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## Germany—Selected Issues

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GERMANY

**Selected Issues**

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Approved by European I Department

August 8, 1997

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Germany: Basic Data

APPENDIX I

Area and population

Total area	357,041 square kilometers
Total population (1996)	82.3 million
GDP per capita (US dollar)	30.1 thousand

<u>Germany</u>	1993	1994	1995	1996
<u>(Percentage changes at 1991 prices)</u>				
<u>Demand and supply</u>				
Private consumption	0.3	1.0	1.8	1.3
Public consumption	-0.0	1.3	2.0	2.4
Gross fixed investment	-5.6	4.2	1.5	-0.8
Construction	0.9	7.7	1.2	-2.7
Machinery and equipment	-14.1	-1.2	2.0	2.4
Inventory accumulation <u>1/</u>	-0.2	1.0	0.3	-0.3
Total domestic demand	-1.3	2.8	2.1	0.8
Exports of goods and nonfactor services	-4.9	8.0	5.9	4.9
Imports of goods and nonfactor services	-5.7	7.6	6.4	2.6
Foreign balance <u>1/</u>	0.2	0.1	-0.1	0.6
GDP	-1.1	2.9	1.9	1.4
Western	-1.9	2.2	1.6	1.3
Eastern	8.9	9.9	5.3	2.0
<u>(In millions)</u>				
<u>Employment and unemployment</u>				
Labor force	38.6	38.7	38.5	38.5
Employment	35.2	35.0	34.9	34.6
Unemployed	3.4	3.7	3.6	4.0
In percent of labor force	8.9	9.6	9.4	10.3
Western	7.4	8.2	8.3	9.1
Eastern	15.1	15.1	14.1	16.5
<u>(Percentage change)</u>				
<u>Prices and incomes</u>				
GDP deflator	3.9	2.2	2.2	1.0
Consumer price index	4.5	2.7	1.8	1.5
Western	3.6	2.6	1.8	1.4
Eastern	10.5	3.6	2.1	2.3
Average hourly earnings (industry)	6.6	1.8	4.2	4.5
Unit labor costs (total economy)	3.6	-0.1	1.3	-0.0
Real disposable income <u>2/</u>	-0.5	0.4	1.7	1.4
Personal saving ratio (In percent)	12.2	11.7	11.6	11.6

1/ Change as percent of previous year's GDP.

2/ Deflated by the national accounts deflator for private consumption.

Germany: Basic Data (concluded)

APPENDIX I

<u>Germany</u>	1993	1994	1995	1996
<u>(In billions of deutsche marks)</u>				
<u>Public finances</u> <sup>1/</sup>				
General government				
Expenditure	1,599	1,662	1,751	1,770
Revenue	1,489	1,582	1,628	1,644
Financial balance	-110	-81	-123	-126
(In percent of GDP)	-3.5	-2.4	-3.5	-3.6
Deficit of the territorial authorities	-138	-116	-111	-120
(In percent of GDP)	-4.4	-3.5	-3.2	-3.4
Borrowing requirement of the Treuhand	38.0	37.0	--	--
Federal government				
Financial balance	-67	-51	-51	-79
(In percent of GDP)	-2.1	-1.5	-1.5	-2.2
General government debt	1,522	1,675	2,008	2,149
(In percent of GDP)	48.2	50.4	58.1	60.7
<u>Balance of payments</u>				
Trade balance (f.o.b./f.o.b.) <sup>2/</sup>	65.7	81.4	105.0	123.8
Services balance	-52.1	-62.9	-69.8	-70.2
Net private transfers	-42.8	-46.4	-42.1	-37.8
Net official transfers	-42.8	-46.4	-42.1	-37.8
Current account	-22.4	-31.9	-30.1	-26.5
(In percent of GDP)	-0.7	-1.0	-0.9	-0.7
Foreign exchange reserves (e.o.p)	120.1	113.6	121.3	119.5
<u>(Percentage changes in annual averages)</u>				
<u>Monetary data</u>				
Money and quasi-money (M3)	8.2	8.5	0.1	7.3
Domestic bank lending	9.8	9.5	7.3	7.8
Of which lending to:				
Public authorities	18.6	10.9	15.7	10.7
Private nonbanks	7.5	9.1	4.9	7.0
<u>(Period averages in percent)</u>				
<u>Interest rates</u>				
Three-month interbank rate	7.2	5.3	4.5	3.3
Yield on ten-year government bonds	6.5	6.8	6.8	6.2
<u>(Levels)</u>				
<u>Exchange rates</u>				
DM per US\$ (end of period)	1.73	1.55	1.43	1.55
DM per US\$ (annual average)	1.65	1.62	1.43	1.50
Nominal effective rate (1990=100)	106.2	106.4	112.2	108.7
Real effective rate (ULC) (1990=100)	109.3	111.9	120.9	119.4

<sup>1/</sup> Data for the federal government and the territorial authorities are on an administrative basis. Data for the general government are on a national accounts basis. In recent years, a persistent difference between the general government deficit on a national accounts and on an administrative basis has mainly reflected sizable net lending to support reconstruction in eastern Germany. Debt data are end-of-year data for the territorial authorities, including the German Unity Fund and eastern Germany from 1990.

<sup>2/</sup> Including supplementary trade items.

## INTRODUCTION

1. Economic recoveries in Germany have become less robust in the postwar period, owing to structural rigidities. The effect of these rigidities has been slower real growth and higher rates of unemployment.<sup>1</sup> In the 1990s, a phenomenon of “jobless” growth has emerged that has yielded record unemployment rates in 1996-97. From 1991 to mid-1997, the cumulative employment decline in Germany was about 6 percent even though output expanded by about 8½ percent. Relatively high labor costs in Germany—due to both high wages and the tax wedge (i.e., income taxes and contribution rates)—coupled with strong trade unions that largely shifted these costs to producers, have caused real growth to become less employment intensive.<sup>2</sup>

2. The very high tax and contribution rates have not only reduced real growth but they have also worsened fiscal performance and thereby jeopardized the achievement of the Government’s fiscal objectives. In particular, the resulting high level of unemployment has increased public spending on unemployment benefits and eroded general government revenues by weakening wage income growth. The following chapters examine the economic and policy implications of these structural problems.

3. Labor market rigidities, including the wage and price setting process, are at the root of Germany’s most pressing problem—the high level of unemployment. Empirical work reported in **Chapter I** shows that in Germany, negative demand shocks increase the unemployment rate by more than the decrease in the unemployment rate caused by a comparable-sized positive demand shock; this phenomenon is attributed to the operation of an asymmetric wage-price mechanism (or convex Phillips curve). Over the business cycle, the average rate of unemployment would be higher in the presence of these asymmetries. Based on international comparisons, Germany has the highest degree of asymmetry and also had the largest increase in the structural rate of unemployment over the past quarter century. These asymmetries also hamper the economy’s ability to respond flexibly to shocks and thus increase the burden on stabilization policies. Moreover, the relatively unfavorable wage-price tradeoff in Germany implies that demand shocks common to all ERM/EMU participants would have more adverse unemployment consequences for Germany than for its partner countries.

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<sup>1</sup>Econometric evidence for a negative correlation between the degree of labor and product market regulation and average real growth rates has been reported by K. Koedijk and J. Kremers, “Market Opening, Regulation, and Growth in Europe,” *Economic Policy*, (October 1996). The regulatory regime in Germany was classified among the highest in Europe.

<sup>2</sup>F. Daveri and G. Tabellini (“Unemployment, Growth and Taxation in Industrial Countries”, draft for IMF seminar, May 1997) find empirical support for the proposition that increased unemployment and slower growth stem from a common cause: excessively high labor costs.



4. The contribution of labor costs to explaining the high level of unemployment, particularly since unification, is studied in **Chapter II**. Empirical estimates are obtained for the wage gap—the deviation of actual labor costs from warranted labor costs based on estimated production functions assuming competitive factor markets and full employment. Since unification, the “wage gap” for unified Germany is estimated to have risen to about 20 percent. Although the wage gap in the new Länder is very large, a wage gap in the old Länder of about 10 percent in 1994 also existed. A positive correlation was also detected between the rate of unemployment and the estimated wage gap, the output gap was negatively correlated with the unemployment rate. Based on these findings, closing the wage gap would reduce the unemployment rate by approximately 6½ percentage points; closing the output gap would decrease the unemployment rate by about 1¼ percentage points. These findings point to the critical importance of wage moderation and growth-oriented policies for reducing the high level of unemployment.

5. **Chapter III** examines the convergence process in the new Länder and the structural problems that have slowed that process almost to a standstill in recent years. The principal problem has been the rapid convergence of nominal wages in the east to the level in the west—driven mainly by social concerns and pressure from trade unions rather than by productivity gains. Consequently, unit labor costs in the east have been at least one third higher than those in the west during 1994-96. The resultant squeeze on profits of firms in the eastern Länder has constituted the major obstacle to self-sustaining growth and has tended to increase labor retrenchment to boost productivity. The registered unemployment rate in the new Länder was above 17 percent in mid-1997 with underemployment reaching close to 25 percent. Spending exceeded production in the new Länder—effectively a current account deficit—by more than 50 percent of eastern Germany’s GDP during 1994-96 and this deficit was financed mainly by official transfers. Simulations suggest that based on the pace experienced during 1991-96, output convergence would require at least an additional 20 years. Improving labor market flexibility and slowing the convergence of nominal wages would help foster self-sustained growth financed by the private sector and would avoid a protracted *mezzogiorno* problem.

6. The structural problems underlying the poor economic performance identified in the three previous chapters can be alleviated, inter alia, through tax policy and the reduction of pension contributions rates.<sup>3</sup> **Chapter IV** examines the weaknesses in the German income tax code. By international standards, the tax burden on labor income in Germany is high and effective capital and corporate income tax rates are low, adding to the incentives to adopt labor-saving production processes. A myriad of exemptions and allowances (particularly in the post-unification period) has made the tax code less transparent and less equitable, eroded tax yields, and complicated the conduct of fiscal policy by making revenue projections less

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<sup>3</sup>For an overview of the theoretical and empirical linkages between taxation and growth of output and employment see “Taxation and Economic Performance” by W. Leibfritz, J. Thornton, and A. Bibbee, *OECD Economics Department Working Paper No. 176*.

reliable. The Government's proposed income tax reform—which would lower marginal tax rates for personal and corporate income and scale back allowances and exemptions to broaden the tax base—is described in detail and its implications analyzed. Overall, this proposal represents a step in the right direction.

7. A pension reform has also been put forward by the Government to slow the increase in pension contribution rates (largely by reducing benefits) and thereby enhance the cost competitiveness of German labor. The proposed piecemeal measures, which were designed within the framework of the existing PAYG system, are studied in **Chapter V** along with more systemic approaches to reform—including a shift of more of the pension provision to privately-funded occupational pension plans and the partial prefunding of the PAYG system. This chapter concludes that a pension reform strategy solely based on piecemeal adjustments to the PAYG system subjects pensioners and contributors to considerable long-run risks related to the rapidly ageing population. A prudent strategy would continue with piecemeal changes to the PAYG and would also move toward partial prefunding and enhance the role of private pension systems. This strategy would reduce distortions affecting the labor market and savings, and contribute to a deepening of financial markets, particularly the equity segment, in Germany.

## I. LABOR MARKET ASYMMETRIES AND MACROECONOMIC ADJUSTMENT <sup>1</sup>

### A. Introduction and Overview

8. Stubbornly high and rising unemployment remains Germany's chief economic problem and reversing this trend poses a considerable challenge to policymakers. In the broader context of European unemployment, much attention has been focused on institutional and structural rigidities of labor markets that may have hindered their functioning. In particular, the structure of unemployment benefits along with aspects of the wage determination process have been studied repeatedly in search of explanations for Europe's persistent unemployment problems. Also at issue is the extent to which unemployment reflects structural factors or stems from cyclical considerations and insufficient demand. In the context of traditional natural rate models of the labor market, unemployment is delineated into cyclical and structural components; in hysteresis models, these lines become increasingly blurred. In turn, different unemployment theories have produced a range of policy recommendations.<sup>2</sup>

9. This paper revisits many of these issues from the perspective of the wage-price mechanism—the linkage between wages, prices and economic activity. This reduced-form relationship can, in principle, encompass the implications of a variety of unemployment theories and allow for broad comparisons across countries with very different institutional features. This framework highlights the costs that economic rigidities in labor (and product) markets can have for their functioning and for overall macroeconomic adjustment. In particular, in the presence of various labor and product market rigidities, the wage-price mechanism may display important *asymmetries* in the unemployment-inflation process. If, for example, labor markets are characterized by significant downward rigidities in nominal and real wages, negative impulses would reduce employment to a greater extent than equivalent positive impulses would raise employment. Thus, the short-run Phillips curve would display a degree of convexity, reflecting this asymmetrical response.

10. Asymmetries in the unemployment-inflation relationship have several important economic implications. A central implication is that economic recoveries fail to generate sufficient employment gains over the cycle to offset the rise in unemployment suffered in economic downturns. As a result, economies tend to operate, on average, at a level of unemployment (economic activity) above (below) the level which would obtain in the absence of these asymmetries. Conceptually, unemployment in this framework can be classified into three broad components: (1) long-run structural unemployment—representing the equilibrium

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<sup>1</sup>Prepared by Hamid Faruquee.

