less willing to migrate. (Sixty-two percent of students and 53 percent of nonstudents indicated that they did have many friends or relatives in the West.) As East Germans move to the West in increasing number, this growing stock of *Zugezogene* will act as an attractor toward those remaining in the East. As in a Schelling "tipping" model, a reason for the continuation of the flow from East to West will be the stock of family and friends who are building up in the West.[90]

We also found that some potential explanations of migration patterns do not appear to be very important to the members of our survey. For instance, neither Eastern pollution nor high Western housing costs seem to affect migration. These negative results hold for both our nonstudent and our student respondents.[91]

The results obtained in our survey confirm the results of earlier studies that show the reluctance of Germans to migrate. For example, Barry Eichengreen has pointed out that only 1.3 percent of the FRG population moved between *Länder* in 1983; in comparison, 3.3 percent of the U.S. population moved from one state to another.[92] This low rate of German migration occurred despite considerable interregional variation in per

90. Schelling (1971).
91. We inquired about a number of factors that might influence mobility. Respondents were asked, "Do you have many friends and/or relatives in the West?" Fifty-three percent said yes and 47 percent no. Respondents were asked to agree, partially agree–partially disagree, or disagree with several statements. The percentages of nonstudents who agreed/disagreed follow. "Higher rents deter me from working in the West." (17/72); "It is important for me to continue living close to my family and friends here in East Germany." (78/11); "Pollution in East Germany significantly lowers my quality of life." (50/26); "I very much like the neighborhood in which I live." (63/10); "I believe that the quality of life is better in East Germany than in West Germany." (11/63); "My family wouldn't like living in West Germany." (48/27); "I can easily imagine living in West Germany." (39/39); "I think that I should help rebuild the East German economy." (86/4).
92. Eichengreen (1990).

capita income: the coefficient of variation of per capita income in 1983 was 0.21 for 31 regions of the FRG compared with 0.16 for the continental U.S. states.[93]

Just because the vast majority of East Germans will wait a long time to leave, and thus will not soon escape from the growing joblessness there, does not mean that a large migration to the West will not occur. The small fraction of the population who are disposed to leave can still yield a large migration relative to the flows that have occurred so far. Our nonstudent sample revealed that 8 percent of the population rated their chances of working in the West 8, 9, or 10. If half of the 8's, three-quarters of the 9's, and all of the 10's who said they would not commute actually migrate to West Germany, then 4.2 percent of the work force will migrate. If the labor force participation rate of migrants is 64.4 percent, as in 1988, and if migration occurs over the next one to two years, total migration would amount to 551,000 over this period. This is comparable to the rate of migration in the six months prior to currency union.

In West Germany, there is considerable fear of migration from the East. Indeed 44 percent of our Eastern survey respondents agreed with the statement "I don't think I would be welcome in West Germany."[94] These fears have affected policy. For example, Chancellor Helmut Kohl's offer of February 6, 1990, to enter into a monetary and economic union with the GDR was prompted, at least in part, by the continuing large-scale GDR emigration. Important aspects of the state treaty were directly aimed at reducing immigration into the FRG. Most importantly, the decision to convert wage contracts at par was an attempt to ensure a reasonable standard of living for East German workers. In addition, unemployment insurance paid to GDR residents migrating to the West was reduced in January 1990; it had been calculated on the basis of FRG remuneration and was changed to a standardized integration allowance with a maximum duration of one year.[95]

93. See Eichengreen (1990, p. 11).
94. Only 27 percent disagreed.
95. Prior to January 1990 unemployment benefits were calculated on the basis of FRG remuneration. Such generous unemployment benefits explain why a study of migrants published in 1985 found a rather relaxed attitude about taking jobs. At 68 percent of FRG wages, an Eastern migrant was typically earning double his or her previous wages if unemployed in the West. See Ronge (1985). Shortly before union, a number of other special social benefits that had previously been granted to GDR immigrants by the FRG

We view the West German fear of *economic* loss from East German migration as exaggerated. One of the significant fears—in addition to concerns about higher rents and greater congestion—is that immigration will lower Western wages.[96] Is that fear rational? The effect of East German emigration on West German wages can be approximated. A migration of 2.5 million workers from East to West over the next decade would increase the West German labor force by 9 percent.[97] Suppose the production function of West German output is Cobb-Douglas with a labor share of 0.65,[98] and labor is paid its marginal product. If the West German capital stock is unaffected by this migration flow, wages will be depressed by 3.15 percent [$= 0.09 \times (1 - 0.65)$], which amounts to a 0.32 percent reduction in the (geometric) annual wage growth. On the alternative assumption that West German entrepreneurs borrow capital at world market rates, which are unaffected by the migration, the German capital-labor ratio remains unchanged as a consequence of the migration, and there is no depression of German wages at all.[99] A further indication of the ability of the West German economy to absorb migration inflows is the 0.5 percent decrease in the Western unemployment rate between the third quarter of 1989 and July 1990, despite the surge in migration during this period. In any case, it is important to note that approximately half of the migration into West Germany is composed of ethnic Germans from outside East Germany.

were also eliminated. These included special official assistance in finding jobs and housing as well as settling-in grants and the celebrated "welcome money." East Germans also had full access to the West German social security system as if they had paid regular contributions. A delay of three months was introduced, before which immigrants from the GDR were not entitled to receive social benefits; this delay is comparable to that for FRG citizens who voluntarily give up a job. See OECD (1990).

96. See Begg and others (1990).

97. The West German labor force in 1989 was 27,742,000. See Statistisches Bundesamt (1990, p. 20).

98. Labor's share of net social product at factor cost in West Germany in 1989 was about 67 percent. See Statistisches Bundesamt (1990, p. 566). Burda and Sachs estimate the elasticity of output with respect to labor input to be 0.64; Burda and Sachs (1987, table A1, p. 35).

99. A further factor mitigates the negative impact of union on West German wages. An important consequence of currency union was a switch in demand toward West German goods by East German residents. This switch in consumer demand, coupled with the market's expectation of large future investment in the united Germany, should in principle lead to an appreciation of the deutsche mark, raising real consumption wages. This issue has spurred a large debate concerning the desirability of a realignment in the EMS. For examples, see Begg and others (1990) and Lipschitz and McDonald (1990).

Wage Movements

One of the most striking consequences of currency union has been the enormous increase in real wages that accompanied it. Between the first quarter of 1990 and July 1990, average industrial wages per full-time worker rose almost 23 percent. Between July and October 1990, industrial wages rose 16 percent. Table 5 reveals the near uniformity of these increases across industrial sectors. Comparable wage increases were achieved in other sectors: for example, between July and October 1990 these increases amounted to 17 percent in mining, 21 percent in wholesale trade, 12 percent in retail trade, and 22 percent in insurance. Further wage increases are being negotiated in most sectors. For example, in January 1991 construction workers were granted increases that brought their wages to 60 percent of West German levels, and in April 1991 their wages will rise to 65 percent of the West German level.[100] There were also reductions in working hours negotiated in most contracts, with a 40-hour workweek guaranteed in many contracts signed in August.

A simple reason for the wage increases, the law of one price, suggests that economic union created a single labor market in which only one wage can prevail. In such a unified labor market, any wage differential induces employers to move jobs from West to East and induces workers to move in the opposite direction. According to this logic, wages in East Germany are rising because East German workers are moving into West Germany, while capital is moving into East Germany. These movements *are* occurring, but they are proceeding slowly. Using reported ratios of jobs created per deutsche mark invested by four large-scale investors in West Germany (Volkswagen, Siemens, IBM, and Opel), the total projected investment by Western firms in 1991, DM 13.5 billion, would result in 112,000, 371,100, 100,000, and 169,000 jobs respectively. This is more than the proverbial drop in the bucket, but also considerably less than the needs of the East German economy. In contrast to the slow movements of both migration and investment, wages have moved rapidly. As the first section of this paper showed, wages were too high

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100. *Konjunktur Aktuell*, Anhang II, January 1991, p. 69. A full description of the provisions of contracts negotiated in East Germany since currency union is contained in Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung (1990, pp. 70–75).

at union for the profitable employment of many East German workers; since union, wages have moved in the wrong direction, away from equilibrium.

Wages rose while migration was relatively small and falling; thus it appears implausible that wage increases were granted in *response* to migration by East German workers or because East German workers were unwilling to accept wage cuts in order to maintain employment. Our survey asked unemployed respondents to agree or disagree with the statement "I would be prepared to accept a job paying up to 20 percent less than my old job paid." Employed respondents were, analogously, asked if they would accept such a pay cut in order to gain work in the event that they lost their current job. Twenty-eight percent of the participants in our survey indicated that they would be willing to accept such a cut in pay. This suggests that there is a significant stock of workers not only available to East German industry at current wages, but even at substantial reductions in pay.

Some combination of five factors is probably responsible for the wage increases. First, the pay increases that occurred following currency union may have been partly intended to compensate workers for higher payroll deductions and the removal of price subsidies following economic union. Our survey asked East German workers who had received wage increases their opinions concerning the reasons for the increases. The responses are summarized in table 11. Fifty-two percent of respondents in our main survey agreed with the statement that "wages rose in order to make up for the elimination of price subsidies (for example, for basic foodstuffs) and increases in social insurance contributions." Thirty-three percent disagreed.

Following currency union both employee and employer contributions to social insurance rose substantially. GDR contributions had been 10 percent of earnings, up to a statutory ceiling of 600 mark a month, paid by the employee and 12.5 percent paid by the employer; at currency union, combined social security contributions (for health, old age, and unemployment) rose to 36.5 percent, split evenly by firms and workers. The FRG personal income tax was also adopted in the East, phased in over two steps. Earnings in the East are sufficiently low, and exemptions under the FRG tax code sufficiently high, that the average income tax rate for East German households is now substantially lower than before union. We estimate that this tax amounts to about 4.5 percent, although

Table 11. Survey Responses Concerning the Reasons for Eastern Wage Increases
Percent

Survey statement	Agree[a]	Disagree[a]
"My wages rose to compensate for the removal of subsidies (for example, on food) and higher social insurance contributions."	52	33
"My wages rose because it would have been unfair for them to remain so far below the West German level."	31	57
"It is fair for West German firms that set up enterprises in East Germany to pay lower wages as long as the unemployment rate in East Germany remains high."	14	76
"My wages rose because productivity increased."	12	80
"My wages rose because unions fought hard for wage increases."	64	22
"My employer and/or my union was concerned that my benefits not be too low in case of short-time or unemployment."	28	56
"Unions were restrained in bargaining because they feared that more firms would go out of business."	29	51
"My current wage would be much lower now if wage contracts had been converted at the rate of two mark to one deutsche mark (instead of one to one)."	69	25

Source: Authors' own surveys of 556 nonstudents in East Germany in February 1991. The table shows the responses of employed individuals whose wages had increased since currency union. See text for further information.
a. In personal interviews, individuals could agree, partly agree–partly disagree, or disagree. In the mail questionnaire, individuals could also agree or disagree strongly. Agree refers to all those who agree or agree strongly. Disagree refers to those who disagree or disagree strongly.

the marginal tax rate for East Germans is currently about 20 percent.[101] Whereas income and social insurance taxes together amounted to about 15 percent of gross wages in 1989, these payments currently amount to almost 23 percent of gross wages for the typical household.[102]

In the GDR, necessities—such as nonluxury food, rent, and public transportation—were greatly subsidized by the government. Food subsidies were eliminated at union; railway subsidies were partially eliminated on January 1, 1991; subsidies on gas and electricity used for heating were also reduced in January 1991; and rent subsidies will be phased out gradually. It was widely expected that consumer prices would rise after union because of the removal of food subsidies. In fact, the aggregate CPI remained almost unchanged; although the prices of some necessities increased, the prices of many manufactured and luxury goods fell. However, the reduction in energy and transportation subsidies caused a

101. These calculations are based on Deutsches Institut für Wirtschaftsforschung (1990, pp. 3, 5) and Genser (1990, pp. 20–22, 75).
102. See Statistisches Amt der DDR (1990, p. 144).