<sup>2</sup>See Dennis Snower, 1995, "Evaluating Unemployment Policies: What Do the Underlying Theories Tell Us?" *Staff Studies for the World Economic Outlook*, IMF for an evaluation of unemployment policies under alternative theories.

which would obtain in the absence of any business cycles; (2) the gap between structural and average unemployment—resulting from asymmetric adjustment over the business cycle; and (3) the difference between observed and average unemployment, reflecting the prevailing stage of the business cycle. Average unemployment (i.e., averaged over the business cycle) associated with stable inflation over the longer run is often referred to as the “natural rate” or non-accelerating inflationary rate of unemployment (NAIRU). In traditional (symmetric) natural rate models with a linear Phillips curve, this long-run equilibrium rate is identical to the structural rate of unemployment, leaving two (rather than three) components of unemployment: cyclical and structural.

11. In the asymmetric model, the third component measured by the difference between the natural and structural rates of unemployment depends on the magnitude and frequency of shocks and the extent of the rigidities which underlie the fundamental asymmetries. Episodes of higher economic variability would tend to increase the natural rate of unemployment and this gap. Correspondingly, effective stabilization policies which lessen the impact of economic shocks can durably reduce (average) unemployment. By allowing business cycles to affect unemployment persistently, this framework combines aspects of both natural rate and hysteresis models. However, whereas the *level* of the economic activity over the business cycle usually affects longer-term unemployment in hysteresis models, its *variability* affects the natural rate of unemployment in the current context.

12. In the case of Germany, the empirical findings suggest that the unemployment-inflation trade off is characterized by asymmetries and significant upward drift in both the natural and structural rates of unemployment. In terms of cross-country comparisons (G-7 countries plus Denmark, the Netherlands, Ireland, Spain, and Sweden), Germany is grouped with countries (e.g., France, Spain, and Denmark) with the highest degree of asymmetry in the wage-price mechanism. It is also found to have had the largest increase in its structural rate of unemployment over the past twenty years. These findings are consistent with other studies that indicate that Germany has considerable structural rigidities in labor markets stemming from the wage bargaining process, labor market regulations, and social programs.

13. In terms of policy implications, the advent of European monetary union (EMU) presents several challenges for Germany. Under the Exchange Rate Mechanism (ERM), Germany occupies a unique role as the anchor currency and, with it, has the flexibility to conduct a monetary policy focused on domestic objectives. This policy flexibility has enabled the authorities to mitigate through their efforts the effects of relatively rigid and asymmetric labor markets, which provide strong incentives to pursue effective stabilization policies. With monetary union, this policy asymmetry vanishes under a common monetary policy, limiting the Bundesbank's ability to address *Germany-specific* shocks and their effects. Consequently, in the absence of further structural reforms, the change in monetary regime could raise average unemployment rates in Germany relative to other countries that might participate in EMU, who have already largely relinquished independent monetary policies. Indeed, this regime change with a greater focus on area-wide conditions may improve average unemployment

rates for other prospective EMU participants compared with the monetary policy regime under ERM.

14. Comparing the wage-price mechanism across countries, Germany also appears somewhat less flexible, in terms of labor market adjustment, than several other European countries (and even more so when compared with Canada, Japan, and the United States). Assuming that these existing differences in the Phillips curve continue, *common* macroeconomic shocks in the future could give rise to uneven outcomes among prospective EMU participants (or existing ERM participants). In particular, without the aid of greater flexibility in prices and wages, the high degree of asymmetrical adjustment to macroeconomic shocks in Germany could lead to relatively adverse unemployment consequences compared with some of its European partners. Moreover, larger structural increases in German unemployment than elsewhere (based on past trends) could further lead to difficult policy dilemmas under EMU (or existing ERM arrangements) in the absence of further structural reforms. Thus, the need for prompt action to increase labor market flexibility is highlighted.

15. This chapter is organized as follows: section B briefly reviews explanations for longer-term developments in German unemployment to motivate the issue of rigidities and asymmetry in the wage-price mechanism; section C outlines the underlying framework and its implications (an illustrative model is relegated to the appendix); section D provides the basic empirical results; finally, several policy implications of labor market asymmetries in Germany are further explored using MULTIMOD simulations in section E.

## **B. Unemployment Developments and Alternative Explanations**

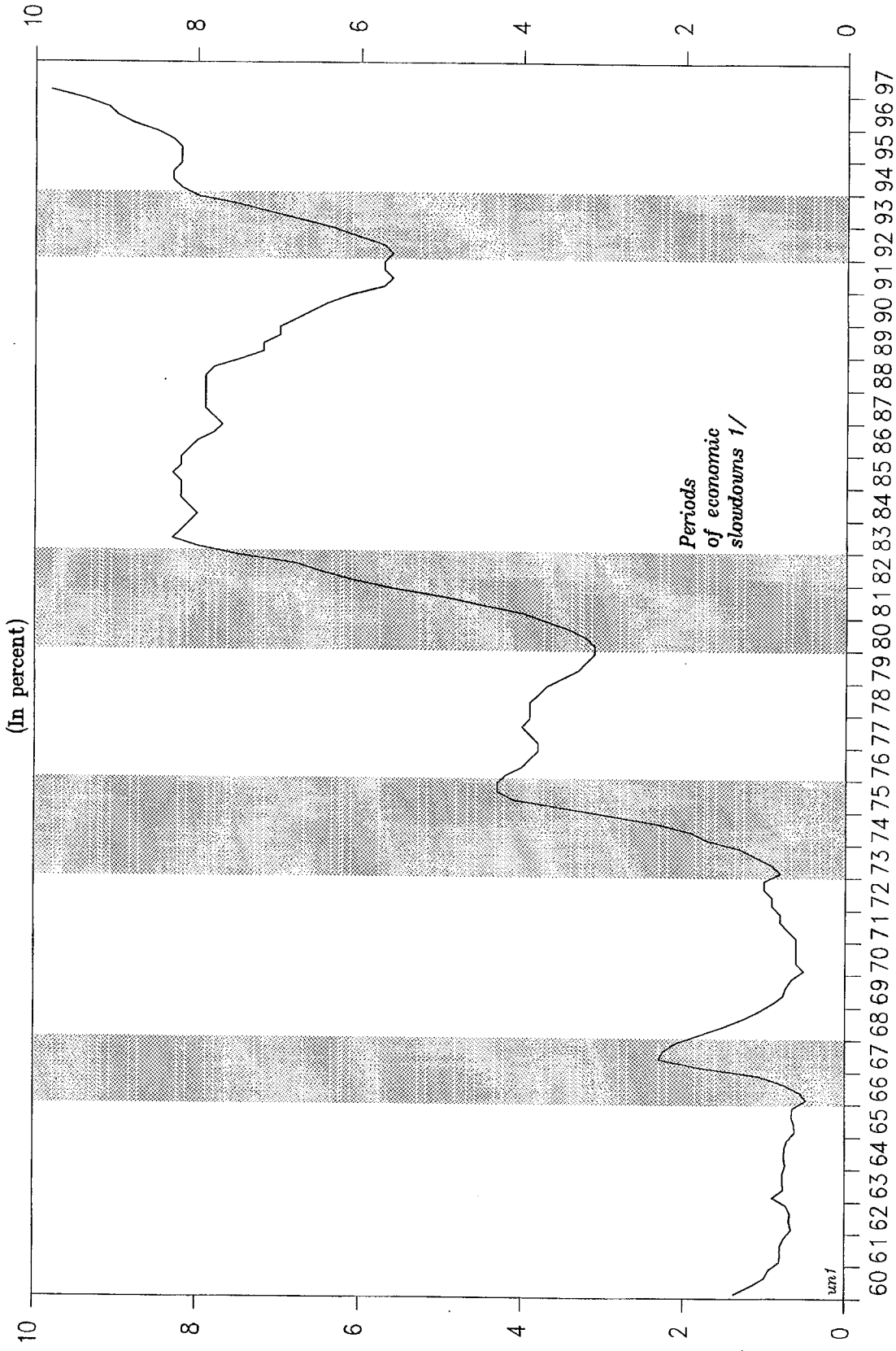
16. Before turning to the analytical framework, it is useful to review prominent developments in German unemployment as well as alternative explanations that have been advanced. Perhaps the most notable aspect of unemployment behavior in Germany has been the sustained or trend increase in the rate of unemployment over the past thirty years. The unemployment rate has risen from ½ percent in the mid-1960s to 9½ percent in 1996 (in west Germany).<sup>3</sup> Although the unemployment rate has oscillated from year to year, since the 1960s each major economic downturn and subsequent recovery, or supply side shock—such as the oil price hikes of the 1970s and German unification in the early 1990s, has left the unemployment rate at a higher level than previously (Chart I-1). Thus, the unemployment rate has been steadily ratcheted up.

17. In general, there are several alternative approaches to studying the “equilibrium” (noncyclical) unemployment rate, relying on natural rate, persistence, or hysteresis explanations. These approaches have certain common features. Noncyclical unemployment,

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<sup>3</sup>The unemployment rate for unified Germany stood at around 10½ percent in 1996, owing to the very high unemployment rate in the new Länder. To maintain a comparable time series, only unemployment in west Germany is considered.

Chart I-1. West Germany: Unemployment Rate



Source: Deutsche Bundesbank, Monthly Report.

1/As defined by Bundesbank.

for example, can be the result of job search, market failures, including regulations (e.g., minimum wage, restrictive labor laws) and unionization, and repeated shocks coupled with a slow adjustment speed to equilibrium. One major difference between traditional natural rate models and persistence/hysteresis models is that in the former, the equilibrium is independent of history but dependent on other economic and policy variables, while in the latter class of models, the unemployment equilibrium is also history or path dependent.<sup>4</sup>

18. Traditional natural rate models build on the framework of a linear Phillips curve and rely on real or structural factors to explain trend developments in the noncyclical unemployment rate. In the presence of adverse supply shocks and structural changes, the equilibrium rate of unemployment would increase over time and the adjustment period to shocks could lengthen. In SM/96/227, the staff estimated simultaneous price and wage equations to identify an expectations-augmented Phillips curve. An “equilibrium” unemployment or NAIRU for west Germany stood around 7¼ percent since unification compared with an annual average unemployment rate of 8¼ percent in 1995—the last year of the estimation period. This estimate—although not very precise with a standard error of nearly 1½ percentage points—is not dissimilar from results obtained by other researchers.

19. The hysteresis approach can accommodate the persistent or ratcheting behavior of the unemployment rate more easily than natural rate models.<sup>5</sup> Such models usually rely on insider-outsider effects or human capital depreciation to explain why the burgeoning unemployed are not easily reabsorbed into the workforce.<sup>6</sup> The implication is that the NAIRU depends on the adjustment path and is thus affected by transitory disturbances in addition to the factors determining long-run equilibrium.<sup>7</sup> An implication of standard hysteresis models is that the

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<sup>4</sup>A more lengthy description of these models and associated empirical evidence can be found in SM/96/227.

<sup>5</sup>The dynamic properties of labor markets as a source of the European unemployment problem is examined in S.G.B. Henry, and Dennis J. Snower, eds., 1996, *Economic Policies and Unemployment Dynamics in Europe* (Washington: International Monetary Fund).

<sup>6</sup>The staff examined German labor markets from this perspective in 1995 (SM/95/202; 8/16/95).

<sup>7</sup>In a pair of studies, Ansgar Belke, 1996, “Testing for Unit Roots in West German and U.S. Unemployment Rates: Do ‘Great Crashes’ Cause Trend Breaks?” *Konjunkturpolitik*, Vol. 42, and A. Belke and Münster Göcke, 1996 “Cointegration and Structural Breaks in German Unemployment: An Error-Correction Interpretation” *Jahrbücher f. Nationalökonomie u. Statistik*, Vol. 216, attribute persistence in the unemployment rate to structural breaks caused by oil shocks and unification, rather than a degenerative adjustment process (i.e., hysteresis). Their findings point toward a stable long-run unemployment trend or relationship once

(continued...)

unemployment rates could just as easily ratchet downward as upward under appropriate conditions. For example, a prolonged economic expansion that steadily reduced unemployment would over time lower the “equilibrium” unemployment rate. However, while examples of countries getting stuck in high unemployment equilibria are not uncommon, examples of countries moving hysteretically into low unemployment equilibria are scarce.<sup>8</sup>

20. In this connection, the importance of asymmetrical responses in explaining developments in unemployment and inflation has recently had a resurgence of interest.<sup>9</sup> Specifically, where excess supply impulses generate larger output and employment losses than the counterpart gains associated with excess demand impulses, the wage-price mechanism exhibits asymmetrical behavior. Correspondingly, the Phillips curve would be convex rather than linear. The implication of the asymmetric model is that economic expansions fail to generate sufficient employment gains over the cycle to offset the losses incurred during comparable downturns, leaving average unemployment higher. Hence, a combination of more economic noise (variability) and asymmetries in the wage-price mechanism can raise the average or natural unemployment rate even if the structural rate was unchanged.

21. Thus, the asymmetric model exhibits features of both natural rate and hysteresis models. Like hysteresis models, the (average) unemployment rate is time dependent, and the history of past shocks is reflected in the current unemployment rate. However, it is the *variability*—rather than the *level*—of economic activity as a result of those shocks that durably affects the longer-run unemployment rate. For a fixed distribution of shocks, the asymmetric model predicts a stable long-run natural rate at a fixed deviation from a given structural rate of unemployment. Of course, the structural unemployment rate can also change over time, representing a shift in the Phillips curve, under the influence of structural and institutional factors as suggested by traditional (symmetric) natural rate models.

22. The economic foundations for asymmetries in the wage-price mechanism derive from underlying rigidities in labor and product markets. In his original formulation, Phillips<sup>10</sup> argued for a non-linear relationship between wage adjustment and unemployment, largely reflecting

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<sup>7</sup>(...continued)

structural shifts are accounted for in the case of west Germany.

<sup>8</sup>Some have argued that the United States in its current expansion represents a possible case where there has been downward drift in the natural rate of unemployment.

<sup>9</sup>For a general description and associated literature see Peter Clark and Douglas Laxton, 1997, “Phillips Curves, Phillips Lines and the Unemployment Costs of Overheating,” IMF Working Paper, WP/97/17 (February).

<sup>10</sup>A.W. Phillips, 1958, “The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957,” *Economica*, Vol. 25.



asymmetric wage demands and bargaining.<sup>11</sup> Other explanations for asymmetries in the wage determination process have turned to segmented labor markets and efficiency wages which place an effective floor on real wage adjustments. At the microeconomic level, features of goods markets and the behavior of firms could generate asymmetries in price adjustment as well. For example, production lags and a floor on inventories suggest that firms with market power may adjust prices upward more quickly as economic conditions change.<sup>12</sup>

23. In the case of Germany, several prominent institutional features of labor markets are worth noting. Wage determination is largely based on a system of collective bargaining at the sector level, with the coverage of negotiated wage settlements extending far beyond the level of union membership.<sup>13</sup> At the firm level, employers are free to set wages above but not below the tariff wages that are agreed upon centrally, under a provision known as the "favorability principle" (i.e., in favor of the worker). At the sectoral level, wage determination is characterized by pattern bargaining, where leading sectors (e.g., the metalworking industry) set the standard for wage increases in the economy;<sup>14</sup> wage dispersion across industries is

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<sup>11</sup>A traditional Keynesian explanation for downward nominal rigidity in wages focused on money illusion as an explanation for workers' reluctance to accept nominal pay cuts. See Eldar Shafir, Peter Diamond, and Amos Tversky, 1997, "Money Illusion," *Quarterly Journal of Economics*, Vol. 112 (May), for a recent paper on the prevalence of money illusion.

<sup>12</sup>Another explanation for asymmetric price adjustment among imperfectly competitive firms is focal-point pricing; see Severin Borenstein, A. Colin Cameron, and Richard Gilbert, 1997, "Do Gasoline Prices Respond Asymmetrically to Crude Oil Price Changes?" *The Quarterly Journal of Economics*, Vol. 112 (February), for a discussion and evidence. Laurence Ball, and N. Gregory Mankiw, 1994, "Asymmetric Price Adjustment and Economic Fluctuations," *Economic Journal*, Vol. 104 (March), motivate asymmetric price adjustment under imperfect competition in the presence of menu costs and trend inflation.

<sup>13</sup>Overall union membership is around 40 percent; however, about 80 percent of employers in the manufacturing and financial sectors belong to federations whose members are obligated to pay their workers (who constitute 90 percent of the sectoral workforce) at or above the wage rates negotiated through collective bargaining. For a detailed description of labor market institutions and wage developments in Germany see Robert Corker, et al, 1995, "United Germany: The First Five Years—Performance and Policy Issues," *IMF Occasional Paper* 125, and SM/96/227.

<sup>14</sup>Lars Calmfors, and John Driffill, 1988, "Bargaining Structures, Corporatism, and Macroeconomic Performance," *Economic Policy*, Vol 6, have argued that sector level bargaining may result in less efficient wage-employment outcomes, lacking the "coordination" benefits of more centralized systems and the "competitive" benefits of more decentralized systems. Wendy Carlin and David Soskice, 1997, "Shocks to the System: The German

(continued...)

lower than in more decentralized systems (e.g., the United States). In terms of firing costs, extensive protection and stringent restrictions regarding dismissals in Germany are considered relatively high by European standards.<sup>15</sup> Meanwhile, social assistance of unlimited duration and high replacement ratios characterize a generous social benefit system supportive of high reservation wages. And while the German authorities have recently embarked on an extensive program of structural reforms,<sup>16</sup> the effects of various labor market rigidities are likely to be felt for some time to come.

### C. Analytical Framework: The Wage-Price Mechanism

24. An approach to exploring the implications of rigidities in labor and product markets for unemployment and macroeconomic adjustment is through a closer examination of the aggregate wage-price mechanism. Derived from the interaction of underlying wage- and price-setting equations (see appendix), the wage-price mechanism is a reduced-form relationship which summarizes the linkage between wage and price adjustment and the level of economic activity (i.e., the unemployment or the output gap). This relationship can be broadly characterized in the form of an expectations-augmented Phillips curve:

$$\pi_t - \pi_t^e = f(u_t - u_t^*), \quad (1)$$

where  $\pi$  and  $\pi^e$  are inflation and inflationary expectations, defined to be a function of the unemployment gap—i.e., the difference between actual unemployment  $u$  and the level associated with non-accelerating prices  $u^*$  (NAIRU). This latter measure is referred

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<sup>14</sup>(...continued)

Political Economy Under Stress,” *National Institute Economic Review*, No. 159 (January), argue that a breakdown in consensus among the social partners following unification—and the sharing of its costs—underlies the lack of wage moderation in recent years and the subsequent labor retrenchment.

<sup>15</sup>David Grubb, and William Wells, 1993, “Employment Regulations and Patterns of Work in EC Countries,” *OECD Economic Studies*, Vol. 21, rank Germany in terms of strictness of employment protection behind only Portugal, Spain, Italy, and Greece, while Kees Koedijk, and Jereon Kremers, 1996, “Market Opening, Regulation and Growth in Europe,” *Economic Policy* (October), find labor and product market regulation in Germany to be among the highest in Europe—only Italy and Greece are rated higher.

<sup>16</sup>In January 1996, the Government adopted a 50-point “Action Program to Foster Investment and Employment.” Under the program, proposed measures cover a wide range of policy areas, including deregulation of goods and labor markets and reforms of work-related benefits.

to—interchangeably in the linear case—as the structural or natural rate of unemployment; correspondingly, this approach has been described as the natural rate hypothesis. As written, equation (1) also implicitly embodies the Keynesian perspective on economic fluctuations. With predetermined or sticky prices, output in the short run is demand determined, with causality running from the level of economic activity to eventual price adjustment. In the traditional Keynesian approach, the wage-price mechanism would summarize the supply-side of the economy and the mechanism for (sluggish) price level adjustment.

25. In contrast to the Keynesian view, the new classical approach runs the causality in the opposite direction, specifying that changes in output and employment are a function of expectational errors;<sup>17</sup> this revised relationship has been referred to as the Lucas supply function.<sup>18</sup> However, treating equation (1) as a reduced-form (rather than structural) relationship, one could allow causality to run in both directions.<sup>19</sup>

26. Causation issues aside, both the Keynesian and new classical perspectives formulate the basic wage-price mechanism in the form of a linear relationship:

$$\pi_t - \pi_t^e = -\gamma[u_t - u_t^*], \quad (2)$$

where  $\gamma$  is interpreted as the (constant) short-run trade-off parameter between unemployment and inflation, related to the “sacrifice ratio” or output costs of disinflation.<sup>20</sup> From the

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<sup>17</sup>The original work on the statistical relationship is attributed to Irving Fisher, 1926, *Journal of Political Economy*, Vol. 81, and, 1973, “A Statistical Relation Between Unemployment and Price Changes,” *International Labor Review*, Vol. 13., who also suggested that the causality ran from inflation to unemployment.

<sup>18</sup>The new classical approach also gave equation (1)—appropriately inverted—a market-clearing interpretation under rational expectations and flexible prices. And while the Keynesian approach has largely adopted the rational expectations hypothesis, the presence of inflation inertia was used to retain a non-market clearing interpretation. See Alan Blinder, 1989, *Macroeconomics Under Debate* (Ann Arbor: University of Michigan Press), for a general review.

<sup>19</sup>In the MULTIMOD simulations that follow, instead of considering shocks to either the unemployment gap or unanticipated inflation, “exogenous” disturbances (e.g., changes in target money supply) are considered and the endogenous responses of both the unemployment gap and inflationary expectations are examined.

<sup>20</sup>The new classical framework also posited that the slope of the short-run Phillips curve was not stable and would react to changes in the macroeconomic and policy environment, leaving

(continued...)

Keynesian perspective, this parameter reflects the interaction of nominal and real rigidities, where greater flexibility suggests a larger  $\gamma$  coefficient (steeper Phillips curve).<sup>21</sup> While this specification does not allow for a lower bound unemployment rate (or fixed capacity constraints), the advantages of the linear specification is that it may provide a reasonable approximation to the short-run unemployment-inflation trade-off over the relevant range in which an economy typically operates.

27. Alternatively, a simple specification for the convex Phillips curve, which maintains a strictly positive unemployment rate, can be written as follows:

$$\pi_t - \pi_t^e = -\gamma \left[ \frac{u_t - u_t^*}{u_t - \phi_t} \right] \quad (3)$$

where  $\phi$  represents the lower bound on the unemployment rate, below which the economy cannot extend ( $\phi_t < u_t$ ), regardless of the degree of excess demand.<sup>22</sup> When the economy reaches this “wall” or capacity constraint, further excess demand pressures would only feed into greater price inflation without any further gain in output or employment. This lower bound could reflect frictional unemployment beyond which excess demand pressures would be manifested in a further rise in vacancies, rather than a further decline in unemployment, owing to technological and informational limitations to search and matching activities.<sup>23</sup>

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<sup>20</sup>(...continued)

no systematic tradeoff even in the short run. See Robert Lucas, 1976, “Econometric Policy Evaluation: A Critique,” in *The Phillips Curve and Labor Markets*, edited by K. Brunner and A.H. Meltzer (Amsterdam: North Holland). In the Keynesian framework, to the extent that the nature of price and wage setting behavior changes (endogenous nominal rigidities), significant changes in macroeconomic environment (e.g., high or variable inflation) would also affect this tradeoff parameter. See Laurence Ball, N.Gregory Mankiw, and David Romer, 1988, “The New Keynesian Economics and the Output-Inflation Tradeoff,” *Brookings Papers on Economic Activity*.

<sup>21</sup>As shown in the appendix, in the case of inflation persistence, equation (2) would be modified as follows:  $\pi = \lambda\pi^e + (1-\lambda)\pi_{-1} - \gamma(u - u^*)$ , where the coefficient  $\gamma$  reflects both nominal and real rigidities.

<sup>22</sup>Note that  $\phi$  must lie between zero and  $u^*$  to ensure a positive, equilibrium rate of unemployment.

<sup>23</sup>Apart from its level, another specification issue for  $\phi$  concerns time dependence. In countries where the unemployment rate has significantly drifted upward,  $\phi$  could increase as well. If, for example, the trend increase brought about a substantial increase in the numbers of  
(continued...)

28. As with the symmetric model,  $\gamma$  in equation (3) reflects the interaction of nominal and real rigidities. However, unlike the linear case, the degree of nominal and/or real rigidity would not be constant (or symmetric). In the asymmetric model, the behavior of these rigidities would further depend on economic conditions and the nature of shocks, which further underpins (beyond capacity constraints) the non-linear relation between inflation and unemployment (see appendix). For example, assuming an effective *floor* below which real wages would not fall, the absolute unemployment response to disinflationary and inflationary impulses could differ significantly, depending on the size of the shock and the prevailing level of excess demand or supply (i.e., whether the floor acts as a binding constraint).

29. If these asymmetries are significant, several important implications are worth mentioning. Once the tradeoff between unemployment and inflation is not constant but changes with economic conditions (i.e., the “unemployment gap”), the history of past disturbances and current conditions become important in determining the response of the system to new shocks. This consideration is essentially irrelevant in a symmetric model where the marginal responses are always identical. Moreover, in the presence of asymmetries, the average (or expected) level of unemployment is *above* the level which would prevail in the absence of these convexities or in the absence of stochastic disturbances. This is shown in Chart I-2.

30. In terms of equation (3), note that the “structural” rate of unemployment  $u^*$  represents an underlying NAIRU only in *deterministic* (non-stochastic) equilibrium in the asymmetric model. In the presence of shocks, however, the average or natural rate of unemployment  $\bar{u}$ , representing the NAIRU in a *stochastic* setting, lies somewhat *above* this value depending on the magnitude and frequency of shocks and the degree of asymmetry in the wage-price mechanism. This asymmetry-based component of unemployment is represented by  $\alpha$ —the gap between  $\bar{u}$  and  $u^*$  in Chart I-2. Finally, the actual unemployment rate  $u$  could diverge from its average or natural rate  $\bar{u}$ , as a result of cyclical considerations stemming from the business cycle, which completes the model’s decomposition of observed unemployment behavior. It should be noted that this second component of unemployment reflected by the gap  $\alpha$ —absent in traditional natural rate models—cannot be considered as purely structural or cyclical as it reflects the interaction of both factors.