7.4 percent increase in the CPI in January 1991. And the rent increases scheduled for October 1991 are likely to erode net real wages by a further 4.3 percent.[103]

These factors are not sufficient to account fully for gross wage hikes of the magnitude that have occurred. As noted previously, we estimate that net wages rose approximately 22 percent between the end of 1989 and October 1990. By February 1991, consumer prices had risen more than 6 percent above their 1989 level. Thus, as of February 1991, net real wages in East Germany were at least 15 percent higher than before union. Even taking account of the scheduled rent increases in October 1991, net real wages are now significantly higher than before currency union.[104]

A second potential cause of the Eastern wage increases might be a strong sense among Eastern workers that wage equality between East and West is fair. In the words of Reiner Gohlke, former head of the Reichsbahn and the first managing director of the Treuhandanstalt, "It is unfair that an engine driver should receive three times the pay to make a roundtrip from Hamburg to Leipzig as to make the same journey in the opposite direction."[105] The argument for equality also has a historical basis: prior to World War II, East Germany was on par with (indeed a little bit richer than) West Germany. Moreover, the formal educational attainments of East Germans remain comparable to those of their counterparts in the West. The East Germans have already suffered 40 years of deprivation as a result of socialism. The continuation of inequitable pay only prolongs the effects of an unfair historical accident.

This explanation for wage increases does not receive strong support in our survey. Most East Germans doubt that their wages increased because it would have been unfair for them to stay so far below Western

103. Rents are scheduled to rise by DM 1 per square meter on October 1, 1991. *Süddeutsche Zeitung*, January 30, 1991, p. 25. This is equivalent to a 4.3 percent decline in net real wages for a typical worker in a four-person, two-earner household who earns DM 1,500 a month.

104. These calculations do not take account of changes in bonuses and fringe payments, which amounted to 19 percent of East German compensation in 1989. No information is currently available on how these benefits have changed since currency union. In 1989 total compensation of full-time employees amounted to 1,324 mark a month in industry, while gross wages amounted to 1,072 mark a month. See table 5 and Statistisches Amt der DDR (1990, p. 144). The difference consists of premiums and bonuses, spousal and child allowances, Christmas money, and other miscellaneous payments.

105. This comment was made in a conversation with the authors.

levels; only a minority—31 percent—agreed or strongly agreed it would
have been unfair. Fifty-seven percent disagreed or strongly disagreed.
But, interestingly, 76 percent of the respondents to our survey disagreed,
many strongly so, with the statement "It is fair for a West German firm
that establishes an enterprise in East Germany to pay lower wages as
long as the unemployment rate in East Germany remains so high."
Presumably East Germans feel that if they work for a Western firm with
productivity and technology equal to that in the West, they should
receive "equal pay for equal work." Lower wages because of higher
unemployment would be exploitation. But, at the same time, East
Germans recognize that wage increases jeopardize employment in the
East and that no productivity increases have yet occurred that could
warrant such wage increases.[106] Thus it is not unfair for Easterners to
receive lower pay in existing jobs. Sixty-two percent of all East Germans
in a poll conducted by Infratest (and 79 percent of West Germans) agreed
that wages in the East should not rise "too quickly."[107]

Third, the wage increases that occurred may reflect the behavior of
strong unions bargaining on behalf of Eastern workers. Unions probably
perceived such wage hikes as enhancing the welfare of their membership.
Sixty-four percent of employed respondents who had experienced wage
increases agreed that "My wage income rose because unions fought for
higher wages." Only 22 percent disagreed.

It was clear, even from the beginning, that currency union would
result in considerable readjustment with a great deal of unemployment
and many plant closings. In a poll conducted in East Germany by the
West German Allensbach Institut, only 45 percent of respondents
thought their current firm would surely survive.[108] The German govern-
ment offered workers generous unemployment benefits, based on ter-
minal wages. In such an "end game," it would pay workers to increase
their wages, so that if unemployed or placed on short time, they would
receive higher benefit payments. Over a quarter (28 percent) of our

106. Eighty percent disagreed with the statement "Wages rose in East Germany
because productivity increased."
107. In a poll taken by Infratest Kommunikationsforschung in Munich, people in both
East and West Germany were asked to list their priorities for East Germany. For East
Germans, the equality of wages ranked as the fourth highest priority out of ten, whereas
for West Germans it was ranked last. *Frankfurter Allgemeine Zeitung*, December 13, 1990,
p. 19.
108. *Frankfurter Allgemeine Zeitung*, September 19, 1990, p. 19.

survey respondents thought that their employer or union was concerned that their benefits not be too low in case of short time or unemployment.

Unions may have fought for higher wages in part because they believed that wage hikes would have only a small negative impact on employment in the East. Consider a union, bargaining on behalf of its membership and trying to maximize its members' expected utility. The optimal wage demand for the union depends on the elasticity of labor demand. If the elasticity of labor demand is low, it would be rational for unions to bargain for high wages. This may well be the opinion that unions hold. Some support for this view comes from our survey. Less than a third (29 percent) of respondents thought unions were restrained in their bargaining because of their fear that firms would go out of business.

Colin Lawrence and Robert Lawrence have a simple reason why labor demand is apt to be inelastic in an end game.[109] The long-run elasticity of demand for labor depends on the responsiveness of both the level of investment to wages and the capital intensity of new investment to wages. In an end-game situation, where an industry is clearly dying, investment will be low whatever the level of wages since firms already have more capital than needed. As a result, the elasticity of demand for labor is low and labor has an incentive to raise wages and appropriate the quasi rents of the firm. Our earlier analysis casts doubt on the validity of the idea that the elasticity of labor demand is actually low at present. According to our analysis, wages are currently so high that labor has already appropriated more than all of the quasi rents of existing enterprises. If subsidies end, many businesses will be closed. A reduction in wages would allow more firms to remain in business. For example, a 10 percent wage cut, under our preferred assumptions, would enable 18 *Kombinate* with about 12 percent of the work force to meet their short-run costs, rather than 14 with 8 percent of the work force—a 50 percent increase in the number of workers in viable firms. This suggests that the short-run elasticity of labor demand is actually quite high, so that the push for higher wages reflects miscalculation on the unions' part.

There are two alternative reasons, however, that unions might discount this analysis. First, the unions may assume that the Treuhandanstalt simply will not permit firms to go out of business regardless of their financial viability, so that the "effective" elasticity of labor demand is

109. See Lawrence and Lawrence (1985).

actually low. Second, the unions may reason that wage increases will have little adverse effect on the flow of new investment and job creation in East Germany. This reasoning makes considerable sense if Western firms intend to follow pay policies that our Eastern survey respondents consider fair: namely, to offer Western rates of pay in new Eastern operations regardless of the level of unemployment (and wages in existing jobs) in East Germany.

A fourth hypothesis concerning Eastern wage increases is that Western unions pushed for East-West wage parity in order to enhance union solidarity and to slow migration. (The vast majority of Eastern workers are covered by union contracts.) Western unions helped Eastern unions organize negotiations for wage increases.[110] They also urged Eastern unions to push for wage equalization.[111] For example, IG Metall announced in November that the union would demand wage increases in the current bargaining round of about 50 percent for East Germany so that wages would rise to 60 to 65 percent of Western levels. The union argued that "unity requires equal wages."[112] It is quite clear that unions' pressure for parity is a major force for wage increases. IG Metall has succeeded in negotiating a contract that will result in wage parity in just four years. The union has justified this aggressive pursuit of parity—both publicly[113] and in private conversation with us—on the grounds that, without high wages, migration will be so large that there will be a

110. Western unions probably perceived large wage hikes in the East to be in their interest. Anecdotal evidence suggests concern on the part of Western unions that firms would switch jobs away from the West toward the East in response to lower wages. For example, the auto workers' union expressed concern that the situation of workers in West Germany would deteriorate because of Volkswagen's new production sites in East Germany and other countries. *Süddeutsche Zeitung*, November 8, 1990. Western unions also may have thought, as did the West German government, that higher wages in the East would prevent migration to the West and reduce downward pressure on Western wages. Since unemployment benefits are linked to terminal wages, such hikes might also reduce migration by raising the incomes of unemployed Easterners.

111. For example, a spokesman for IG Chemie, the union for the chemical industry, was quoted as saying that "the unions want wages to reach West German levels as soon as possible" but would not object if up to 40 percent of the jobs were destroyed. *Frankfurter Allgemeine Zeitung*, November 16, 1990, p. 19.

112. The union also argued that a big differential between East and West Germany would lead to migration of qualified workers, which would jeopardize the economic development in East Germany. *Frankfurter Allgemeine Zeitung,* November 16, 1990, p. 19.

113. *Frankfurter Allgemeine Zeitung*, February 7, 1991, p. 15; *Süddeutsche Zeitung*, February 7, 1991, p. 23.

shortage of qualified people in the East. Seldom has an argument been so specious. With massive unemployment in the East it is hard to believe that qualified job applicants will not be abundant. Furthermore, our survey found that most jobholders, on losing their current job in the East, would wait for another if it were available, *despite* the East-West wage differential. An article in the January 1991 issue of the trade journal of the German unions, *Die Quelle*, explains the other important argument for wage parity: "The Eastern Reserve Army drives down Western wages and threatens the unity of the unions. This is the reason for wanting a unified labor market as quickly as possible."[114] While this concern with West German wages and union solidarity may explain the demand for parity, our survey results suggest that parity without employment will not stop the migration, which unions fear as a threat to Western wages.

A fifth reason for the large wage increases is that management offered no effective resistance to union demands. The standard form of collective bargaining in Germany is between a regional or national association of employers and a single industrial union.[115] Where was management at the time of the negotiations? It was in disarray. Many firms were already losing money and were dependent on subsidies from the Treuhandanstalt (the Trust) to continue operations. A large proportion of Eastern managers from the previous regime remained.[116] They were unaccustomed to collective bargaining and knew that they would ultimately lose their own jobs, no matter what wage agreements were negotiated. The Trust, the holder of the stock of the newly formed firms, chose not to intervene in wage negotiations, although there have been clear indications of their dissatisfaction with the agreements negotiated by the managers of Treuhand companies. For example, in a dispute over severance pay, the Trust criticized managers for signing contracts offering, in its view, excessive payments of DM 10,000 to DM 15,000 to those workers that were laid off.[117] Apparently, the Trust failed to intervene because in Germany the government has traditionally remained aloof from labor

114. "Tarifpolitik: Die Einheitsklemme," *Die Quelle*, January 1991, p. 16.
115. See Flanagan, Soskice, and Ulman (1983, p. 234).
116. At the end of 1990 only 12 percent of all people in management or supervisory positions had not been there before the *Wende*. *Süddeutsche Zeitung*, January 17, 1991, p. 32.
117. *Frankfurter Allgemeine Zeitung*, January 29, 1991, p. 18.

negotiations. Thus superior union organization, at a time when management was not in a good position for concerted resistance against wage increases and when the owner of the firms—the Treuhandanstalt—remained uninvolved, played an important role in the eventual wage increases.

Choice of Conversion Rate

In the spring of 1990 one of the key questions surrounding currency union concerned the rate at which wage contracts denominated in mark would be converted into deutsche mark; the state treaty set this conversion rate at unity, one deutsche mark for every mark. Some economists argued that it would make little difference what rate was chosen since, in the labor negotiations subsequent to July 1, wages would fall if they had been set above their equilibrium level and rise if the conversion rate were too low. According to a variant of this argument, wages were sticky downward and not upward. If wages rose following currency union (as in fact occurred), the conversion rate did not matter, since the conversion rate could only be a binding constraint against downward movements.[118]

This last argument is correct if wage bargains are made about the *level* of wages. In fact, however, wage bargainers often act as if they are negotiating about the *increases* or *decreases* in wages. Thus the level of wages in deutsche mark set by the conversion rate at union may have had considerable effect on wage negotiations, if only by affecting "initial conditions."

To see whether wages were affected by the conversion rate, we asked survey respondents who were employed and who had experienced wage increases since July 1 their opinions on the statement "My current wage would be much lower if wage contracts had been converted at the rate of two mark to one deutsche mark (rather than at the rate of one mark to one deutsche mark) at currency union." Sixty-nine percent of respondents strongly agreed with the statement; 25 percent disagreed or disagreed strongly. Whatever the real truth may be, many East German workers believe that the nominal wages established at currency union made a difference to their current wages even after the first round of post-union wage negotiations.