31. By modifying this separation found in standard models between the natural rate and cyclical developments, the asymmetrical model is akin to hysteresis models where cyclical unemployment directly affects the path-dependent NAIRU.<sup>24</sup> However, whereas changes in the level of economic activity can have direct permanent effects on unemployment in standard hysteresis models, only changes in the variability of economic fluctuations would permanently

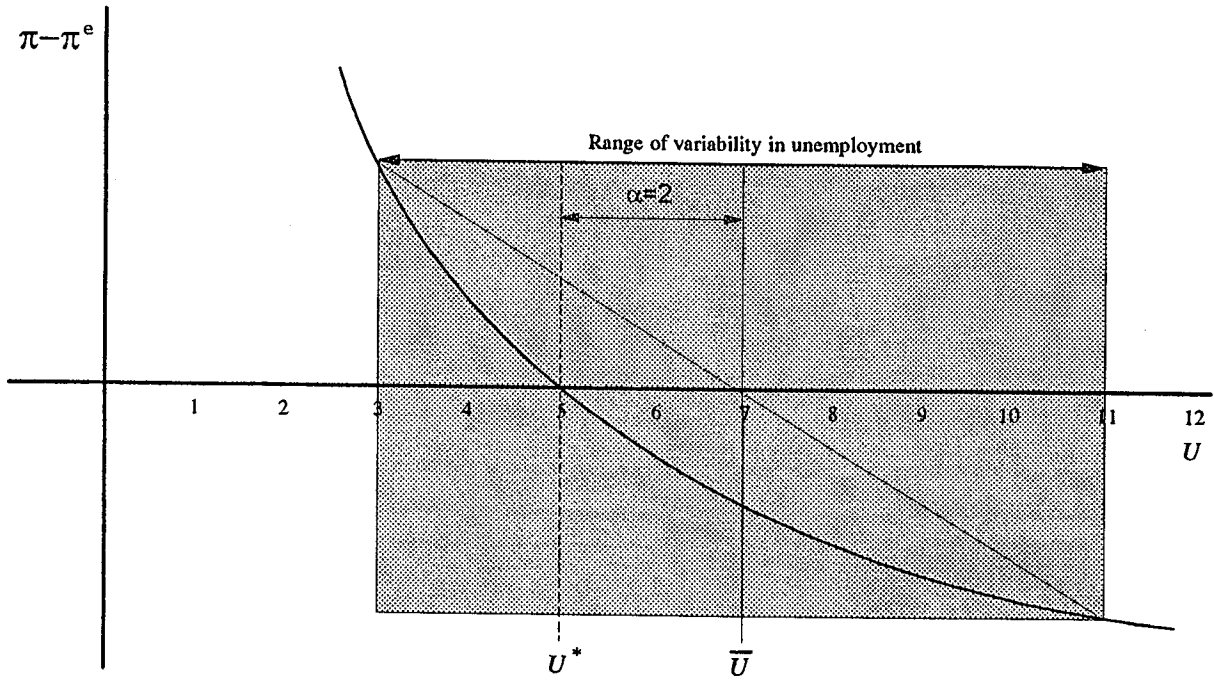
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<sup>23</sup>(...continued)

long-term unemployed with depreciated human capital, it may prove difficult to entirely reabsorb these workers back into the workforce.

<sup>24</sup>See for example Albert Jaeger, and Martin Parkinson, 1994, “Some Evidence on Hysteresis in Unemployment Rates,” *European Economic Review*, Vol. 38., for an empirical analysis.

Chart I-2.  
Germany  
Convex Phillips Curve



affect the natural rate of unemployment in the present context. Meanwhile, temporary episodes of higher economic variability would lead to a protracted rise in unemployment in the asymmetric model which would eventually reverse depending on the degree of inertia in the economy.

32. In this sense, the asymmetric model combines elements of both hysteresis and traditional natural rate models. Transitory disturbances can have persistent (variance) effects on average unemployment, but the economy eventually reverts back to a given long-run natural rate of unemployment. Of course, lasting changes in the unemployment rate in the asymmetric model could also arise, through changes in the “structural” rate of unemployment  $u^*$ , representing shifts in the Phillips curve. These permanent or trend developments would largely reflect institutional or structural considerations, including supply-side shocks such as oil price increases, and, in the case of Germany, reunification.

33. In terms of policies, the model with asymmetries addresses a notable shortcoming of traditional (symmetric) natural rate models wherein macroeconomic policy was incapable of affecting the longer-term level of output and unemployment.<sup>25</sup> In the current context, economies with a high degree of asymmetry will be hampered in their ability to respond to economic disturbances, leading to a larger decline in average activity and employment than would prevail if markets were more flexible; correspondingly, effective stabilization policies which mitigate the impact of these disturbances can durably reduce (average) unemployment. To the extent that the gap between  $\bar{u}$  and  $u^*$  changes over time—because of changes in the policy regime, in the distribution of external shocks, or in structural factors affecting the degree of asymmetry—the asymmetric model can also explain sustained or persistent changes in the observed level of unemployment. Such explanations are absent from the symmetric model.

34. Over the business cycle, the asymmetric model also has broad implications for the short-run stance of financial policies. The convex Phillips curve, for example, specifies that the inflationary costs of overheating can be much higher than in the linear case, suggesting that policymakers may wish to make preemptive changes in the stance of monetary policy to forestall excess demand pressures. However, this caution against inflationary pressures needs to be balanced against the higher costs of excessive disinflation, in terms of larger output and employment losses (i.e., rising sacrifice ratio), associated with the region of excess supply. Thus, compared to the policy implications of the linear Phillips curve, the asymmetric model attaches a premium on timely and appropriate stabilization policies, as excess demand or supply pressures are more costly in terms of inflation and unemployment.

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<sup>25</sup>This basic shortcoming led Lawrence Summers, 1988, “Should Keynesians Dispense with the Phillips Curve?” in *Unemployment, Hysteresis, and the Natural Rate Hypothesis*, ed. Rod Cross, Basil Blackwell, to question whether the traditional natural rate model was useful.

#### D. Estimation

35. To examine whether potential asymmetries in the wage-price mechanism are important in the case of Germany, the following empirical equation is considered:

$$\pi_t = \lambda \pi_t^e + (1 - \lambda) \pi_{t-1} - \gamma \left[ \frac{u_t - u_t^*}{u_t - \phi_t} \right] + \epsilon. \quad (4)$$

This is essentially a stochastic version of equation (3) augmented for inflation persistence.<sup>26</sup> To proxy for inflationary expectations which are unobservable, data on long-term interest rates are used to construct measures of expected inflation following Debelle and Laxton.<sup>27</sup> Actual inflation is measured in terms of the GDP deflator.<sup>28</sup>

36. In equation (4), also note that  $u^*$  is an unobserved component. Hence, to estimate the empirical equation and to allow for time variation in  $u^*$ , Kalman Filter estimation of equation (4) is employed following Kuttner.<sup>29</sup> Essentially, for a given set of parameters, incremental information in the difference between inflation and inflationary expectations is used to update time-varying estimates of  $u^*$ .<sup>30</sup> Recursive estimates of  $u^*$  and the parameters are then revised based on information in the whole sample to maximize the likelihood function. In effect, the

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<sup>26</sup>See appendix for an explicit derivation.

<sup>27</sup>Guy Debelle, and Douglas Laxton, 1996, "Is the Phillips Curve Really a Curve? Evidence for Canada," IMF Working Paper, WP/96/111.

<sup>28</sup>Data are for West Germany from 1962 to 1995. Other country data cover the period from 1970 to 1995. Alternative price measures such as the consumer price index and absorption deflator were also used and do not qualitatively affect the results. Using the OECD standardized measure for unemployment also yields similar implications.

<sup>29</sup>Ken Kuttner, 1994, "Estimating Potential Output as a Latent Variable," *Journal of Business and Statistics*, Vol. 12. Note that  $\phi$  is statistically unidentified in the empirical model. However, theory places some structure on the feasible parameter space:  $\phi_t < u_t$  and  $0 \leq \phi_t < u_t^*$  for all  $t$ . Consequently, various (static and time-varying) rules for  $\phi$  are employed to test for robustness of the estimates. See appendix Table I-A2.

<sup>30</sup>Equation (4) represents the measurement equation, and for a given  $\phi$ , the coefficient  $\beta_t$  on  $(u_t - \phi_t)^{-1}$  is allowed to be time varying; hence, the transition equation is given by:  $\beta_t = \beta_{t-1} + v_t$ . The estimated coefficient  $\gamma$  on  $u_t(u_t - \phi_t)^{-1}$  in equation (4) then identifies  $u_t^* = \beta_t/\gamma$ . See Guy Debelle, and Douglas Laxton, 1996, "Is the Phillips Curves Really a Curve? Evidence for Canada," IMF Working Paper, WP/96/111 (October), for further details of the estimation methodology.



behavior of inflation and inflationary expectations and the nature of the wage-price mechanism itself are used to identify  $u^*$ , in addition to the information contained in the times-series behavior of actual unemployment.

37. As mentioned above, while *global* asymmetry is imposed in this framework, which is a reasonable assumption, the model allows for more symmetric behavior *locally*—i.e., in the neighborhood of  $u^*$ —depending on the parameters. Hence, this framework is sufficiently general, to allow the data to determine the degree of asymmetry in the output-inflation trade-off over the relevant range. Estimates of equation (4) and its linear variant for Germany are shown in the table below (for  $\phi=0$ ).<sup>31</sup>

Linear vs. Convex Phillips Curves West Germany, 1962–95

$$\text{Symmetric Model: } \pi_t = \lambda \bar{\pi}_t + (1-\lambda)\pi_{t-1} - \gamma[u_t - u_t^*] + \epsilon_t;$$

$$\text{Asymmetric Model: } \pi_t = \lambda \bar{\pi}_t + (1-\lambda)\pi_{t-1} - \gamma \left[ \frac{u_t - u_t^*}{u_t} \right] + \epsilon_t.$$

	$\gamma$	$\lambda$	$\hat{\sigma}$	$\ell$
Symmetric model	0.30 (1.92)	0.52** (3.96)	0.82	-51.40
Asymmetric model	1.43** (3.56)	0.47** (3.98)	0.74	-46.17

Note: A \*(\*\*) indicates significance at the 5 (1) percent level;  $t$ -statistics in parentheses.

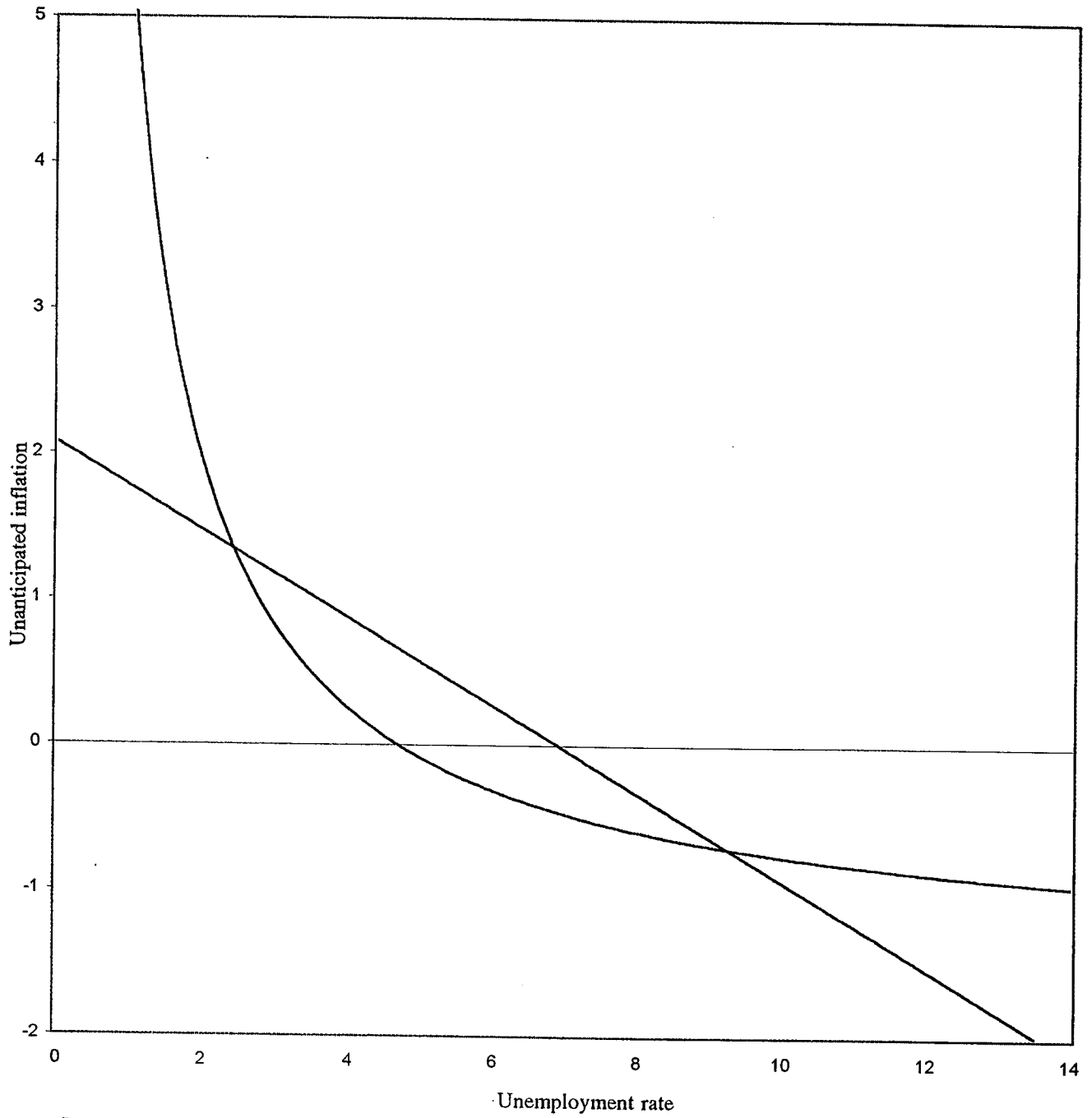
$\hat{\sigma}$  = standard error of estimate;  $\ell$  = value of log likelihood function.  $Q$ -statistics (not reported) against low and high order serial correlation for both models were insignificant.

38. Based on the point estimates, plots of the Phillips curve under each specification at the end of the sample are shown in Chart I-3. In the symmetric model, estimates of the slope parameter  $\gamma$  suggest a fairly “flat” short-run Phillips curve as shown in Chart I-3. This finding is indicative of the presence of a high degree of nominal and real rigidities and a high “sacrifice ratio.”<sup>32</sup> The estimate of  $\gamma$  in the asymmetric model is also low—as will become apparent in

<sup>31</sup>Using  $\phi$  fixed at 0 in the case of Germany where  $u^*$  is likely to rise over time tends to make the Phillips curve act more symmetric *by construction* in the region of excess demand (i.e., where  $u$  is above  $u^*$ ). Alternative models which better preserve the convexity are considered shortly.

<sup>32</sup>Laurence Ball, N. Gregory Mankiw, and David Romer, 1988, “The New Keynesian Economics and the Output-Inflation Tradeoff,” *Brookings Papers on Economic Activity*, and Laurence Ball, 1994, “What Determines the Sacrifice Ratio,” in *Monetary Policy*, ed. by N. Gregory Mankiw (Chicago: Chicago University Press), finds similar results for Germany.

Chart I-3.  
Germany 1/  
Linear versus Convex Model



Source: Staff estimates.

1/ Estimates refer to West Germany only.

the cross-country comparisons later—also indicating significant rigidities and, in the current context, a fair degree of asymmetry in the wage-price mechanism (shown graphically in Chart I-3). Both models yield similar estimates of the degree of inflation persistence  $(1-\lambda)$ .

39. Using estimates for  $\lambda$  and the  $u^*$  series obtained from both models, an auxiliary regression is shown in the table below, which compares each model's ability to explain the difference between inflation and (fitted) inflationary expectations—adjusted for inflation inertia— $\hat{\pi}^e = \hat{\lambda}\bar{\pi} + (1-\hat{\lambda})\pi_{-1}$ . The asymmetric model yields a somewhat better fit although not overwhelmingly so.<sup>33</sup> However, where the two models do differ significantly is in terms of their implications for  $u^*$ . Under symmetry, positive and negative unemployment gaps should be (in large samples) equally likely to occur. With the actual unemployment rate just as likely to be above or below the NAIRU, the level of  $u^*$  with a linear Phillips curve should be closer to the level of observed unemployment. With the convex Phillips curve, the unemployment rate will generally lie asymmetrically *above* the structural unemployment rate  $u^*$  as in Chart I-2. This level difference is seen in Chart I-3 by comparing where each model intersects the horizontal axis.

Linear vs. Convex Phillips Curves West Germany, 1962–95

$$\pi_t - \hat{\pi}_t^e = -\gamma[u_t - \hat{u}_t^*] + v_t \text{ or } = -\gamma\left[\frac{u_t - \hat{u}_t^*}{u_t}\right] + v_t$$

(Symmetric model)

(Asymmetric model)

	$\gamma$	$R^2$	$\hat{\sigma}$	<i>D.W.</i>
Symmetric model	0.37** (7.46)	0.51	0.70	1.98
Asymmetric model	1.64** (8.44)	0.61	0.63	2.15

Note: A (\*\*\*) indicates significance at the 5 (1) percent level; *t*-statistics in parentheses.  $\hat{\sigma}$  = standard error of estimate; *D.W.* = Durbin-Watson statistic for serial correlation.

<sup>33</sup>Allowing a strictly positive  $\phi$  based on (say) the minimum unemployment rate would further improve the fit of the asymmetric model. Estimates using alternative rules for  $\phi$  can be found in the appendix Table I-A2.

40. Another important difference between the two models pertains to the variability of  $u^*$ .<sup>34</sup> Because the symmetric wage-price mechanism has a constant inflation-unemployment tradeoff, it cannot fully explain *both* inflationary and disinflationary episodes without greater variability in  $u^*$ . In other words, the Phillips curve must shift more often and to a greater extent under the linear specification in order to explain periods of high inflation or high unemployment. In the case of Germany, this restriction even leads (implausibly) to negative estimates of the NAIRU in the early part of the sample period, when the actual unemployment rate was quite low but disinflationary pressures were present.

41. Meanwhile, for Germany, the model with asymmetries yields sensible, and more stable estimates of  $u^*$ , in accordance with the natural rate hypothesis. Chart I-4 depicts the time-series implications for German unemployment of the asymmetric model, showing actual, average (filtered), and structural unemployment rates.<sup>35</sup> Notice again that the average unemployment rate  $\bar{u}$  lies uniformly above the structural rate of unemployment  $u^*$ , consistent with convexity in the Phillips curve.<sup>36</sup>

42. Over time, most of the increase in the unemployment rate in west Germany between 1970 and 1995 is attributable to a rise in its underlying structural component. However, part of the sustained increase in unemployment also appears to stem from an expanded gap between the natural rate  $\bar{u}$  (i.e., stochastic NAIRU) and the underlying structural rate  $u^*$  (i.e., deterministic NAIRU). This wider gap stems from episodes of greater macroeconomic variability. In particular, this widening largely occurred during the mid-1970s and again around 1980. Both episodes correspond to major oil shocks, where downward real wage resistance may have exacerbated the effects of these supply shocks on unemployment.<sup>37</sup>

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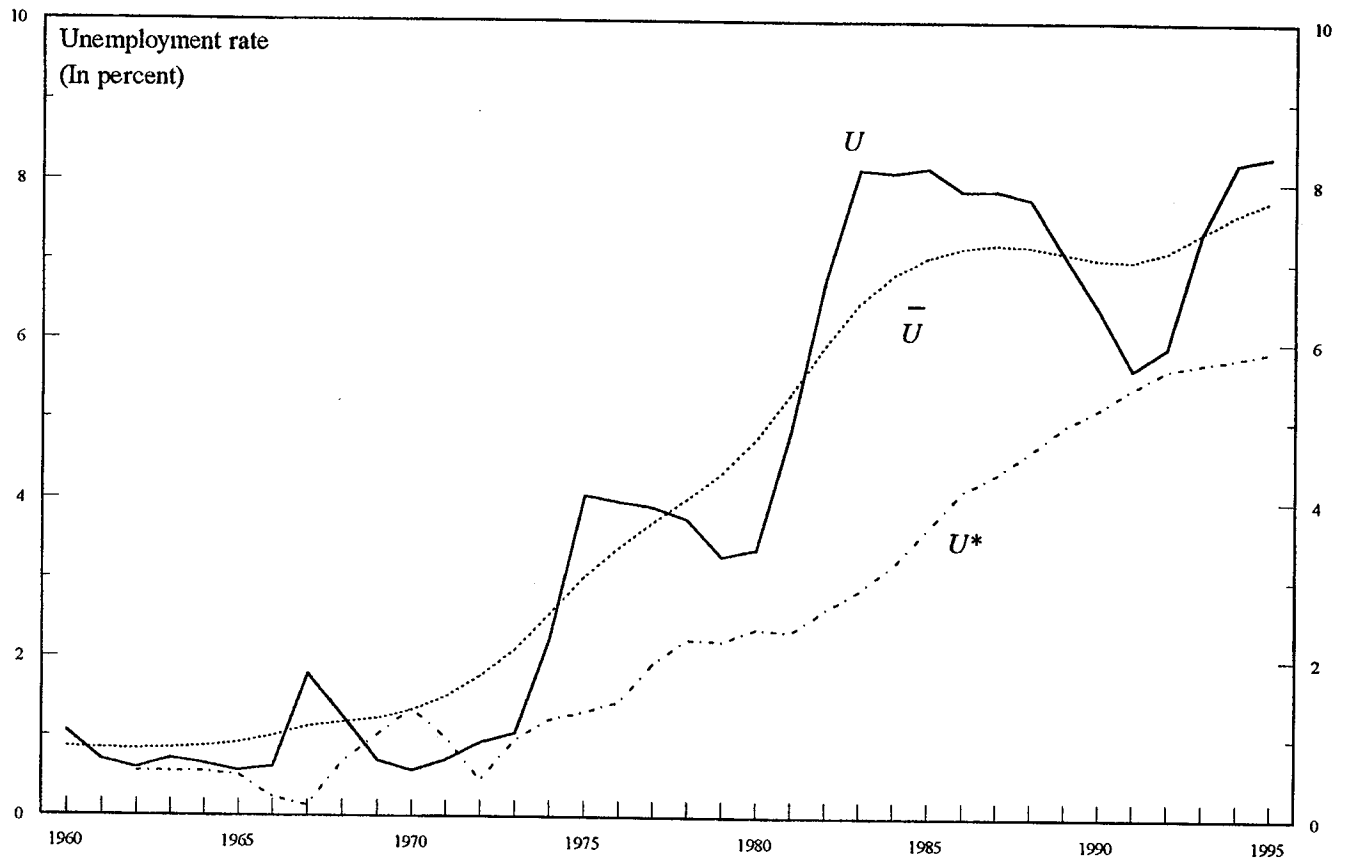
<sup>34</sup>The implicit variability of innovations to  $u^*$  in the transition equation is restricted *a priori* to be the same across the two models for comparability. Allowing greater variability in  $u^*$  in the estimation procedure would allow either model to fit the inflation data better.

<sup>35</sup>The estimates shown in this chart are based on a time-varying  $\phi$  similar to the estimates presented in the appendix Table I-A2. This specification yields higher estimates for  $u^*$  than with  $\phi=0$  as shown in Chart I-3. The variance restriction in the transition equation is such that innovations in  $\Delta u^*$  are allowed to be as variable *a priori* as actual  $\Delta u$  over the sample period; see Table I-A1.

<sup>36</sup>Actual unemployment  $u$  also lies above  $u^*$  except for 1969-1971. It is interesting to note that, during this period, vacancies rose markedly relative to unemployment, consistent with excess demand pressures; inflation also increased sharply. The symmetric model shows a similar result, albeit with a larger increase in  $u^*$  (i.e., larger unemployment gap) necessary to explain the corresponding pick-up inflation.

<sup>37</sup>Ansgar Belke, 1996, "Testing for Unit Roots in West German and U.S. Unemployment (continued...)"

Chart I-4.  
Germany 1/  
Unemployment Developments, 1960-95



Sources: OECD Economic Indicators and staff estimates.  
1/ Data refer to West Germany only.

43. In 1995, observed unemployment in west Germany (8¼ percent) can be decomposed according to the asymmetric model as follows:<sup>38</sup> structural unemployment  $u^*$  is estimated around 6 percent, the natural rate of unemployment  $\bar{u}$  is approximately 7-7½ percent (i.e.,  $\alpha$  between 1-1½ percent).<sup>39</sup> These estimates suggest that three quarters of west German unemployment was structural, while the remaining one quarter was divided nearly equally between the asymmetrical (i.e., gap) component and the cyclical component of unemployment.

44. To view these results from a **cross-country perspective**, the basic model is also estimated for the remaining G-7 countries plus several of Germany's European partner countries (Denmark, the Netherlands, Ireland, Spain, and Sweden). The individual country estimates of the wage-price mechanism are shown in Table I-1.<sup>40</sup> Based on these estimates, plots of the Phillips curves for several of the major industrial countries, including Germany, are shown in Chart I-5. Among the G-7 countries, Germany and France have the lowest estimates for  $\gamma$ , suggesting a comparatively high degree of downward nominal or real wage rigidity. Real wage rigidity appears more important in the case of Germany based on the

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<sup>37</sup>(...continued)

Rates: Do 'Great Crashes' Cause Trend Breaks?" *Konjunkturpolitik*, Vol. 42, and A. Belke and Münster Göcke, 1996 "Cointegration and Structural Breaks in German Unemployment: An Error-Correction Interpretation" *Jahrbücher f. Nationalökonomie u. Statistik*, Vol. 216, also identifies these important events in the German unemployment series, but using structural breaks rather than through asymmetries in the wage price mechanism (and  $\alpha$  shifts).

<sup>38</sup>The annual unemployment rate for unified Germany in 1995 at 10½ percent was higher than in west Germany, owing to much higher unemployment in the east which stood around 14 percent in 1995. This latter figure has been viewed as largely structural, suggesting a overall natural rate for unified Germany of 8 to 8¾ percent; OECD estimates place this latter figure at around 9 percent.

<sup>39</sup>Using a second-order Taylor expansion of the convex function, one can obtain an approximate solution (conditional on  $u^*$ ) for the gap  $\alpha$  between the natural and structural unemployment rates as a function of  $u^*$ ,  $\phi$  and the variability of  $u$  about  $u^*$  (which depends on  $\gamma$ ). Estimates of these parameters and the variance over the *entire* sample yield an approximate solution for  $\alpha$  of around 1 percentage point or a  $\bar{u}$  estimate of 7 percent at the end of the sample; variability in the latter part of the sample was however somewhat higher; filtered unemployment estimates yield an estimate of 7½ percent at the end of the sample.