118. See Schinasi, Lipschitz, and McDonald (1990, p. 148).

Privatization and the Treuhandanstalt

In March 1990 all publicly held East German firms were converted into joint-stock companies with the shares held on behalf of the government by a trust, the Treuhandanstalt. The major purpose of the Trust is to privatize the 8,000 companies[119] in its holdings, which together employ about 3.7 million workers.[120] Until the time that it can privatize these firms, the Trust oversees the management of these companies and serves as an intermediary between the government and the firms, especially in the provision of guaranteed loan repayments. As of late February 1991 the Trust had privatized just under 700 firms (or parts thereof) with proceeds of DM 3.1 billion.[121] The slow rate of devolution can be attributed to five factors.[122]

First, the speed and scale of change made routine management tasks Herculean. For example, the Treuhandanstalt had to guide the 8,000 firms in creating supervisory and management boards of directors, a process that involved approximately 120,000 appointments.[123] The people chosen for these boards were to be knowledgeable, but were not to

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119. This figure does not include stores, restaurants, and hotels. The responsibility for the privatization of these entities is being handled by a subsidiary of the Treuhandanstalt— the Gesellschaft zur Privatisierung des Handels. Treuhandanstalt Pressestelle, 10/11/1990 and 10/15/1990.

120. Of these companies, 1,900 are utilities, which are expected to be transferred to local communities. See Cornelsen (1990). In the industrial sector, in 1985 there were about 11 establishments (individual production sites) per enterprise. See Cornelsen (1989, p. 22). For the number of employees in the Trust's enterprises, see *Süddeutsche Zeitung*, February 21, 1991, p. 29.

121. *Handelsblatt*, February 26, 1991. As of late January, 70 percent of the 11,000 restaurants and small stores had also been sold. *Frankfurter Allgemeine Zeitung*, February 23, 1991, p. 14.

122. We do not include in this list section 613a of the German labor law, which prevents dismissals of workers because of takeovers within one year of the date of sale. In the case of most layoffs after the sale of East German firms, sufficient other reasons can usually be given so that this law is not a binding constraint on employment. Large-scale layoffs, however, must be accompanied by a social plan between the firms and the workers. In East Germany these social plans have typically involved severance pay, especially for long-term workers.

123. Under German law, each firm incorporated as an "*Aktiengesellschaft*" (AG) must have separate supervisory and management boards typically with five and ten members respectively.

have had close Stasi connections. (One percent of the GDR work force were Stasi agents; a much larger number were Stasi informants.)

Second, the Trust does not have clear title to all of its holdings. Properties expropriated after the establishment of the German Democratic Republic at the end of the Soviet occupation can be claimed by their original owners, as can properties taken between 1933 and 1945 for religious and political reasons.[124] One indication of the scope of potential claims is that 30 percent of East German industry was not yet nationalized at the time the GDR was established.[125] Sensibly, owners of property that has been considerably altered can only claim compensation, not the return of the original property. Nevertheless there are many cases where the exact division of legal rights is unclear. The inability of the Trust to transfer clear legal title makes it difficult for property to be sold, even with the Trust's promise of indemnity against losses.[126] There have been 17,000 claims for the reprivatization of companies or parts of companies,[127] of which 3,000 had been processed by February 1991. In addition over one million other claims to property have been filed, overwhelming the offices in charge of processing them.[128] It has recently been decided that job-creating projects by investors will take precedence over claims of former owners until the end of 1992; this is expected to ease the property rights logjam.[129]

The third impediment to privatization is that East German industry and agriculture fail to meet Western environmental, health, and safety standards. The air stinks; the waters of the brooks and rivers are syrupy; and the soil is so polluted that in some areas even earthworms are extinct.[130] More scientifically, emissions of sodium dioxide and nitrous

124. Sinn (1990); John Tagliabue, "Germany Returning Property in East to Pre-War Owners," *The New York Times*, February 3, 1991, p. 8.

125. See Cornelsen (1990).

126. See Sinn (1990, p. 26).

127. Ferdinand Protzman, "Rebuilding East German Industry," *The New York Times*, February 14, 1991, p. C5.

128. *Frankfurter Allgemeine Zeitung*, December 20, 1990, p. 19. The property rights issue has had a serious impact on the ability of the Trust to sell or lease the 1.7 million hectares of agricultural land that it owns. The state treaty states that land can only be sold or leased if there are no property rights by old owners. *Frankfurter Allgemeine Zeitung*, November 20, 1990.

129. *The Wall Street Journal*, March 19, 1991, p. A21.

130. For this description of water and air pollution, see Marlise Simons,"New Taint on East German Pollution," *The New York Times*, September 9, 1990, p. 6.

oxide are high; the streams and rivers have high levels of contaminants, including mercury, cadmium, lead, copper, and zinc; and the soil contains high levels of wastes, including dioxins and residues from the use of pesticides.[131] Agriculture, mining, and the chemical sector are particularly affected. The Trust has had a hard time finding reputable firms who want to tackle the environmental problems involved in running these industries, even though the Trust has typically negotiated agreements that indemnify purchasers against liability stemming from past environmental damage.

Fourth, the Soviet Occupation and the subsequent GDR regime nationalized and concentrated production throughout the economy—in industry, in agriculture, and in services. Industry provides the most extreme example. In 1970 there were 12,000 enterprises; by 1985 less than 4,000 were left, each of which was part of one of 214 industrial *Kombinate*.[132] The size distribution of industry in East Germany is very different from West Germany, especially in the East's absence of middle-sized firms. The Trust must now decide how to bundle for sale the enterprises under its control.

Finally, the fifth problem facing the Treuhandanstalt in privatization results from the financial losses of its constituent firms; these losses make the firms hard to sell to individuals who will operate rather than scrap them. This problem is a direct result of the price-cost squeeze, and its implications are the focus of the remainder of this section.

The Treuhandanstalt could probably sell most of its enterprises easily for scrap or for real estate. But it is unwilling to do so. It wants the people or firms who take over existing enterprises to continue employing workers and to create new jobs.[133] Its actions to date clearly illustrate its concern about employment. In several instances, the Trust has accepted a symbolic payment of a single deutsche mark when the buyers of the firm have given explicit job guarantees.[134] The Trust has refused to sell

131. See Streibel (1990).
132. See Cornelsen (1989, pp. 21–23).
133. This conclusion is based on personal conversations with officials of the Treuhandanstalt. Jens Odewald, a spokesman for the Trust, said in an interview, "It is not the only goal to sell the firms as quickly as possible to the highest bidder. Instead, we also have to help to create jobs, encourage investment, and let a sound economic structure develop." *Frankfurter Allgemeine Zeitung*, November 19, 1990, p. 29.
134. For several examples, see *Frankfurter Allgemeine Zeitung*, January 25, 1991, p. 14, and February 20, 1991, p. 21; and *Der Spiegel*, no. 6, February 4, 1991, p. 112.

firms to buyers who have just wanted to use the real estate; in one case, the Trust accepted the *third* highest bid for a cigarette company because this bidder promised to transfer some of its production from West to East Germany.[135]

In a market economy without distortions, the Trust would maximize social welfare by maximizing the proceeds from privatization. Each enterprise should be sold to the highest bidder, with no additional conditions of sale. However, the Treuhand's emphasis on employment is *warranted* because there is a major distortion in the East German economy. Wages are significantly above market clearing. Thus, in the absence of a job creation policy, employment in East Germany will be well below the socially optimal level. The Trust is acting in the country's best interest by promoting employment as an objective. On this basis, though, the firms are very hard to sell. The high wages that must be paid to the workers at existing firms constitute a serious obstacle to sales. Consider an analogy. Suppose that there is a hardware store owner who is selling shovels at a very cheap price. The owner, however, places two conditions on the shovels' sale: first, the shovels must be used; second, his brother-in-law must be employed to use the shovels and be paid much more than the competitive rate for his labor. Not many people are likely to buy the shovels. Indeed, to get rid of his stock of shovels (and get his brother-in-law employed), the hardware store owner may have to pay buyers to purchase the shovels, and not just sell them at a low price. The Treuhandanstalt is trying to sell East German industry, and it is willing to take *low* prices; but on the terms of employment it wants, most of the firms have *negative* value.

More formally, if capital is used in fixed proportions with labor (as occurs in the putty-clay model after the capital has been built), the quasi rents to a unit of capital are $q - wl$, where q is the output of the capital, w is the real wage, and l is the labor used with that capital. The market value of the capital is the expected present discounted value of these quasi rents, $(q - wl)/(\delta + r)$, where δ is the rate of depreciation and r is

135. Recently, the Trust has indicated that it is unlikely to close a firm because of the impact that this would have on its community. Detlev Rohwedder, managing director of the Treuhandanstalt, said that even though the situation of Zeiss Jena was incredibly bad it was in the interest of the region to prevent the collapse of the firm. *Frankfurter Allgemeine Zeitung*, February 22, 1991, p. 15.

the rate of interest. When the machines are used and not scrapped, this market value is negative for wages that are sufficiently high.

The percentage of *Kombinate* with positive quasi rents under alternative assumptions was tabulated earlier. It was shown that, at present, the great bulk of East German industry cannot cover its short-run variable costs, so that quasi rents are negative. If the Trust wants entrepreneurs to buy these enterprises and use the existing labor, they will find no takers unless some arrangement is made, such as copayments for the employment of labor. In the absence of such copayments, the firms have negative value. The case of the hardware store owner, who wants to sell a shovel and gain work for his brother-in-law, is still analogous. The hardware store owner might agree to pay a generous fraction of his brother-in-law's excessive wage. If the fraction of the wage is sufficiently large, the buyer will find it worthwhile to purchase the shovel and hire the brother-in-law.

Unprivatized firms must either be subsidized on an ongoing basis by the Trust or be liquidated. Disguised liquidations have already taken place on a large scale, as firms have been sold or allowed to restructure themselves since economic union. Throughout the fall and winter of 1990–91, a litany of deep cuts in employment and large layoffs has been announced.[136] A director of the Treuhandanstalt has estimated that eventually, 50 percent of employment in the Treuhand's firms will be eliminated.[137] Apparently, these cuts will occur despite the Trust's concern for job creation: the Trust has not been given a mandate to rescue failing firms on a broad scale.

136. Some of the cuts that were announced in February 1991 follow: Interflug is to be liquidated (*Frankfurter Allgemeine Zeitung*, February 11, p. 16); Robotron will cut its work force from 10,600 to 7,600; SKET Magdeburg with 30,000 employees reduced its work force to 16,700 at the end of 1990 and plans to lay off 10,000 more workers by the end of September 1991 (*Frankfurter Allgemeine Zeitung*, February 23, 1991, p. 15); Zeiss Jena plans to cut employment from 29,000 to 10,000 by the summer of 1991 (*Frankfurter Allgemeine Zeitung*, February 28, 1991, p. 18). A Swiss consulting firm estimated that 17 firms in the microelectronics sector could survive but employment would have to be cut from 35,000 to 5,000–7,000 (*Frankfurter Allgemeine Zeitung*, February 8, 1991, p. 15). In March the Treuhand estimated that 100,000 jobs in the textile industry will disappear in 1991 and 25 firms will be closed down (*Frankfurter Allgemeine Zeitung*, March 2, 1991, p. 12) and that half of the 46,000 jobs in the shipyards will be cut by 1994–95 (*Frankfurter Allgemeine Zeitung*, March 5, 1991, p. 15). The former Kombinat Takraf announced that it would reduce employment from 27,000 to 7,000 workers by the end of 1993 (*Frankfurter Allgemeine Zeitung*, March 5, p. 15).

137. *Süddeutsche Zeitung*, February 21, 1991, p. 29.

Employment Bonuses

The status quo in East Germany is simply not acceptable. Yet the question remains, what is to be done? A simple plan, a variant of which we favor, would be to offer wage subsidies or employment bonuses (EBs) to all private (nonagricultural) employment located in the former GDR. Any private firm hiring a worker in the East would be paid a specified fraction of that worker's initial wage. With the bonus program in place, all firms presently owned by the Treuhand would be auctioned off to the highest bidder, without additional conditions of sale.[138] Firms that could not be sold would be liquidated.

The high level of wages relative to productivity in East Germany is a major distortion in factor prices; such wages result in too little current employment and too slow a pace of investment and new job creation. The subsidy offsets this distortion. The EB program would raise the value of the Treuhandanstalt's properties, enabling the Trust to sell enterprises that have negative values in the absence of such a scheme. The subsidy would enable the Trust to achieve its goal of employment creation without having to evaluate each bidder's detailed employment and investment plans.[139] With an appropriately chosen subsidy in place, the social and private gains from hiring more labor exactly coincide, so that further decisionmaking can be left to the marketplace: the subsidy

138. Two early proponents of such a wage subsidy plan were George L. Perry, "Managing Economic Reunification," *The Los Angeles Times*, March 18, 1990, and Peter Passell, "East Germany's Morning After," *The New York Times*, August 1, 1990. Klodt (1990b) has also discussed the merits of such schemes.