<sup>40</sup>For  $\phi=0$ . The case of a time-varying  $\phi$  is presented in Table I-2 and Chart I-6. Guy Debelle, and Douglas Laxton, 1996, "Is the Phillips Curve Really a Curve? Evidence for Canada," IMF Working Paper, WP/96/111 (October), report similar estimates to those in Table I-1 using quarterly data for the United States and United Kingdom.

Table I-1. (Convex) Phillips Curve Estimates, 1970-95

$$\text{Model: } \pi_t = \lambda \bar{\pi}_t + (1-\lambda)\pi_{t-1} - \gamma \left[ \frac{u_t - u_t^*}{u_t - \phi_t} \right] + \epsilon; \phi_t = 0.$$

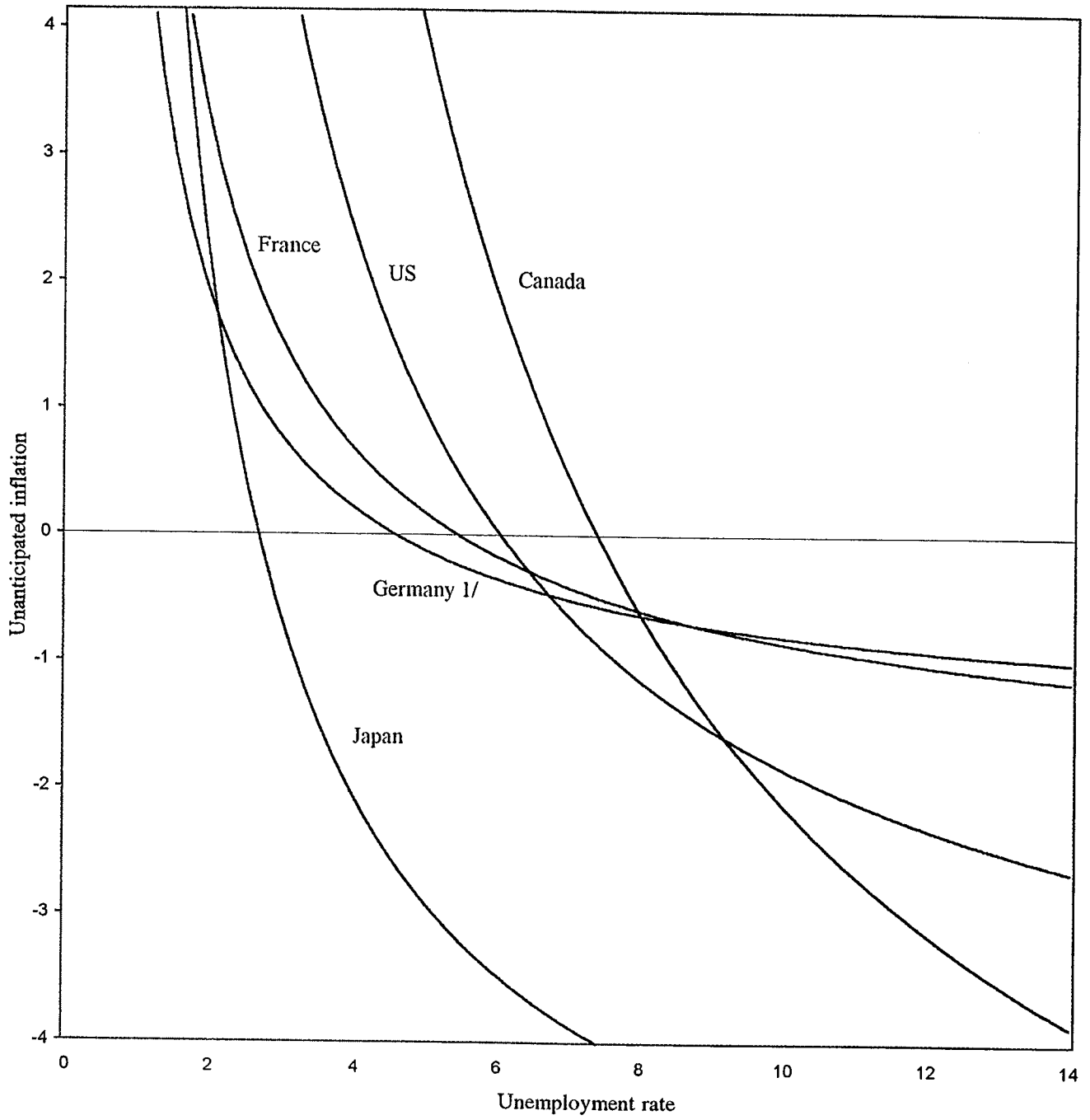
	$\gamma$	$\lambda$	s.e.e.
United States	4.63**	0.14	1.03
Japan	6.25*	0.79**	2.06
Germany 1/	1.47**	0.53**	0.85
France	1.86**	0.28**	1.02
Italy	5.72**	0.59**	2.17
United Kingdom	2.60	0.63**	2.95
Canada	8.16**	0.54**	1.41
Denmark	1.83**	0.24**	1.18
Sweden	2.68**	0.83**	1.65
Netherlands 2/	2.16**	0.40**	0.90
Ireland	3.93*	0.77**	3.38
Spain	1.64**	0.19	2.07

Note: A \*(\*\*) indicates significance at the 5 (10) percent level.  
Based on data obtained from OECD Analytical Database.

1/ Data are for West Germany.

2/ Data from 1972 to 1995.

Chart I-5.  
Germany  
Phillips Curve Estimates, 1995



Source: Staff estimates.

1/ Estimates refer to West Germany only.



Table I-2. (Convex) Phillips Curve Estimates, 1970-95

$$\text{Model: } \pi_t = \lambda \bar{\pi}_t + (1-\lambda)\pi_{t-1} - \gamma \left[ \frac{u_t - u_t^*}{u_t - \phi_t} \right] + \epsilon; \phi_t = \max[0; \bar{u}_t - 8].$$

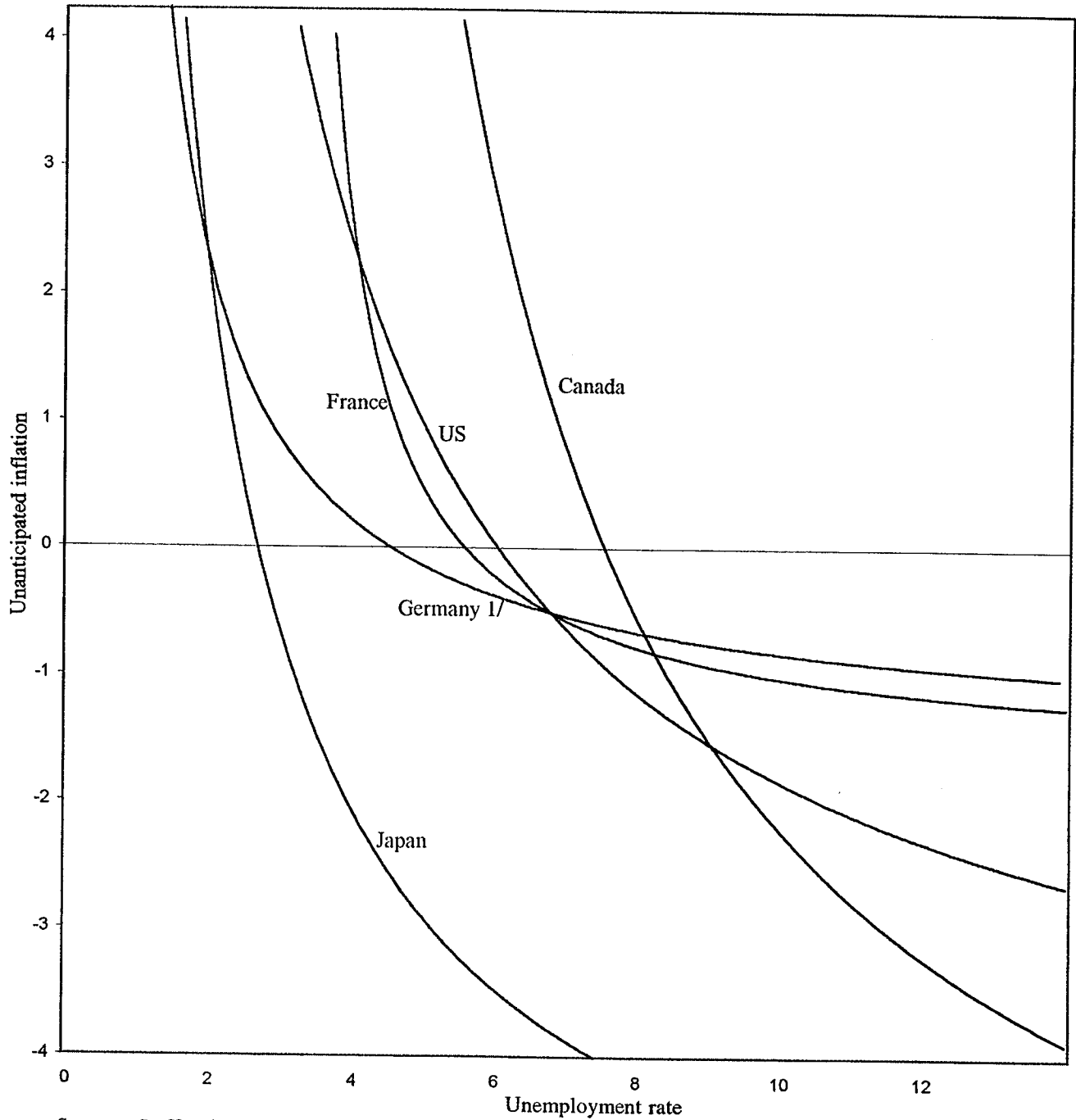
	$\gamma$	$\lambda$	s.e.e.
United States	4.63**	0.14	1.03
Japan	6.25**	0.79**	2.06
Germany 1/	1.46**	0.53**	0.85
France	1.62**	0.28**	1.03
Italy	5.14**	0.60**	2.18
United Kingdom	2.52	0.64**	2.94
Canada	7.20**	0.55**	1.43
Denmark	1.54**	0.21**	1.21
Sweden	2.68**	0.83**	1.65
Netherlands 2/	2.16**	0.40**	0.90
Ireland	2.84*	0.81**	3.30
Spain	1.12**	0.22*	2.09

Note: A (\*\*\*) indicates significance at the 5 (10) percent level.  
Based on data obtained from OECD Analytical Database.

1/ Data are for West Germany.

2/ Data from 1972 to 1995.

Chart I-6.  
Germany  
Phillips Curve Estimates, 1995



Source: Staff estimates.

1/ Estimates refer to West Germany only.

estimate of  $\lambda$ .<sup>41</sup> In terms of the Chart I-5, this is manifested in a relatively “flat” Phillips curve in the region of excess supply ( $u > u^*$ ); given global convexity (i.e., the Phillips curve turns “steep” in the region of excess demand), this finding suggests a higher degree of local asymmetry (around  $u^*$ ) in the inflation-output process, in the sense that disinflationary shocks have proportionately larger (absolute) unemployment effects.

45. As for overall inflation inertia, Germany has a comparatively moderate degree of nominal flexibility, somewhat higher than in the United States (low  $\lambda$ ),<sup>42</sup> but somewhat below that of Japan or Sweden (high  $\lambda$ ). A non-exhaustive list of factors that could help explain cross-country differences in the degree of nominal rigidity would include the degree of indexation, length and staggering structure of nominal contracts, inflation levels and variability, policy credibility, and openness of the economy. As an open economy, with contracts typically lasting around one to two years, and with a strong, independent central bank, Germany fares well on most of these counts.

46. To account for significant upward trends in the unemployment rate in some instances, Table I-2 allows the lower bound for the unemployment rate to drift upward in the estimation.<sup>43</sup> The corresponding Phillips curve estimates are shown in Chart I-6. If  $\phi$  were anchored at zero (as in Table I-1), high unemployment countries would by construction have fairly “linear” Phillips curve in the region of excess demand (less local asymmetry; larger  $\gamma$ ). Allowing  $\phi$  to rise with the unemployment rate controls for the impact that location of the Phillips curve has on its curvature. Not surprisingly, the estimates change only for those countries with significant unemployment trends or very high unemployment levels (e.g., Spain and Ireland).

47. It is interesting to note from Table I-2 that countries like Germany with low  $\gamma$  estimates (e.g., Spain, France, Denmark) are also countries which tend to have significant persistent increases in the level of unemployment over the sample period. In other words, countries which have prominent structural rigidities and asymmetries are also more likely to have experienced trend increases in the average unemployment rate over time. This result is perhaps not surprising considering that the institutional and structural factors that underlie labor market asymmetries are likely to be closely related to the factors underpinning the

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<sup>41</sup>An illustrative derivation of  $\gamma$  and its relation to real and nominal rigidities is shown in the appendix.

<sup>42</sup>The finding of significant nominal rigidity or inflation persistence in the United States is well documented. See for example Robert Gordon, 1997, “The Time-Varying NAIRU and Its Implications for Economic Policy,” *Journal of Economic Perspectives*, Vol. 11.

<sup>43</sup>The conservative rule which is used allows  $\phi$  (non-negative) to rise above zero as the average unemployment rate rises above 8 percent. Other time-varying rules are shown in appendix Table I-A2 for select countries.

upward trend in structural unemployment. In the case of Germany, most of the increase in average unemployment appears to be the result of increases in structural unemployment; however, a comparatively larger share is attributable to a rise in the gap between average and structural unemployment for these other countries (see the table below). This finding suggests that increased variability in external shocks, increased asymmetries, and/or less effective stabilization policies over the sample period have featured more prominently in the unemployment increase for those European countries, while for Germany the problem has largely been structural.