139. Although subsidies to business are not ordinarily allowed under the Treaty of Rome, they probably would be allowed in East Germany. Under Part II, Chapter 1, Section 3, Article 92, Subsection 2, Part c of the Treaty, special assistance is allowed to "promote the economic development of areas where the standard of living is abnormally low or where there is serious underemployment." In response to our inquiry concerning our SEFEB plan, the office of the Director-General for Economic and Financial Affairs of the European Communities has offered the following opinion: "There are precedents for Commission approval of labor subsidies in the least developed regions of the Community, notably the Mezzogiorno in Italy. As Eastern Germany, with the possible exception of East Berlin, almost certainly qualifies as one of the least developed regions, the Commission is likely to have a favorable attitude towards a labor subsidy scheme, provided that the amount of aid per worker is not excessive and that the scheme covers a limited period, as you envisage. Non-discrimination between sectors would also be an essential requirement, although the Commission could impose restrictions on sectors where there is serious over-capacity at the Community level (e.g. steel, shipbuilding)."

gives privatized firms the incentive to hire labor just to the point where the value of the marginal product of hiring the last worker equals the value to that worker of his or her lost leisure. Furthermore, managers of newly privatized firms will be more effective than the Treuhandanstalt's officials in restructuring existing enterprises, transferring Western technology, adopting productivity-raising measures, and resisting further wage increases.

BUDGETARY IMPACT OF AN EB PROGRAM. The major objection that can be leveled against an EB program is that it is costly. However, a subsidy program generates large offsetting budgetary savings since workers who would otherwise be unemployed gain employment through the EB program. Consider further the analogy of the hardware store owner who offers a copayment for the employment of his brother-in-law. While such a proposition might result in large payments to the shovel purchasers, it could save money for the store owner if he has agreed to support his sister's family in the event that the brother-in-law is unemployed. This is the situation for the German government now: it is already committed to supporting the incomes of East Germans at a high level. The German government will most likely come out ahead even if it pays substantial wage subsidies because such a program is likely both to preserve many existing jobs and to speed significantly the creation of new jobs.

In East Germany, a worker who is unemployed receives unemployment benefits, pays no income taxes, and makes no contributions to the social insurance fund. In addition, there are no employer copayments for social insurance. For the typical worker with children, unemployment benefits are 68 percent of the net wage. Social insurance contributions are 18.25 percent of the gross wage for both the employee and the employer. The average income tax rate for East Germans is about 4.5 percent. At these rates, the revenue gain from moving a worker out of unemployment into a job is substantial: 79.1 percent of the worker's compensation.[140] A program of wage subsidies offering benefits

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140. We define worker compensation as the gross wage plus employer's contribution to social insurance. This calculation assumes that the wage the worker will receive when employed is the same wage that is used as the basis for the worker's unemployment compensation. Because unemployment benefits decline to 58 or 53 percent after one year of unemployment, the savings declines from 79.1 percent to 72.6 percent for a typical worker in the second year of unemployment.

below this 79.1 percent level saves the German government money on every individual who is employed under the program and who would have otherwise been unemployed.
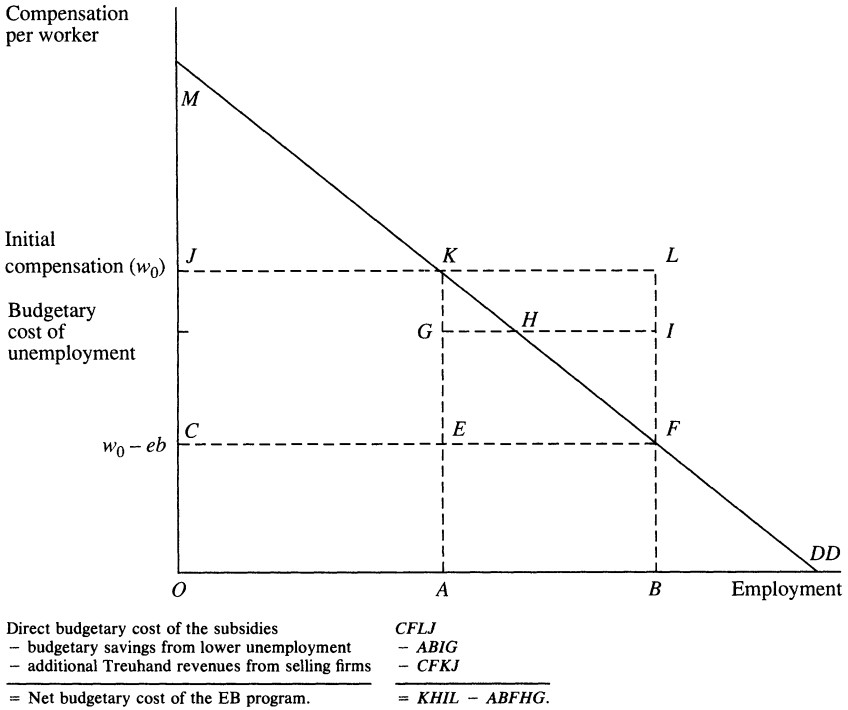
Under an across-the-board wage subsidy program, however, benefits are also paid to workers who would have been employed even in the absence of the subsidies—not just to workers who would have otherwise been unemployed. In the East German case, some jobs would be preserved in Treuhandanstalt firms, and some new job creation would take place even without the subsidy program. For these inframarginal workers, it could be argued that the bonuses are costly since there is no revenue gain to offset the cost of these bonuses.

It turns out, however, that this argument is *not* valid when applied to inframarginal workers in as yet unprivatized Treuhandanstalt firms— those workers who would be employed even in the absence of a bonus program. The windfalls created by the employment bonuses accrue to the government itself. As long as wages are not changed by the EBs, the payment of EBs to workers in Treuhandanstalt properties who would otherwise be employed results in *no* revenue loss to the Treuhandanstalt. *The Treuhandanstalt recoups the cost of its EBs in the sale of its property.* Remember for a moment the example of the hardware store owner. If the owner offers an employment bonus of DM 1,000 to any shovel buyer who hires his brother-in-law, this would increase the value of the shovel by DM 1,000 to anyone who would have hired the brother-in-law in the absence of the bonus. The hardware store owner can recoup the cost of the bonus by raising the sale price of the shovel.

An employment bonus proposal whereby wage subsidies would be granted in the East was recently put forth by the unions, which are concerned about the disappearance of jobs. The proposal was retracted when it was realized that the bonuses would be granted to both profitable as well as unprofitable firms.[141] Such concerns should be discounted in the case of subsidies that preserve jobs on existing capital in as yet unprivatized firms owned by the Treuhandanstalt. They do apply, however, in the case of jobs that are created outside the Treuhand sector or as a consequence of new investment in Treuhand firms. A complete analysis of an East German employment bonus program requires, therefore, separate discussion of the budgetary costs and savings of

141. *Frankfurter Allgemeine Zeitung*, November 16, 1990, p. 19.

Figure 3. The Effects of Employment Bonuses with Fixed Eastern Wages

Direct budgetary cost of the subsidies	CFLJ
− budgetary savings from lower unemployment	− ABIG
− additional Treuhand revenues from selling firms	− CFKJ
= Net budgetary cost of the EB program.	= KHIL − ABFHG.

bonuses paid on existing jobs in unprivatized Treuhand firms and those paid on new jobs created after the scheme is put into effect. We consider these in turn.

BUDGETARY COSTS FOR CURRENT TREUHAND JOBS. A simple diagram illustrates the benefits and costs of EBs paid on existing jobs in firms that are currently in the portfolio of the Treuhandanstalt. In figure 3, DD represents the demand curve for labor as a function of worker compensation aggregated over all of the Treuhand's properties. At the initial compensation level, w_0, employment is OA. An employment bonus in the amount eb ($= JC$) raises employment to OB. The payment of this bonus has three distinct budgetary effects. First, there is the direct cost of the program—the rectangle $CFLJ$—which is the product of the bonus (JC) and the total number of employees on which it is paid (OB). The second budgetary effect of the program is positive:

the government puts the unemployed to work, generating additional income tax revenue, higher contributions to the social insurance funds, and lower unemployment compensation. This effect is measured by the area *ABIG*, the product of the number of additional workers employed (*AB*) and the budgetary cost per unemployed worker (*BI*). The third budgetary effect of the program is to enhance the market value of the Treuhand's properties, resulting in greater revenue for the Trust when the enterprises in its portfolio are sold. In the absence of the subsidy program, the value of the firms is measured by the present discounted value of the triangle *JKM*; with bonuses, the value of the firms rises to the present value of *CFM*. The extra revenue realized by the Trust from the bonus program in the current period is *CFKJ*. Summing up the three budgetary impacts of the program, the overall net budgetary cost of the employment bonuses is equal to the difference between two areas: *KHIL* − *ABFHG*. As figure 3 illustrates, the difference is negative when there is a large budgetary cost for unemployed workers. In this realistic case, the program generates an overall budgetary gain, not a loss.[142] Both the government and the workers gain from the employment bonus program. Assuming that leisure has no value, workers gain because they earn higher after-tax income working than they do receiving unemployment benefits. Their net benefit is the rectangle *GKLI*. Finally, there is a net social gain, the trapezoid *AKFB*, which is the sum of the gains to the workers and to the government.

From figure 3, it is possible to estimate the budgetary effects of subsidies to existing jobs in Treuhandanstalt firms using our earlier calculations of the impact of employment bonuses in table 8. A 50 percent EB to Treuhand workers raises the fraction of employment in viable firms from 8.2 to 36.6 percent and generates budgetary savings of approximately DM 11.9 billion a year if all workers in viable firms are employed. A 75 percent EB raises the fraction of employment in viable

142. This analysis treats the scrap value of the Treuhand's firms as zero. The demand curve, *DD*, represents the aggregate demand for labor across all firms. As compensation per worker rises, employment may fall for two reasons: each firm hires less labor and some firms become unviable and are shut down. In the putty-clay model, only this second effect is at work. When firms are shut down, their assets may be sold for scrap, generating revenue for the trust that is not included in our analysis. If the scrap value of firms is high, our analysis overstates the budgetary savings of the bonus program. In an early sale by the Treuhandanstalt, textile machines from one factory were sold to an industrial museum in West Germany. The real estate may be of more significant value.

firms from 8.2 to 77.2 percent and generates budgetary savings of DM 22.3 billion. Insofar as there is less than full employment in viable firms, the budgetary surplus resulting from the program is proportionately less. With less employment, there will be proportionately fewer subsidies given out, but also proportionately less benefit.

We can illustrate how these calculations are made. According to table 8, if all workers at viable firms are employed, the increase in employment due to a 50 percent subsidy is 28.4 percent of all employees—from 8.2 to 36.6. Subsidies of half of initial compensation thus have a direct cost of 0.5×0.366 of the total compensation of all Treuhand employees (this cost is subsequently denoted $w_0 L_0$). This is the area *CFLJ* in figure 3. The budgetary benefit can be found by summing three areas. First, there is the benefit from fewer unemployed workers. This is the area *ABIG*, which is $0.791 \times 0.284 \times w_0 L_0$. The contribution of the subsidy to the increased value of Treuhand properties is the sum of the two areas *CEKJ* and *EFK*. *JC* is one half of compensation, so *CEKJ* has the area $0.5 \times 0.082 \times w_0 L_0$, and the area of the triangle *EFK* is $0.5 \times 0.5 \times 0.284 \times w_0 L_0$. The net budgetary surplus is 15.4 percent of the compensation bill.

In the preceding example, unlike the typical case where subsidies are given, the capitalists do not benefit from the EBs. Any gain they might realize is exactly offset by higher competitive bids for the properties of the Treuhandanstalt. This occurs even in noncompetitive situations with few bidders: in most models of auctions, a program that increases a good's value by the same amount for all bidders will raise the auction price of that good by the identical amount. In the case of EBs, if the bidders' employment of labor is unaffected by the bonus payments, all bids should increase by the amount of the bonuses.