Unemployment Developments 1973–95 1/

	$u$	$\Delta u$	$u^*$	$\Delta u^*$
United States	5.6	0.7	6.0	-0.4
Japan	3.1	1.9	2.7	0.4
Germany 2/	8.3	7.3	5.9	5.0
France	11.6	8.9	5.6	1.1
Canada	9.5	4.0	7.7	0.4
Denmark	10.3	9.2	5.5	3.8
Netherlands	8.3	7.6	2.5	-0.2

1/ Entries for  $u$ ,  $u^*$  are for end of sample (1995);  $\Delta$  reflects change between 1973 and 1995.

2/ Data for West Germany.

48. Comparisons among the G-7 also indicate that Germany has been quite successful in its overall economic stabilization, as measured by relatively low output and inflation (but not unemployment) variability and has the lowest mean inflation rate over the sample period.<sup>44</sup> However, despite its otherwise solid macroeconomic performance, Germany (along with France) has the highest estimated gap between average and structural unemployment among the G-7, consistent with its higher degree of asymmetry.<sup>45</sup> Overall, these findings highlight the importance of labor market flexibility and suggest that Germany's stabilization record has been achieved more in spite of its labor market structure than because of it.

<sup>44</sup>Summary statistics for unemployment, inflation and output over the sample period are shown in Table I-A1.

<sup>45</sup>For Germany and France, the estimates for  $u^*$  in Chart I-6 are around 6 percent and 5½ percent, respectively, while average (filtered) unemployment stood at 8 percent and 10 percent respectively in 1995. The gap  $\alpha$  between  $u^*$  and  $\bar{u}$  for the United States, Japan, and Canada were found to be less than ½ percent.

49. To summarize, estimation of the asymmetric model (convex Phillips curve) performs reasonably well across a fairly broad spectrum of countries. While individual country estimates show a good deal of variation from one another, countries are generally found to have some degree of asymmetry in the wage-price mechanism. In the case of Germany, low point estimates of  $\gamma$  indicate a comparatively high degree of rigidity and local asymmetry (around  $u^*$ ). From a time-series perspective, the rise in German unemployment over the past quarter century largely reflects a rise in the rate of structural unemployment; however, part of the rise can also be attributed to a further rise in average unemployment, reflecting the impact of underlying labor market asymmetries on macroeconomic adjustment in the wake of the oil shocks and German unification. From a policy perspective, the high degree of asymmetry provides ample incentive for the German authorities to pursue effective stabilization policies in order to contain the adverse effects of economic fluctuations on output and employment.

### E. Dynamic Simulations and Policy Scenarios

50. To further illustrate the economic and policy implications for Germany of asymmetries in the wage-price mechanism, this section examines the effects of various shocks on output, inflation, and unemployment in the context of MULTIMOD simulations.<sup>46</sup> To modify MULTIMOD accordingly, the new estimates for the wage-price mechanisms presented are introduced into the model.<sup>47</sup> The revised labor market segment of the model is completed by estimation of a short-run adjustment equation for unemployment, characterizing the short-term behavior of cyclical unemployment.<sup>48</sup>

51. Based on the country model for Germany, the dynamic impacts of negative and positive demand shocks are shown in Table I-3 to examine the issue of asymmetry. Specifically, the response to a 10 percent increase and a 10 percent decline in the (target) money supply are simulated to illustrate the degree of asymmetry present at Germany's

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<sup>46</sup>A complete description of MULTIMOD can be found in Paul Masson, Steven Symansky, and Guy Meredith, 1990, "MULTIMOD Mark II: A Revised and Extended Model," *IMF Occasional Paper* 71.

<sup>47</sup>For Germany, the particular estimates of the wage-price mechanism which are used are based on model (2) in Table I-A2 which covers the longer sample period 1962-95; for other countries, the estimates are those taken from Table I-2 for the sample period 1970-95.

<sup>48</sup>Following Leonardo Bartolini, and Steven Symansky, 1993, "Unemployment and Wage Dynamics in MULTIMOD," *Staff Studies for World Economic Outlook*, the unemployment gap was expressed as a function of its own lag and the output gap (i.e., Okun's law). Unemployment and output gaps were obtained through filtering. Coefficient estimates on the lagged unemployment gap were between 0.2 and 0.7, and point estimates on the output gap typically ranged from 0.25 to 0.4 in absolute terms; these estimates were generally found significant at the 1 percent level.

Table I-3. Germany: Asymmetric Effects of a Change in Money Supply

(In percent deviation from baseline, unless noted otherwise)

Expansion	1997	1998	1999	2000	2001	2002	2003-10 3/	Long Run
Real GDP	4.8	5.5	3.9	1.6	-0.4	-1.7	-5.4	0.0
Unemployment rate 1/	-0.9	-1.5	-1.4	-0.9	-0.3	0.3	2.7	0.0
GNP deflator	0.9	2.7	5.0	9.4	10.8	11.5	10.7	10.0
inflation	0.9	1.8	2.3	2.3	1.9	1.3	-0.9	0.0
Real interest rates (short) 1/	-3.7	-4.4	-3.7	-2.2	-0.6	0.7	4.8	0.0
Real interest rates (long) 1/	-2.9	-2.1	-0.9	0.2	0.9	1.2	1.6	0.0
Exchange rate (effective)	-12.2	-9.9	-7.1	-4.8	-4.0	-4.4	-9.3	-9.1
Target money supply	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Contraction	1997	1998	1999	2000	2001	2002	2003-10 3/	Long Run
Real GDP	-5.5	-6.3	-4.9	-2.7	-0.6	1.0	4.4	0.0
Unemployment rate 1/	1.1	1.8	1.8	1.3	0.6	0.0	-2.3	0.0
GNP deflator	-0.8	-2.4	-4.4	-6.5	-8.4	-9.7	-10.2	-10.0
inflation	-0.8	-1.6	-2.1	-2.2	-2.0	-1.5	0.0	0.0
Real interest rates (short) 1/	3.6	4.6	4.1	2.7	1.1	-0.3	-5.1	0.0
Real interest rates (long) 1/	3.3	2.5	1.3	0.1	-0.7	-1.1	-1.9	0.0
Exchange rate (effective) 2/	15.9	12.8	9.1	6.1	4.7	4.8	10.9	11.1
Target money supply	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0

Source: IMF staff calculations

1/ Percentage point deviations from baseline level.

2/ Inverted scale where an increase denotes an appreciation for the home currency.

3/ Average value for price level, money supply and exchange rate; otherwise cumulative value.

current level of unemployment.<sup>49</sup> In the previous (symmetric) version of MULTIMOD, the impact effects were identical in absolute value; as evident from the table, this is no longer the case. In particular, the negative effects of the contractionary shock on output and the unemployment rate are larger in absolute terms than their counterpart effects associated with the expansionary shock.

52. Looking at the cumulative deviations over the first five years, the cumulative inflationary effects under the expansionary shock raises the price level to greater extent than the decline associated with the contraction (10.9 versus -8.4 percent). Meanwhile, the cumulative gains in output and the rise in the unemployment rate in the first instance are 15 percent and 4½ percentage points respectively; while for the contractionary episode, the respective short-run losses are higher at 20 percent and 6½ percentage points. Hence, over the cycle the net loss would be 5 percent of GDP with a net increase of 2 percentage points in the unemployment rate. Note that these simulation results are sensitive to initial conditions. Here, they are based on prevailing economic conditions in 1996, which in the case of Germany reflects excess supply (i.e., cyclical unemployment). If the initial conditions were closer to full employment the asymmetric effects of the shocks would become more pronounced.

53. Changes in  $\gamma$  would also affect these calculations. If, for example,  $\gamma$  were increased from Germany's point estimate of 1.5 to 2.5—close to the point estimates for Ireland and the Netherlands, the degree of asymmetry would be reduced appreciably.<sup>50</sup> From the same starting point as before, the demand expansion would result in smaller cumulative gains in the unemployment rate (3½ percentage points), while the demand contraction would result in smaller cumulative losses (4¾ percentage points).<sup>51</sup> The net difference in the unemployment rate (at 1¼ percentage points) would also be smaller than previously. In a stochastic environment, these results suggest that unemployment variability decreases with a higher  $\gamma$  (i.e., with a steeper and more symmetric Phillips curve), while the variance effect on average unemployment is smaller.<sup>52</sup>

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<sup>49</sup>Here, the Bundesbank is assumed to follow a money targeting rule as described in Paul Masson, Steven Symansky, and Guy Meredith, 1990, "MULTIMOD Mark II: A Revised and Extended Model," *IMF Occasional Paper* 71.

<sup>50</sup>If  $\lambda$  were also increased from 0.45 to 0.6, back of the envelope calculations using the model in the appendix translate these parameter changes into a one-quarter decrease in the degree of both real wage and nominal rigidity.

<sup>51</sup>A higher value for  $\gamma$  acts to "tilt" the Phillips curve, making it more vertical in both excess demand and supply regions; hence, smaller unemployment effects of the monetary shock obtain in both directions. In the limit, as  $\gamma \rightarrow \infty$ , the Phillips curve becomes a vertical line at  $u^*$ .

<sup>52</sup>Stochastic simulations (i.e., repeated trials with random shocks) in MULTIMOD (not reported) (continued...)

54. Overall, these results highlight the fact that countries with significant asymmetries (low  $\gamma$ ) in the wage-price mechanism will operate at a level of unemployment higher than in the absence of shocks or these asymmetric effects. A lasting increase in the variance of shocks would ratchet up the natural rate of unemployment rate, whereas episodes of high variability would tend to raise unemployment (on average) on a persistent rather than permanent basis. Conversely, countries with more symmetric adjustment will be less vulnerable to the variance effects of external disturbances on the average level of output and employment.

55. In terms of policy, structural reforms which address the underlying rigidities in labor and product markets will affect unemployment through two broad channels. There will be an *indirect* effect stemming from reduced asymmetry which would lower the gap between average and structural unemployment, reflecting the economy's increased ability to respond flexibly to shocks; in addition, there will likely be a *direct* effect on the level of structural unemployment itself.<sup>53</sup> The tabulation below illustrates the long-run effects of structural reforms in MULTIMOD when the Phillips curve is made more symmetric in Germany along the lines discussed above (i.e., raising  $\gamma$  to 2.5 and  $\lambda$  to 0.6).<sup>54</sup> The long-run decline in the natural unemployment rate essentially reflects the decline in the gap (1 percentage point) attained through greater market flexibility, as well as the direct impact on structural unemployment (about 1 percentage point).<sup>55 56</sup>

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<sup>52</sup>(...continued)

were used to verify the effects of different degrees of asymmetry ( $\gamma$ ) on unemployment variability and the size of the variance effects on average unemployment.

<sup>53</sup>This latter channel is not modeled in this reduced-form framework, although many examples of such analysis have been conducted, usually through explicit consideration of wage and price setting equations. See Richard Layard, Stephen Nickell, and Richard Jackman, 1991, *Unemployment: Macroeconomic Performance and the Labor Market*, Oxford University Press, for an overview; see Leslie Lipschitz, and Donough McDonald, eds., 1990, *German Unification: Economic Issues*, IMF Occasional Paper No. 75 (Washington: International Monetary Fund), for analysis regarding Germany. See Olivier Blanchard and Lawrence Katz, 1997, "What We Know and Do Not Know About the Natural Rate of Unemployment," *Journal of Economic Perspectives*, Vol. 11 for a critical review of this literature.

<sup>54</sup>In above tabulation,  $\phi$  also declines. Changes in  $\phi$  alone largely affect the shape of the Phillips curve in the excess demand region (e.g., Chart I-A1). Changes in both  $\phi$  and  $\gamma$  can allow the adjusted Phillips curve to also lie uniformly below or above the unadjusted curve (tangent at  $u^*$ ) by changing the degree of curvature in *both* the excess demand and supply regions.

<sup>55</sup>The indirect (variance) effect is approximated in the deterministic simulations analytically. Using a second-order Taylor expansion of the convex function, one can obtain—*conditional*  
(continued...)



### Germany: Structural Reforms and Reduced Asymmetries

(In percent deviation from baseline, unless noted otherwise)

	Long-Run Effects
Real GDP	2.0
Unemployment rate 1/	-2.1
Natural rate of unemployment 1/	-2.1
Structural rate of unemployment 1/	-1.1
GNP deflator	-2.0
inflation	0.0

Source: IMF staff calculations.

1/ Percentage point deviation from baseline level.

### F. Multi-Country Simulations

56. Applying the same basic framework to a multi-country context, one can examine the implications of asymmetries in the wage-price mechanism on macroeconomic adjustment under alternative policy regimes. In particular, the effects of various shocks on Germany are considered under ERM and a broad EMU, as well as the comparative country responses within a given policy regime.

57. Under the ERM regime, it is assumed that German monetary policy follows an inflation targeting rule geared toward *domestic* inflation (and output) objectives,<sup>57</sup> while its

<sup>55</sup>(...continued)

on  $u^*$ —an approximate solution for the gap  $\alpha$  between the natural and structural rates of unemployment as a function of  $\phi$ ,  $u^*$  and the conditional variability  $\sigma^2$  of  $u$ :

$$\alpha \equiv E[u - u^*] = \frac{E[(u - u^*)^2]}{(u^* - \phi)} \text{ or } \alpha = (u^* - \phi)/2 - \sqrt{\{(u^* - \phi)/2\}^2 - \sigma^2};$$

where  $E[.]$  denotes a conditional expectation.