BUDGETARY COSTS AND BENEFITS FOR NEW JOBS. A full analysis of the budgetary impact of an employment bonus scheme requires separate consideration of the costs and benefits of bonuses paid on new jobs that are created after the bonus scheme is instituted and of bonuses paid to workers who are currently outside of Treuhandanstalt firms. At present the number of such workers who would be covered by an employment bonus scheme is quite small.[143] Thus we focus on the

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143. Such a scheme would apply to private, nonagricultural employment. In order to avoid creating windfall gains for firms and establishments that have been privatized during the last year, it would be appropriate to offer such enterprises a bonus only for employment exceeding the present or agreed upon levels. The number of non-Treuhand, nongovern-

budgetary consequences of bonuses paid on new jobs created by new investment. The number of workers in such jobs will become quite large as new investment, we hope, rapidly comes to dominate the productive capital in the East German economy.

An employment bonus paid to workers on *new* capital will create new jobs in two ways. First, the subsidy to wages will affect the optimal labor-capital ratio of new investment: with capital subsidies, for example, we might expect capital-intensive investments like oil refineries to locate in East Germany; with labor subsidies we might expect labor-intensive investments like corporate billing services to locate there. With a Cobb-Douglas production function, the cost-minimizing labor-capital ratio is inversely proportional to the effective wage. With a deep wage subsidy of 75 percent, this ratio increases by a factor of 4; with a subsidy of 60 percent it increases by a factor of 2.5.

Second, employment bonuses will increase the volume of investment by raising its profitability. By lowering effective wages, employment bonuses decrease unit labor costs and raise quasi rents $(q - wl)$ per unit of newly invested capital. In consequence, Tobin's q—the ratio of the market value of the profit stream from new investment relative to the cost of the capital goods—would rise; the optimal rate of investment would rise accordingly. We expect this effect to be quite large: a deep wage subsidy would substantially lower labor costs and increase profits. At only 3 percent of total West German investment, current private investment by West German firms in East German firms has considerable scope for expansion. And deep wage subsidies would make East Germany competitive with alternative production sites in eastern and southern Europe.

By speeding the pace of job creation in these two ways, deep wage subsidies on new investment permit a more rapid reduction in East German unemployment, resulting in considerable budgetary savings on unemployment benefits. These savings must be weighed against the cost of paying for subsidies on those new jobs that would have been created even without the program. Some sample calculations show that the savings from expanded job creation are likely to be large enough that the

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mental, nonagricultural workers is quite small. Based upon 1989 employment figures fewer than half a million workers would obtain subsidies at present who are not in Treuhand firms. See Statistisches Amt der DDR (1990, p. 127). Most uncovered workers are in trade and crafts.

overall budgetary cost of the subsidies on new investment would amount to only a small fraction of the wage bill.

To approximate these costs and benefits suppose that, in the absence of an employment bonus, investment would occur at a constant rate I_0, with a capital-labor ratio of k_0, resulting in the creation of $N_0 = I_0/k_0$ new jobs per period. In contrast, suppose that with an employment bonus equal to a fraction λ of initial compensation, new investment occurs at the constant rate I_1, with a capital-labor ratio k_1, so that $N_1 = I_1/k_1$ jobs are created per period. (In actuality the optimal investment rates and capital-labor ratios will vary over time.) The net budgetary cost of the bonuses paid on these new jobs in a given period, t, is the difference between the direct cost of the program and the savings that result from decreased payments for unemployment benefits and increased tax and social insurance payments. The net budgetary cost is $[\lambda - 0.791 + 0.791(N_0/N_1)]w_0N_1t$. With the slightly optimistic assumption that both investment and the capital-labor intensity are unit elastic with respect to the wage, a 75 percent EB would cost 0.84 percent of total compensation on new investment in each period. With the less optimistic assumption that each of these elasticities is one half, an employment bonus of 75 percent on new capital would have a net cost of 15.7 percent of the compensation of these workers. With both elasticities equal to unity, a 60 percent bonus would generate a 6.4 percent surplus. With both elasticities equal to one half, the 60 percent bonus to these workers would cost 12.5 percent of their total compensation.[144]

In evaluating the overall budgetary impact of an employment bonus program, the budgetary effects of the program on new and existing capital must be aggregated. Because private investment is proceeding so slowly at present, deep subsidies to labor could provide significant incentives to invest and to intensify the usage of labor, yielding budgetary savings on new investment. But, even if subsidies on new investment are costly, the cost is likely to be relatively small and will be partially or

144. We propose a plan below that gradually phases out employment bonuses once full employment has been achieved and that terminates bonus payments when Eastern wages have reached the West German level. Assuming that the bonuses are fully eliminated by the time that full employment would be reached in the absence of the plan, the budgetary cost, if any, of the bonus program attains a maximum when full employment is reached. If there are budgetary savings before full employment is reached, these continue until the bonuses are fully eliminated.
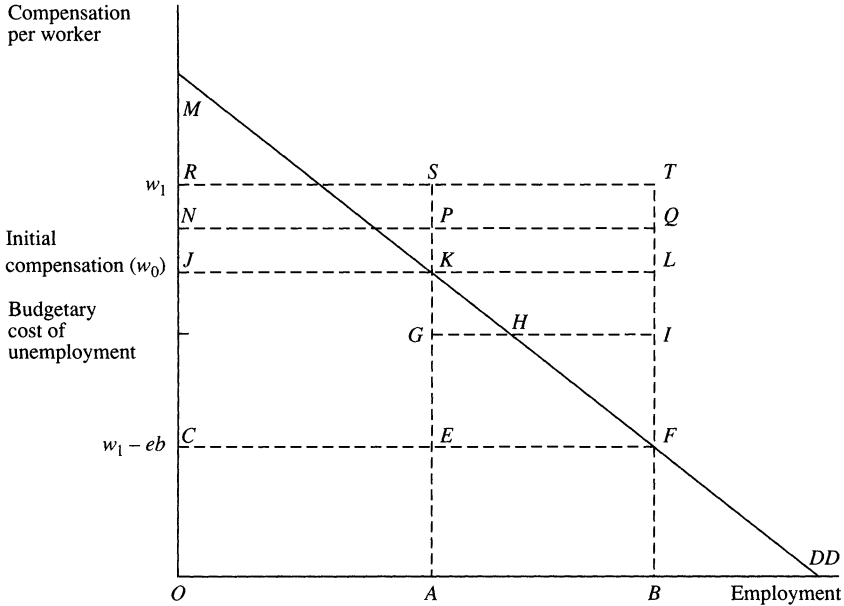
perhaps even fully offset by the savings from the bonuses paid to Treuhandanstalt workers.

THE IMPACT OF THE EB ON WAGES. A second objection that can be leveled against a wage subsidy program is that its beneficial incentive effects—to hire workers who would be otherwise unemployed—may be vitiated if the program induces wages to rise by more than would occur in its absence. Continuing the analogy, the hardware store owner loses money in offering a subsidy if his brother-in-law uses the existence of the subsidy to bargain for a yet higher wage. For example, if the brother-in-law bargains for a wage increase of DM 400 when the DM 1,000 EB is instituted, a purchaser of a shovel who would have hired the brother-in-law in the absence of the EB will now be willing to pay only DM 600 more for the shovel. The hardware store owner, in this case, has lost DM 400. By analogy, subsidies given by the Treuhandanstalt should ideally not cause resultant wage hikes.

Figure 4 illustrates the argument. It shows that the budgetary benefits from an EB to workers on existing Treuhand capital will be significantly lower, and perhaps even ambiguous in sign, if the EB results in wage increases. A larger subsidy must be offered to achieve the same employment gain (within existing Treuhand firms) as in figure 3. In figure 4, compensation rises from its initial value, w_0, to w_1 because of the subsidy. However, only a portion of this compensation increase, JN, actually accrues to workers as higher net pay. The remainder, NR, returns to the government coffers as extra income tax and social insurance payments. The size of the required subsidy is CR. (When wages remain unchanged, the size is merely CJ.) The net gain to the workers is thus $JKGIQN$. This program has exactly the same effect on the revenue of the Treuhand as before—it realizes additional revenue equal to the discounted value of $CFKJ$ from the sale of its properties. The program also results in the same budgetary savings from lower unemployment as before ($ABIG$). Finally, the social benefits of the program are also unchanged, amounting to the trapezoid $ABFK$. But the direct cost of the bonus program is higher than before by the amount $JLQN$. The overall budgetary cost to the government is now $KHIQPNJ - ABFHG$, which is higher than before by the amount of the net pay hike—$JLQN$. In this case the government does not necessarily make budgetary gains.

EB-induced wage increases will, similarly, increase the budgetary costs of increased employment on new investment. If unions are suffi-

Figure 4. The Effects of Employment Bonuses When Wages Rise as a Consequence

Compensation per worker

M

w_1 — R ——— S ——— T

N ——— P ——— Q

Initial compensation (w_0) — J ——— K ——— L

Budgetary cost of unemployment — G ——— H ——— I

$w_1 - eb$ — C ——— E ——— F

DD

O A B Employment

Direct budgetary cost of the subsidies	$CFLJ + JLTR$
— extra tax and social insurance payments from wage increases	$- NQTR$
— budgetary savings from lower unemployment	$- ABIG$
— additional Treuhand revenues from selling firms	$- CFKJ$
= Net budgetary cost of the EB program.	$= JLQN + KHIL - ABFHG.$

ciently powerful, it is conceivable that the subsidy could simply raise the wages of workers at the expense of the government budget without generating any additional employment at all. This is an extreme and unlikely possibility, but the basic problem is serious.

It is possible, however, to design an employment bonus scheme that eliminates unions' incentives to raise wages and preserves employers' incentives to hire more labor. This is accomplished by linking the value of the bonus inversely to the wage. Such a linkage serves as a union-disciplinary device because it raises the elasticity of labor demand, making wage hikes more costly in terms of reduced employment.

A third objection to wage subsidies is that there is no natural time for the program to be terminated and thus it becomes self-perpetuating. But subsidies can be designed that automatically phase themselves out when no longer needed.

The Self-Eliminating Flexible Employment Bonus Program

The goals of the Treuhandanstalt should be to privatize its properties with simple contracts that (1) induce employers to hire workers who would otherwise be unemployed, (2) speed new investment, (3) do not cause budgetary loss to the government, (4) do not trigger union behavior that would offset the beneficial implications of the contracts, and (5) are self-terminating when no longer useful.

The self-eliminating flexible employment bonus (SEFEB) program accomplishes these objectives. Under this program, a bonus would be offered for the private employment of all workers in East Germany. The bonus is a specified fraction of initial compensation. But the bonus is *flexible* because its value is governed by a formula that depends linearly on the gap between Eastern and Western compensation. The bonus is also *self-eliminating* because its value falls to zero as wages in East Germany approach those in West Germany. With the plan in place, further wage increases should occur only as the economy recovers; the bonus will automatically terminate as it ceases to be useful. More specifically, the bonus at time t, b_t, would be determined by the formula: $b_t = \lambda w_0[(w_t^* - w_t)/(w_t^* - w_0)]$, where w_t denotes Eastern compensation per worker at time t, w_0 denotes initial Eastern compensation, w_t^* denotes Western compensation at time t, and λ is the desired percentage reduction in compensation costs.

These SEFEBs would serve five major purposes. First, by changing the value of most East German properties from negative to positive, they would permit sale without scrappage. With the SEFEB plan in place, the Trust would simply sell its properties to the highest bidder and liquidate those that it still cannot sell. The scheme eliminates the need for detailed evaluations by the Trust of the employment and investment plans of prospective purchasers. It would speed the process of privatization, thereby encouraging restructuring and the introduction of market incentives. Second, SEFEBs will provide the appropriate incentives for firms to preserve existing jobs and to create new ones, lowering unemployment substantially. Third, by taking workers off the unemployment rolls, payments for unemployment compensation will fall and revenue from the income tax, social insurance contributions, and the sales of Treuhand firms will rise. Fourth, SEFEBs will reduce politically undesired migration and lower the level of social unrest. Fifth,

SEFEBs will control excessive wage demands above and beyond the effect of introducing market incentives. Unions will have less reason to raise wages than with the usual form of wage subsidy because the SEFEBs will make labor demand more elastic; the beneficial incentive effects for hiring are less likely to be dissipated in demands for higher wages, and the bonuses are less likely to result in a budgetary drain.

In simple maximizing models of union behavior, the SEFEB plan usually makes wages sticky when unemployment exists. Unions that are concerned about employment as well as wages have an added incentive to keep wages low. If unions maximize the income of their employed members, and labor demand is linear, a SEFEB will usually not result in any change in wages. Unions seeking to raise wages above their initial level encounter a kink in the labor demand schedule at this point. Wage increases above this initial level cause the bonuses to diminish and thus the trade-off of wages for employment suddenly worsens. Consequently, the initial wage is usually a corner solution to the income maximization problem. The SEFEB plan makes it difficult for the union to appropriate the quasi rents that the EBs create. As a consequence, these rents can be recouped by the Trust from the sale of its property. This makes the plan attractive from a budgetary perspective. Wages will rise eventually in this model, when demand and labor productivity grow to the point that there is full employment: once that has occurred unions have nothing to gain by keeping wages low because employment is limited by the supply of, and not the demand for, workers.[145]

The SEFEB plan takes advantage of the unions' concern about the disappearance of jobs. In effect, it offers them a trade: the unions can either push for wage parity and forgo the bonuses that will keep jobs in East Germany or forgo the wage increases and keep the jobs. The SEFEB makes the trade-off between jobs and wages stark, while it simultaneously creates incentives for management to create and to continue those jobs.

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145. In this case, the availability of labor becomes the condition that determines labor usage. At each level of demand, the unions compare the maximum value of labor income with and without the subsidy. Eventually, when the wage has risen sufficiently, they find that labor income is maximized by forgoing the bonuses. At this point wages are raised beyond the point where employment bonuses are paid, and employment falls to what it would be in the absence of the program. At no time, however, is employment decreased by the payment of the SEFEBs; as long as bonuses are paid, employment is always larger.

In the current round of wage negotiations, unions are bargaining for rapid achievement of wage parity. In February, as we noted above, IG Metall signed a pattern-setting contract granting wage parity in just four years. Such contracts represent an absence of any social contract between government and workers. Any employment bonus plan, SEFEB or otherwise, must be made with the understanding, implicit or explicit, that the government is giving bonuses to protect jobs, and that unions in turn should show wage restraint in order to maintain the viability of those jobs. We endorse any plan with such an understanding. We offer the SEFEB as a suggestion because, relative to simpler employment bonus schemes, it makes the loss in employment resulting from higher wages clearer and more automatic. Thus unions have greater incentive to abide by their part of the social contract than with simple employment bonuses. Thus far, management associations of as yet unprivatized firms have staged little resistance to demands for wage parity. By allowing privatization, SEFEB will install profit-oriented owners with an interest in resisting unrealistic wage increases.

Two precedents for an employment bonus plan already exist in East Germany. First, the Bundesanstalt für Arbeit has allocated DM 5.3 billion in its 1991 budget for a job creation program. The money will be used to pay the wages of previously unemployed workers, typically for a year, and is expected to create temporary jobs for at least 260,000 workers. Second, the German government is currently subsidizing new jobs in the research and development (R&D) operations of East German companies. Firms that create new R&D jobs can get 60 percent of the gross wages of these employees for the first 15 months and 50 percent thereafter. Thirty million deutsche mark are available for such subsidies in 1991.[146]

The SEFEB plan will *not* save every job in East German industry. The 75 percent SEFEB lowers the short-run variable cost of production for *Kombinate* employing 77.2 percent of the workers below the price that these *Kombinate* were receiving for the share of their output sold in Western markets. But it will take time and knowledge of Western markets before these firms will be able to sell all of their output at these prices. For viable firms, the SEFEB shifts down the short-run supply curve so

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146. See *Süddeutsche Zeitung*, March 18, p. 24, and *Frankfurter Allgemeine Zeitung*, January 5, 1991, p. 9.

that their short-run average variable cost, $\hat{p}$, is less than the world price, p^* in figure 1. It thus eliminates the price-cost squeeze for these firms. It does not, however, affect that part of the output reduction resulting from the demand shift.

We intend SEFEBs to apply to all private, nonagricultural employment. Using 1989 figures for employment, this would not include the more than two million government and transport workers. These workers' jobs must be protected by adequate subsidies from the federal budget to the Eastern *Länder* and municipalities. Nor does it protect most of the almost one million jobs in agriculture.[147] In the European Community, agriculture has its own forms of protection and support.

The SEFEB plan will not eliminate incentives for firms to lay off workers not needed to produce output; through its effect on privatization, the plan maintains incentives for adopting productivity-raising measures, including those that come about through cuts in the work force. With SEFEBs, activities that have very low (or conceivably negative) value added at world prices *should* and *will* be discontinued. A rational means is created to allow market forces to decide which activities should continue in the East: activities should continue as long as they are profitable when labor is appropriately priced—at the social opportunity cost of labor, rather than at the current wage. In the absence of such a plan, the Trust will find itself with insufficient funds to subsidize everything, and decisions will be made on an ad hoc basis about which firms to subsidize and which to shut down.[148] Such decisions should be made by profit-maximizing entrepreneurs; they will instead be made by the Trust. The old socialist system under the Central Planning Commission of the GDR has been replaced by a new system of central planning under the Treuhandanstalt. Indeed one of the strongest advantages of the SEFEB program is that it breaks the unsatisfactory status quo by allowing fast and easy privatization, thereby speeding restructuring and the introduction of market incentives.

We add three cautionary notes about SEFEBs and our calculations. In our budgetary calculations, we projected the unemployment compen-

147. See Statistisches Amt der DDR (1990, p. 125).
148. For example, the shipyards in Schwerin and Rostock have orders from the Soviet Union that, if filled, will show losses. Should these orders be accepted? A rational way to decide is by seeing whether these sales are profitable when the costs are evaluated using wage costs, net of the SEFEB bonus.

sation for the typical worker at 68 percent for the indefinite future. This is based on the potentially false prediction that it will be difficult politically to cut off benefits to Eastern workers because of the severity of the recession. A husband-wife, two-child family under current law would impose budgetary costs on the German government of 53.6 percent of their previous compensation after two years of joint unemployment, rather than 79.1 percent.[149]

A second assumption that yields optimistic estimates of budgetary costs is that the SEFEB plan leaves migration unaltered. The SEFEB plan will lower migration by creating more jobs in the East. Unemployed Eastern workers impose budgetary costs on the German government, whereas Easterners who work in the West impose no such costs as long as they do not displace Western workers from jobs. But, given West German fears about migration and East German reluctance to move, the benefits from decreased migration are likely to be of the same order of magnitude as, if not greater than, the offsetting increase in budgetary cost. Our calculations therefore understate the budgetary costs of the SEFEB plan but they also ignore the perceived benefits from decreased migration to the West.

With any successful bonus program there will be incentives to locate activities just across the border to take advantage of the subsidies.[150] We do not see how this is avoidable. Of course few West German workers will want to work at SEFEB wages, which will begin much lower than West German wages, so there will be no incentive for West German labor to cross-migrate to take advantage of the wage subsidies. Still, there will be incentive for new investment to locate just across the border. The main border between East and West Germany is, for the most part, relatively unpopulated. The major problem occurs in West Berlin, which has two million people. Until now Berliners have managed to be competitive with West Germany with the help of subsidies from the federal government. West Berlin is now a boom area because of unification, so the problems caused by the introduction of a deep SEFEB may not be severe. If they turn out to be serious, the special subsidies to West Berlin and the border areas, which were recently discontinued, can be reinstated. We view the border area problem as an unpleasant

149. After one year of unemployment, benefits decline from 68 to 58 percent for a worker with children and the overall "replacement ratio" falls from 79.1 to 72.6 percent.

150. We are most grateful to Christopher Sims for pointing out this problem to us.

side effect of the SEFEB plan—but, given the severe distress caused by the depression in East Germany, we consider it better to take the medicine than to avoid its side effects.

Subsidies to Capital

Many subsidy programs for East Germany have already been instituted. Most of these are subsidies for *investment*—not for the use of labor.[151] The most important of them are a 12 percent investment grant for equipment, accelerated depreciation for equipment, European Recovery Program loans for new enterprises and modernization of enterprises, and subsidized financing for new enterprises.[152] Except in instances where the subsidies are for the modernization of existing capital that makes existing jobs more productive, such policies fail to address the problem that existing firms with existing capital cannot meet expenses at current wages. These subsidies fail to solve the fundamental problems both of privatization (how can firms with continuing losses be sold?) and of labor usage (who wants to use labor when the wage exceeds the value of its marginal product?).

Furthermore, subsidies to capital give large incentives to activities that create relatively few jobs. The classic example of the failure of capital subsidies to create jobs is in the Italian *Mezzogiorno*, where the bulk of expenditures were taken up by the capital-intensive metallurgical and chemical industries, with relatively few backward linkages. A European Economic Community report concluded in 1979: "What has become blatantly obvious is the illogicality of financing labor-saving undertakings in a region like the *Mezzogiorno*, where it is precisely labor which is the overwhelmingly abundant factor of production."[153] The same statement is equally true substituting *will become* for *has become*, and *East Germany* for the *Mezzogiorno*.

Conclusion

This paper has analyzed the great depression that is occurring in East Germany. There are two reasons for this depression. First, at the wages

151. See Klodt (1990b) for a valuable summary of these programs.

152. Accelerated depreciation on investment in East Germany is an important aspect of the tax revisions announced in February 1991. See U.S. Department of State Telegram on Financial and Economic Developments in Germany, February 1–7, 1991.

153. Commission of the European Communities (1980, p. 22).

paid to East German workers there is a price-cost squeeze. East German firms are unable to sell their goods at world prices and pay their short-run variable costs. Thus wages are too high for most firms to remain profitably in business. Second, economic union was accompanied by reductions in demand and shifts away from Eastern goods toward Western goods.

The two ultimate solutions to the problems in East Germany will be the in-migration of capital with new technology and the out-migration of labor. Capital is coming in—slowly. Similarly, labor is going out—slowly. In our survey we found a significant number of people who will move—enough to make for a great migration when cumulated over, say, a decade. But, still, the vast majority of East Germans want jobs in East Germany and are willing to make sacrifices to get those jobs. Thus many will wait in East Germany for those jobs—unemployed. The view that wages must be high to prevent migration is unfounded. Rather, the higher are wages, the greater the price-cost squeeze, the more layoffs, and the fewer new jobs from investment; thus the higher will be unemployment. This unemployment will be the real cause of most out-migration.

The high wages, and the price-cost squeeze, also make it difficult for the Treuhandanstalt to perform its major function (which is to privatize the East German economy) unless it sells its properties for their scrap or real-estate value. Few people want to own and operate firms with short-run variable costs that exceed their revenue.

This analysis suggests that there is one variable that can and ought to be changed: the effective price for using labor. In East Germany, wages are above the market-clearing level and rising toward parity with those in the West. A social contract is needed to keep wages from increasing further. In return for wage restraint, employment bonuses should be given to save existing jobs and to speed the creation of new ones. We propose a plan for SEFEBs—self-eliminating flexible employment bonuses—which will accomplish this aim. A 75 percent SEFEB plan would make *Kombinate* employing three-quarters of the industrial work force viable. The budgetary cost will be low—possibly even negative.

Finally, we have emphasized the interdependence of different governmental budgets: the attempt to cut one budget—for example, the budget of the Treuhandanstalt—has spillovers to other budgets—for example, the budget for unemployment insurance. In fact we found that

because of these spillovers, the net budgetary cost of additional spending in the East is presently quite low. Thus, expansionary governmental programs and infrastructure programs, which create jobs and have high long-run payoffs, can be carried out at low cost now. Seldom have the causes of such a great economic event or the desirability of policy responses to it been more clear.

Comments
and Discussion

Rudiger Dornbusch: This paper by George Akerlof, Andrew Rose, Janet Yellen, and Helga Hessenius deserves more than perfunctory compliments: it is the most thorough assessment of the collapse of East Germany's economy to date and contains the sharpest policy recommendation. Their paper is more than timely: Eastern Europe is looking for direction in developing transition strategies, and Western optimism, and even enthusiasm, is waning in the face of East Germany's economic collapse. The costs of unification have been staggering and, not surprisingly, T-shirts are appearing in West Berlin that read "I want my wall back."

The authors arrive at three central findings. First, they identify and quantify two main causes for the collapse in output and employment: the shift in demand away from East German goods and the sharp increase in costs relative to prices. They identify the price-cost squeeze in particular as the central problem. Second, the paper uses an opinion survey to establish that people would migrate only as a result of unemployment, and not in response to wage differentials. This finding points to the need to avoid unemployment. Third, from these two findings, the authors make the case for a wage subsidy. In fact, beyond arguing that a wage subsidy would stabilize employment, they even demonstrate that it would reduce budget deficits.

Their advocacy of massive, economywide wage subsidization is breathtaking. Without the thorough research used to back it up, such a proposal would have been rejected out of hand; within the context of their well-reasoned case, however, it becomes the most serious policy innovation yet proposed. The only alternative is a more aggressive pursuit of a market economy, if necessary with protracted high unem-

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ployment. In previous work I have developed this alternative position, and so have some others.[1]

In focusing on the profit squeeze as the reason for economic collapse, the authors develop an especially interesting point: they argue that the conversion rate, which was the center of much discussion, was not the critical consideration. The choice of a 1:1 or a 3:1 ratio may not have made much difference. West German unions, we are told, made a hard case for closing the wage gap between East and West and moving toward wage parity, and would have done so even without conversion at par. This point is important because it recognizes that with unions we must suspend the idea of wages clearing the labor market and the notion that picking the right exchange rate is essential to avoid Keynesian unemployment in a situation where wages might be inflexible downward. With union pressure for wage parity, the issue becomes classical, or high real-wage, unemployment. The authors correctly emphasize this interpretation of the collapse and hence rightly dismiss the controversy still raging in Germany about what conversion rate was appropriate. Their analysis clearly singles out West German unions as the villains in the collapse. It is not an argument the Bundesbank will like.

Now consider the central argument of the paper, the case for a wage subsidy. Analytically the argument is perfect: from the social point of view, labor is a fixed cost. Either the government pays unemployment compensation or it supports employment by a wage subsidy; one way or the other, the government will pay and hence the only question is what is the best allocation of resources. The authors conclude that if the government pays anyway, better to squeeze a bit of work out of the labor force than support idleness. Their conclusion recalls the argument in Western Europe that the government should finance social security by lump-sum taxes or expenditure taxes, since social benefits are citizens' rights and not entitlements based on employment.[2] In that way, social security taxes would not become an obstacle to employment. In the case of Western Europe the argument is very plausible; it is far less so in East Germany, where transformation of the economy is incomplete. With transformation still on the agenda, wage subsidies risk fossilizing the status quo in production and employment.

1. Dornbusch (1991); Schmieding (1991); Siebert, Schmieding, and Nunnenkamp (1991).
2. Blanchard, Dornbusch, and Layard (1986).

The authors lead us to believe that there are only two choices: high unemployment and its resulting migration or the wage subsidy scheme. But there is surely a third way. The third way emphasizes the need for a radical change in the landscape of production and employment. East German firms are not organizations that ought to be nurtured and preserved. The sooner they are broken up, the sooner we will see productivity growth and sustainable real wage gains. We can think of a firm as valuable when it possesses a good business organization in terms of management or labor, an unusual product that commands rents, or a market that is privileged. In East Germany none of these qualities apply to most firms. Business organization is appalling: the *Kombinate* are oversized firms that deny the gains from trade and specialization; they have incompetent managers, are highly overstaffed, and produce goods that no one wants. It is hard to see why policy should not focus on breaking up these organizations or, where there is a spark of hope, forcing the radical shedding of labor in order to improve competitiveness.

The authors' proposal, while not encouraging the status quo outright, does accommodate it too much. While it does not actually subsidize unproductive employment, neither does it force the squeeze. It is hard to believe that without a drastic squeeze adjustment will happen fast. But the fact is that at least a third of workers, if not more, are currently in the wrong job. Why keep them in an automobile factory if they should be flipping hamburgers?

The authors' proposal also raises the question of where the demand for current East German output might come from. Suppose that employment stabilized with moderate unemployment. There has been a drastic fall in demand for East German goods at most prices, and for some at any price. East German goods are regarded as "lemons." They have even lost their formerly captive customers in the East. Imagine the East German automobile, the Trabant, which is the same price as a Volkswagen Golf. It is just not plausible that at such a price any Trabants could be sold. The same argument holds for many, if not most, goods produced in the East. The radical shift of customers away from East German goods is as extreme as it is understandable. The economic implication is equally clear: East Germany cannot possible go on producing the product range of the past. Arguing that they ought simply to upgrade quality, marketing, sales, and productivity is unrealistic. If that could be accomplished by sheer effort alone, it might even have been done under the communists;

if it were so easy China could do it too. The fact is that most production will have to cease, and brand new firms must be put in place. Interestingly, that is precisely what Western investors seem to be doing. They put up new plants next to the old ones, bring new capital and management from the West, and hire a third of the plant's previous labor force. A wage subsidy might affect their capital intensity, but even that is not clear.

Starting a guessing game as to which firms should be rescued by wage subsidies, because their products might stand a chance, and which firms should go recalls the prospect of a planning mechanism. East Germany has surely had its share of planning. Thus, the current situation represents a state of limbo—planning without socialism, capitalism without profits. The way forward should not be more planning, but something more radical.

One alternative is to accept a few years of massive unemployment, with its attendant risk of mass migration. We should simply recognize that in a few years most people will be producing very different goods and that a shakeup is inevitable. Unemployment, job searches, and relocation are the costs of reaching a higher productivity level.

The situation resembles 1948, when West Germany had to accommodate nearly 10 million immigrants in a short period of time. This was a period of hardship, and unemployment persisted at high, though declining, levels throughout the early 1950s. But that hardship of a market economy with few safety nets translated into strong growth in output and employment. The German miracle of the postwar period started with an emphasis on self-help, not with a British-style welfare state or with a plan like the authors'. West German growth in the 1950s averaged 5.9 percent against only 1.9 percent in the United Kingdom. Policies that guard against risks to production and employment become a major obstacle to the ultimate upgrading of the East.

To conclude, let me suggest a different interpretation of the situation in East Germany, one that leads me to a different conclusion from the authors'. A recent survey of the Institute of Applied Economics Research reported that only one-eighth of the firms questioned complained about unreasonably high labor costs.[3] Firms in the survey identified lack of demand as the dominant problem (67 percent), followed by financing (39 percent). Wage costs were seen as a problem by only 12 percent of

3. See Deutsche Bank (1991b).

the firms. If this interpretation is correct, the solution to East Germany's problem is radically different from what the authors suggest. The solution would be to bring in, as rapidly as possible, firms from the West—with their products, management, and markets—rather than try to maintain a semblance of East German identity. The emphasis would be on subsidizing the creation of firms rather than on the perpetuation of current employment. Akerlof in an earlier study taught us that lemons may not be sold at any price; East Germany's economy is mostly a lemon.[4] To get out of the conundrum, a pooling equilibrium with the West is essential.

A competitive market may not readily solve the problem of relocating firms to the East. There is the option of waiting until at least some of the uncertainty about wages, the environment, subsidies, and the like is resolved. In the face of a coordination issue, subsidizing the creation of new firms offers more direct support for solving the critical bottleneck than does excessive focusing on immediate employment. A subsidy for firm formation—not a subsidy for capital-intensive technology—would also help improve East Germany's ability to compete for investment with countries like Czechoslovakia, where wages are much lower.

Manuel Guitian: This is a most interesting paper, on which it has been a pleasure to comment.[1] George Akerlof, Andrew Rose, Janet Yellen, and Helga Hessenius describe starkly the serious ills currently afflicting the former German Democratic Republic (GDR). And they present an attractive strategy for curing them and thus engineer an East German "Wirtschaftswunder." After having gone through the text, I was left with the impression that a better title would have been something like: "East Germany in, but not from the Cold: The Economic Aftermath of Unification." After all, the authors argue most persuasively that whatever it is that East Germany has come in from, it certainly is not from the cold; if anything, the temperature in the area has dropped. And, as the opening paragraph makes clear, the aftermath is not just from currency union, but from the broad process of economic unification.

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4. Akerlof (1970).

There is much to praise in this paper, not least the amount of information and the wealth of analysis it provides on the situation in East Germany and its presentation of a simple, yet powerful policy proposal. But, attracted as I was to the suggestions in the paper, on reflection I found myself not wholly persuaded by them. Faced with this quandary, I decided to stress the reasons for my skepticism, believing that the very importance of the paper's policy recommendations makes it imperative to question the robustness of the underlying analysis. For all these reasons, my comments conform more to those of a doubting Thomas or a devil's advocate than to those of a convinced reader. But I stress from the outset that the strength of my doubts should be viewed as a tribute to the quality of the paper.

There can be no disagreement with the authors' description of the severe downturn in East Germany. The additional data provided in the paper confirm it beyond any doubt. According to the authors, there are two fundamental causes behind the depression: a contraction in aggregate demand and a divergence between prices and wage costs. The strategy to deal with them follows inevitably: government spending to stimulate demand and wage subsidies to correct for the distorted price of labor. In the abstract, the reasoning behind their strategy is straightforward. But does it fit well with the concrete case of East Germany?

The analysis in the paper is appropriate for a Keynesian downturn resulting from a cyclical reduction in aggregate demand. Yet, what East Germany confronts is a permanent shift in demand out of its domestic products in favor of foreign goods. I will not deny that there may be an element of global demand failure in the Keynesian sense; after all, consumers' shift away from East German products may have been exaggerated (a Dornbuschian overshooting, so to speak) and the same may have been the case with investment spending. If so, part of the demand failure may be transitory and as such the paper's analysis would be eminently applicable to it. But part of the demand decline reflects a structural shift to foreign commodities, with domestic suppliers unable to compete in their production. The temporariness of this shift is not obvious and the analysis in the paper is therefore less applicable to it. Still, given the complementary nature of public infrastructure and private capital, the paper's advocacy of an expanded program of public infrastructural investment is well founded; other things equal, such public outlays will help to induce private investment flows.

I now turn to the other major element of the paper's diagnosis and strategy: the distorted price of labor and its correction through the introduction of a wage subsidy. The reasoning behind such a subsidy would be unassailable if the high level of wages were the only distortion afflicting the East German economy. In such a case, as the paper contends, the subsidy would correct the distortion and that would be the end of the story. But the appropriateness of such a proposition in the East German context is questionable, to say the least. Among other reasons, the activities of the Treuhandanstalt cast doubts on it by helping keep afloat firms that have little, if any, hope of becoming viable. Even potentially viable firms should be improving efficiency, a fact that, in its preoccupation with the maintenance of employment, the Treuhandanstalt is likely to have overlooked.

These considerations support my impression that the paper would benefit from more emphasis on the institutional setting of the East German economy, particularly the role of economic policy as a factor behind the events unfolding in the journey toward the establishment of a market. For understandable reasons (most eloquently laid out in the paper), the Treuhandanstalt could hardly avoid acting like a public employment agency; as a consequence, however, this agency has done relatively little to promote structural adjustment in the economy. Though mentioned in the paper, issues related to property rights and environmental problems warrant a more in-depth discussion, as does the wisdom of extending West German labor legislation (and other aspects of the regulatory environment) to East Germany. All these have been obstacles to employment creation and to the promotion of behavioral changes in the East. Administrative weaknesses have been reported that undoubtedly have slowed down infrastructural programs. These factors together cannot but have failed to encourage private investment.

An analysis that stresses key institutional shortcomings and that deepens the scrutiny of the Treuhandanstalt would help to focus attention on the role and responsibility of economic policy. Instead, the paper treats the prevailing economic distortions as exogenous to policy. As a result, important questions are overlooked or left out, such as whether it is possible to make behavior conform to the market without permanently severing the ties with the previous system of central planning, or whether a market setting can be created when (no matter how understandable the reasons) the Treuhandanstalt blocks market signals, or

whether an efficient financial intermediation system can be established with banks lending under government guarantee.

I will now turn to a number of specific subjects in the paper. The section on the price-cost squeeze contains an impressive examination of the cost structure of East German firms. It also provides a vivid and revealing image of an economy woefully unprepared to confront the threat of competition. But caution must be exercised in the interpretation of the data; a few examples will suffice. The paper is certainly right in asserting that preunification domestic prices in East Germany provide no basis for establishing the value of output. But the statement that prices obtained for exports give "a good measure of the viability of East German firms under free trade" may go too far. To begin with, those firms had export targets, the achievement of which most likely required some reliance on "dumping." Similarly, the reliability of reported cost data may well be suspect since profits were largely appropriated by the government. Care should also be taken, I think, to avoid overstressing the degree of initial weakness of East German industry. I agree that firms were vulnerable and that their vulnerability has probably increased since unification; there can hardly be any doubt of their disadvantaged position at the outset of the process. But, whatever the starting point, it was a feature of the initial state of affairs and attention must be directed instead to the policy-induced worsening of the economic situation of East Germany.

Caveats also apply to the discussion of consumption, investment, and the multiplier. Real aggregate consumption has been maintained, if not actually increased, through substantial income transfers from West Germany. In addition, the data presented on private investment prospects for this year may well exaggerate the weakness in investment plans. Moreover, on the basis of current plans, public sector investment (including railways and telecommunications) may be close to the upper end (DM 55 billion) of the range mentioned in the paper. In any event, taking account of the decline in investment-good prices, real investment may now exceed its preunification level. Here again, this is not to say that the evolution of private investment so far has not been disappointing. It has, but the uncertainty over property rights and environmental problems combined with the cost, in terms of new production, of a possibly unsustainable concern for employment maintenance must have had a bearing on this front. The multiplier analysis, in turn, seems to

overstress the output effects and understress the budget impact of government spending. Possibly, too much is made of scenarios that stress low import content or of the share of profits that accrues to publicly owned firms. Nevertheless, as I pointed out earlier, the case for public investment in infrastructure is strong on efficiency grounds.

The paper contains a most lucid discussion of the possible reasons for the rapid wage growth that has taken place in East Germany since unification. All of them—fairness of wage parity, labor union pressure, compensation for higher deductions, the search for a high base for unemployment benefits, and the absence of effective resistance to union wage demands—are eminently plausible. But they are not complete. A fundamental force behind wage behavior—which is barely, if at all, touched upon in this paper—surely has been the Treuhandanstalt's unwillingness to countenance high open unemployment and to close down plants (though, as already noted, this attitude is understandable). This has created a fertile environment for large wage demands, an environment that, as the paper makes abundantly clear, East Germany can ill afford. Incidentally, the argument that bargaining centers on wage increases seems to be in conflict with the general thrust of the paper, which underscores the importance of wage level differentials. In this context, let me leave no doubt that, in my opinion, the argument that points to the relatively limited importance of the one-to-one conversion rate on the grounds of the pronounced rise in wages in East Germany after currency union is valid.

Possibly the subject where I depart most from the paper's analysis is with regard to the Treuhandanstalt. I have no doubt that its mandate is nothing short of daunting. But the assertion that the ''Trust is acting in the country's best interest by promoting employment as an objective'' not only stretches the mandate too far, but is open to question as a general proposition. No wonder the authors are compelled to follow up with an acknowledgment that on ''this basis, though, the firms are very hard to sell.'' Has it really been in the interest of East Germany that the pace of plant closures has been so slow, given that a large share of industry is hopelessly unviable? Do not misunderstand: I do not advocate unemployment; but reform is not helped by preserving employment in unsalvageable firms. Rather than operating in the best interests of East Germany, the Treuhandanstalt has helped to encourage high wage claims, thus frustrating market signals and impeding the restructuring of firms in its portfolio.

Much of the paper's case depends on East German wages being too high to clear the market. If the authors' survey of East German labor is to be believed, this imbalance has not been caused by linkage with the West German labor market. At the risk of appearing callous, let me venture to argue that perhaps the threat of unemployment should be one of the instruments used to keep excessive wage claims under control. Such a threat, accompanied by the certainty of the availability of appropriate unemployment benefits, might provide a more efficient solution to the labor market imbalance.

These considerations lead directly into the paper's proposal for a self-eliminating flexible employment bonus (SEFEB), which, as I said at the outset, has obvious merits. Its net financial cost will be limited because of the consequent savings on unemployment compensation as well as the taxes and contributions made by and on account of the otherwise unemployed. Society will gain when idle labor can be used productively. And, although all employed labor would benefit from the bonus, this will not impair firms in the Treuhandanstalt portfolio because their value will correspondingly rise. Indeed, if wages do not increase on account of the bonus, the government may in fact make a net gain out of the scheme.

But let us examine the case closely. If the bonus is to be paid to firms across all sectors and not just to those in industry (so as to avoid distortions in labor allocation), the budgetary cost of the scheme would be higher than the paper suggests. Furthermore, the cost of the bonus will in any event increase because unemployment benefits decline after the first year while SEFEBs continue until the establishment of wage parity. Moreover, there is no reason to presume that those employed because of the subsidy would have remained unemployed in its absence. Finally, as the paper acknowledges, there is a real possibility that the introduction of the bonus will lead unions to press for even higher wages, thereby endangering the financial viability of the scheme. The importance of the cautionary notes made explicit in the paper with regard to the SEFEB scheme and its calculations must be stressed.

A most appealing feature of the SEFEB plan is its self-liquidating nature, but subsidies will only fully disappear after (or if) wages reach parity. Yet the paper does not make clear how the scheme will affect the incentives to narrow the productivity gap between East and West, let alone how long it would take for the gap to be closed. It would have been desirable for the paper to discuss further certain critical aspects of SEFEBs: How will they affect intersectoral labor mobility? Will they

only serve to prolong the demise of decaying industries? How fast would unemployed labor be gainfully occupied without SEFEBs?

In a real sense, the wage subsidy scheme resembles attempts made to reform central planning partially, that is, without fundamentally changing the regime. Instead of focusing on the need to revamp the industrial sector, a need increasingly perceived as essential to the process of reform, the SEFEB plan may only serve to perpetuate it. Is it reasonable to expect the development of entrepreneurial spirit, so critical for the transition to the market, to occur in such an environment?

Then, there are a number of practical considerations worth noting. The temporariness of subsidy schemes is typically easier to assert than to ensure. Moreover, the complexity of such schemes is often underestimated: a clear illustration is provided in the paper's acknowledgment that the effects of SEFEBs on border areas between East and West Germany may call for the reinstatement of the special border subsidies prevailing before unification (thus paradoxically converting old "costs of division" into new "costs of unification"). All these considerations aside, is it logical to start a journey to the market system by introducing subsidies that are likely to endure for long? Have employment subsidies ever worked? Last, will West German voters countenance subsidizing East German wages for a protracted period?

In sum, attractive though the SEFEB plan appears, it is doubtful that it will function as the paper describes. Not only will its cost rise over time, but it will most likely create distortions that impede the process of "creative destruction" required for reform to succeed.

General Discussion

Christopher Sims reasoned that in order to determine the appropriate policies, it is necessary first to decide if unification will lead to a brief transition in which the East adjusts its employment and production according to comparative advantage or whether it will lead to a long transition during which a large number of workers will move west while infrastructure, capital, and environmental investment gradually transform East Germany. If the new equilibrium is one in which a lot of people have to move and reservation wages are high, it may take high unemployment to achieve the needed reallocation. Thus it could be that the unions are not such villains and that the equilibrium wage is roughly

where the wage is now. In this case, the correct policy may be to subsidize mobility rather than to subsidize wages.

Although he agreed that the unions go too far when they press for equality between Eastern and Western wages, Edmund Phelps observed that wages in East Germany would have risen even without union intervention, although perhaps not as much. Personnel managers in the East would raise wages to keep from losing workers to the West. He compared the situation to that in the south of Italy, where, he maintained, the unemployment rate has been kept high because of wage pressure from the North. Andrew Rose responded that Eastern firms have had very few problems with workers quitting, and there was no survey evidence supporting the idea that East Germans felt it was unfair for them to be paid less than workers in the West. Gary Burtless questioned the authors' discussion of the effects of the subsidy on union bargaining. While the subsidy makes the demand for Eastern labor more elastic, the unions have a Western worker as a median voter. Thus, depending on how the unions take into account the welfare of an Eastern worker, the increased elasticity may not have much effect on their bargaining.

Sims was also concerned that the border problem, whereby a large wage subsidy induces firms near the border to jump to the East, may be bigger than the authors acknowledge. William Nordhaus discussed a number of other potential difficulties with the policy proposals. A subsidy scheme could slow the introduction of market attitudes in the East. Furthermore, subsidies may not be fully capitalized, making the program more expensive than estimated. The policy is not robust to mistakes by policymakers. For example, if the government found the proposed phaseout of subsidies too complicated and instead chose a fixed percentage subsidy, it would undermine the whole scheme. And, unlike a tax credit, the policy would be susceptible to bogus employment schemes because it violates a principle of public finance to "never give a net subsidy." Charles Schultze suggested the scheme include a supermajority clause to reduce the temptation to keep the subsidy rather than forcing it to phase out.

There was a broad discussion of whether a wage subsidy would slow the needed transition by preserving existing inefficient firms. Robert Lawrence noted that the goods-producing sector of the economy was much too large, so that many people are going to have to leave the firms where they are currently employed. He suggested that more considera-

tion be given to the trade-off between maintaining employment and getting to the creative destruction. Referring to the British experience with state enterprises, William Brainard reasoned that overmanning in East German concerns was likely to have cut labor productivity to half of what efficient manning would produce. Combined with the apparent overproduction of the goods sector, this made it unclear whether, even with the subsidy, employment in this sector could expand at all once firms became efficient. Nordhaus noted that by focusing only on the short-run costs of production, the analysis of subsidies does not get at the questions of encouraging investment and technology transfers within Germany and could even impede them by keeping inefficient firms alive.

Rudiger Dornbusch found it misleading to treat the state enterprises as having any value worth saving. He noted that in the Mexican experience two out of three state enterprises were closed and argued that similar closures had to occur in East Germany. Dornbusch also cited a recent survey in which only one in eight East German firms complained of unreasonably high labor costs. He suggested that the wage situation may be radically different across firms, with the authors' sample of the *Kombinate* representing the extremely inefficient firms that should be destroyed. The problems of most firms in the East may be due more to low demand than to high wages.

Some panelists reasoned that the subsidy scheme would speed the transition to the market. Schultze believed that it would promote investment by Western firms that would otherwise be inhibited by excessively high wages. He pointed out that it is better to provide incentives for Western management to come in and promote efficiency than to count on high unemployment to push down wages. Burtless agreed that the subsidy would not discourage innovation and investment in the East, because it would go to new firms as well as old. George Akerlof reiterated that a subsidy would speed up the transition by making it possible to sell existing firms to private sector investors.

Nordhaus calculated that the paper implied that central planning in Germany had been even more disastrous economically than previously thought. Whereas most calculations before unification placed East German per capita income between 60 and 90 percent of the West German level, the authors' results suggest a figure of about 12.5 percent. Assuming the two Germanys had roughly equal incomes at the introduction of socialism, this implied a negative 6 percent annual growth rate in

the East compounded over 40 years relative to West Germany. While he found this number hard to believe, and reasoned that the short-run observations may be misleading because of pent-up demand for Western goods, he did believe the authors' data showed that previous estimates overstated real incomes in the East rather drastically.

Nordhaus also noted that the present difficulties of the Treuhandanstalt demonstrated the importance of rapid privatization and cautioned against interpreting the German experience as demonstrating that "big-bang" as opposed to "step-by-step" policies will not work. He felt the correct analogy was more akin to Britain's return to gold at the wrong exchange rate in the 1920s. Lawrence Katz noted two historical experiences that had relevance for the situation in Germany. Prior to the late 1960s, Puerto Rico enjoyed free migration between it and the United States. There were huge income and wage differences, but unemployment was low and Puerto Rico was thought to be converging toward the United States. Once the U.S. minimum wage was extended to Puerto Rico and food stamps were distributed at U.S. levels, unemployment rose in Puerto Rico and has remained at extremely high levels for the last 20 years. This suggests that imposing high wages and benefits with no wage subsidy can lead to very persistent, poor labor market performance. The second experience demonstrates that employment bonuses can pay for themselves. In Illinois and Washington, the Reemployment Bonus Experiment provided subsidies to firms and bonuses to workers for taking jobs if the worker got off the unemployment insurance rolls. In at least some of these programs, the government did end up saving money.

Robert Barro applied the results of his paper with Xavier Sala-i-Martin (*BPEA*, this issue) to the prospects for income and migration in East Germany. Assuming initial per capita income in the West is twice that in the East and using a convergence coefficient of 2 percent a year, he calculated that per capita income in the East should grow by 1.4 percent a year faster than in the West. At this rate, half the income gap would be closed in 35 years, implying that any program that sought wage parity in less than 50 years was doomed to fail. Assuming capital income is also twice as high in the West, his migration estimates imply that 1.4 percent of the East German population, or a quarter of a million people, would have moved west in the first year after the border was opened, which is the same order of magnitude as the reported migration rate.

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