<sup>56</sup>Using equation (A4) in the appendix, back of the envelope calculations show that an decline in real wage rigidity by 20 percent would lead to a proportional decline in  $u^*$ .

<sup>57</sup>The specification follows a forward-looking Taylor rule with conventional weights on inflation and economic activity. See for example Paul Masson, and Bart Turtelboom, "Characteristics of the Euro, the Demand for Reserves, and Policy Coordination Under EMU," IMF mimeo. See Richard Clarida, Jordi Gali, and Mark Gertler, 1997, "Has the

(continued...)

ERM partner countries adjust domestic interest rates to maintain their bilateral exchange rates vis-à-vis the deutsche mark within a given exchange rate band. For Austria, Belgium, Italy, France and the Netherlands, the bands are “tight” (2¼ percent width); for Denmark, Finland, Ireland, Portugal and Spain, the bands are “loose” (15 percent).<sup>58</sup> Under the EMU regime, which consists of all the ERM countries plus Sweden, the United Kingdom, and Greece,<sup>59</sup> monetary policy is centralized, identical for all members, and follows a comparable inflation targeting rule but now geared toward *EMU-wide* indicators.

58. Table I-4 displays the effects of a *country-specific* demand shock on Germany on its major macroeconomic variables under each policy regime. Specifically, German investment and consumption levels are assumed to decline initially, reflecting an exogenous loss in private sector confidence; consumption and investment decline by about 2 percent and 6 percent (from baseline) in the first year, with some declining residual effect in subsequent years. The dynamic and long-run effects—expressed as deviations from baseline—of this “business-cycle” type shock are shown in the table.<sup>60</sup>

59. With monetary policy focused on EU-wide rather than national objectives,<sup>61</sup> the adverse effects of the shock are more pronounced for Germany under EMU than under ERM; thus output would be lower (by about 0.3 percentage point of GDP) and the unemployment rate would be higher (by about 0.1 percentage point) in the first year. A potential increase in

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<sup>57</sup>(...continued)

Bundesbank Followed A Taylor Rule?” Columbia and New York University, mimeo, for empirical evidence on the Bundesbank’s conduct of monetary policy in terms of the Taylor rule. Results are qualitatively similar under money targeting.

<sup>58</sup>See Paul Masson, and Bart Turtelboom, 1997, “Characteristics of the Euro, the Demand for Reserves, and Policy Coordination Under EMU,” IMF Working Paper, WP/97/58, for details of the exact policy rules under both regimes a further description of the MULTIEU version of MULTIMOD, and treatment of the risk premia under ERM and EMU.

<sup>59</sup>All members of the European Union have been included in EMU.

<sup>60</sup>The analysis of shocks under EMU versus ERM neglects the potential differences in the baseline or control solution which might emerge under the two policy regimes. Instead, the analysis focuses on the deviations from each respective baseline.

<sup>61</sup>Richard Clarida, Jordi Gali, and Mark Gertler, 1997, “Has the Bundesbank Followed A Taylor Rule?” Columbia and New York University, mimeo, argue that German monetary policy has pursued both domestic inflation and output objectives over the past twenty years, largely through managing short-term interest rates (following a Taylor rule) in a manner broadly similar to that in the United States; comparative stabilization performances can be seen in Table I-A1.

Table I-4. Germany: Comparative Effects of a Demand Disturbance  
under Alternative Policy Regimes 1/

(In percent deviation from baseline, unless noted otherwise)

ERM	1997	1998	1999	2000	2001	2002	2003	Long Run
Real GDP	-0.9	-0.4	-0.2	0.0	0.0	-0.1	-0.1	0.0
Unemployment rate 2/	0.3	0.1	0.0	-0.1	-0.1	0.0	0.0	0.0
GNP inflation	-0.1	-0.1	-0.0	-0.0	0.0	0.1	0.1	0.0
Real interest rates (short) 2/	-0.2	-0.3	-0.3	-0.3	-0.2	-0.1	-0.1	0.0
Real interest rates (long) 2/	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.0	0.0
Real exchange rate (effective) 3/	-1.1	-1.0	-0.8	-0.6	-0.4	-0.3	-0.2	0.0
EMU	1997	1998	1999	2000	2001	2002	2003	Long Run
Real GDP	-1.2	-0.8	-0.6	-0.2	0.0	0.0	0.1	0.0
Unemployment rate 2/	0.4	0.3	0.2	0.0	0.0	0.0	-0.1	0.0
GNP inflation	-0.1	-0.2	-0.1	-0.1	0.0	0.0	0.1	0.0
Real interest rates (short) 2/	0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.0
Real interest rates (long) 2/	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0
Real exchange rate (effective) 3/	-0.3	-0.3	-0.4	-0.5	-0.5	-0.5	-0.4	0.0

Source: IMF staff calculations

1/ Under inflation targeting based on either national or EU aggregates.

2/ Percentage point deviations from baseline level.

3/ Inverted scale where an increase denotes an appreciation for the home currency.

economic variability in Germany associated with country-specific shocks under an EU-wide (rather than German) monetary policy would expose the economy more to the effects of these asymmetries than in the past. This would tend to raise the NAIRU over time in the absence of further structural reforms. An increase in unemployment variability of one-third to two-thirds, for example, could over time raise the average unemployment rate in Germany (given its structural rate) by  $\frac{1}{2}$  to 1 percentage point, *other things being equal*.

60. An important caveat should be noted here: other things may *not* be equal across the two policy regimes. To the extent that a change in regimes affects the distribution of shocks, risk premia, etc., the level outcomes under each scenario may be somewhat different. The present analysis of shocks under EMU versus ERM neglects these potential differences in the baseline or control solution which might emerge and focuses instead on the deviations from each respective baseline. Hence, implications regarding the *absolute* welfare implications across the two regimes are difficult to draw. However, to the extent that the benefits of (say) monetary union accrue to all its member countries somewhat evenly, country differences across regimes concerning the response to shocks (as deviations from baseline) can be illustrative of the *relative* economic implications across countries.

61. In this regard, the differential effects of country-specific shocks under these alternative policy regimes may be less important for other countries. As ERM participants have to some extent already relinquished an independent monetary policy—particularly those operating under tight bands, monetary union with a monetary policy that seeks to stabilize area-wide economic conditions could represent a beneficial regime shift. For those countries, the effects of adverse country-specific shocks may be broadly similar, or even diminished, under EMU compared with ERM. Simulations of the same country-specific shocks in MULTIMOD (not reported) in the case of France, for example, support this proposition, showing quantitatively similar output and employment effects under the two policy regimes.<sup>62</sup> Consequently, the removal of Germany's asymmetric ability to conduct monetary policy according to national objectives may entail a rise in unemployment *relative* to many of its EMU partner countries when each are subject to country-specific shocks.

62. For a given policy regime, the current analysis also suggests that countries with different institutional and structural features and varying degrees of asymmetries may respond to *common* shocks differently. For example, a uniform increase in the volatility of external disturbances would have differential implications for unemployment across countries owing to substantial differences in their wage-price mechanisms. Although the comparative effects would reflect a variety of factors (e.g., openness, initial conditions, etc.) in addition to the shape of the Phillips curve, countries such as Germany, which are hampered by more severe rigidities and asymmetries, would tend to experience a larger rise in unemployment variability

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<sup>62</sup>Additional simulations also show that further structural reforms and more flexible labor markets in France would further improve these outcomes under *either* regime, highlighting the benefits of labor market reforms in countries other than Germany.

and, consequently, in the natural rate of unemployment. In the case of Germany, for example, an increase in the variability of shocks sufficient to raise average unemployment by 1 percentage point given present asymmetries ( $\gamma=1.5$ ,  $\lambda=0.45$ ) would lead to an increase of only  $\frac{1}{2}$  percentage point if its labor markets were more flexible ( $\gamma=2.5$ ,  $\lambda=0.6$ ).<sup>63</sup>

63. These comparative differences in average unemployment effects are *compounded* when country differences in longer-term trends in structural unemployment are also considered. Extrapolating from past trends, unemployment levels in west Germany would further rise by  $1\frac{1}{2}$  percentage points after five years, compared to smaller increases for Denmark (1 percentage point) and France ( $\frac{1}{2}$  percentage point), unchanged longer-term unemployment in the Netherlands, and a trend decline for Ireland ( $\frac{1}{2}$  percentage point).

64. From a policy standpoint, countries with rigid labor markets are confronted with challenging fiscal implications. With higher average unemployment through less flexible labor market adjustment or through continuing rises in structural unemployment, countries like Germany potentially face larger burdens on public finances through larger social transfers. Under the conditions of the Stability Pact, these higher fiscal burdens would leave countries with more rigid labor markets with less room to maneuver and could give rise to difficult policy dilemmas under EMU in the absence of further structural reforms. All in all, these simulations reinforce the proposition that entering a currency union places greater stress on reforming labor and product markets.

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<sup>63</sup>Analytically, the change in average unemployment as a function of the change in unemployment variability can be approximated as follows:  $d\alpha = [(u^* - \phi) - 2\alpha]^{-1}d\sigma^2$ , where the change in  $\sigma^2$  depends on  $\gamma$ . Stochastic simulations in MULTIMOD were used to quantify the effects of different degrees of asymmetry ( $\gamma$ ) on unemployment variability.

### ILLUSTRATIVE MODEL

65. A very simple derivation of a non-linear Phillips curve is presented to motivate the empirics as well as to provide some further insight into the possible features of labor (and goods) markets which may underlie the implied nexus between wages, prices and employment. To proceed, we borrow from the framework discussed in Layard, Nickell, and Jackman (1991) and Clark and Laxton (1997). Specifically, we assume that price-setting and wage-setting behavior can be characterized respectively as follows:

$$p = w + \delta_0 - \delta_1 u, \quad (A1)$$

$$w = p^e + \varphi_0 - \varphi_1 u. \quad (A2)$$

Equation (A1) specifies that (log) prices  $p$  are set as a (constant) mark-up over unit labor costs, expressed in terms of (log) wages  $w$  and the rate of unemployment  $u$ , which can also be related to output or capacity utilization via Okun's law. Equation (A2) represents a target real wage expression in which  $\varphi_1$  signifies the responsiveness of real wage demands to level of unemployment, and  $p^e$  is the expected price level.

66. In the presence of nominal inertia, the observed price is assumed to only gradually adjust to the target price (as described in equation (A1); denoted now with a bar):

$$\Delta p = \lambda_1(\bar{p} - p_{-1}) + \lambda_2 \Delta p_{-1}. \quad (A3)$$

Note that the first term on the right hand side represents an error-correction mechanism, while the second term introduces (higher-order) inertia in inflation ( $\pi = \Delta p$ ) and not just the price level.<sup>64</sup>

67. Using these three equations, one can show that in expectational equilibrium ( $p = p^e$ ), with non-accelerating prices ( $\Delta \pi = 0$ ), the equilibrium unemployment rate or NAIRU is given by:

$$u^* = \frac{\varphi_0 + \delta_0}{\varphi_1 + \delta_1}. \quad (A4)$$

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<sup>64</sup>We also impose that  $\lambda_1 + \lambda_2 = 1$  in equation (A3) which translates it into an error-correction equation for *inflation* rather than the price level:  $\Delta \pi = \lambda_1(\bar{\pi} - \pi_{-1})$ ; this implies inflation persistence, given by  $1 - \lambda_1$  and yields a non-zero (steady-state) equilibrium inflation rate where  $\pi_{-1} = \pi = \bar{\pi}$ .

Away from the NAIRU, a linear expectations-augmented Phillips curve summarizes the (reduced-form) relationship between inflation and unemployment :

$$\pi = \lambda_1 \pi^e + (1 - \lambda_1) \pi_{-1} - \lambda_1 (\varphi_1 + \delta_1) (u - u^*), \quad (\text{A5})$$

where expected inflation is defined by:  $\pi^e = p^e - p_{-1}$ . Note that in equilibrium,  $\pi_{-1} = \pi = \pi^e$  in conjunction with an unemployment rate at its NAIRU level  $u^*$  shown in (A4). In equation (A5), note that the tradeoff coefficient on the unemployment gap reflects the degree of nominal rigidity which depends on  $\lambda_1$ , and—following the discussion in Layard, Nickell, and Jackman (1991)—the degree of real wage rigidity  $RWR = (\varphi_1 + \delta_1)^{-1}$  implied by the price- and wage-setting equations. The interaction between these two considerations determines the slope of the Phillips curve or the constant short-run trade-off between inflation and unemployment. For example, greater nominal flexibility (larger  $\lambda_1$ ) implies a steeper linear Phillips curve.

68. However, if this coefficient is *no* longer fixed and independent of labor market conditions, non-linearities in the output-inflation process are introduced. For example, if we posit that the degree of real wage rigidity is not constant but is instead a *function* of the level of unemployment:  $RWR = h(u)$ ;  $h' > 0$ , the Phillips curve would exhibit convexity. In the case where this functional form is linear:  $h(u) = \Lambda u - \Omega$ , we can rewrite the Phillips curve as follows:

$$\pi = \lambda_1 \pi^e + (1 - \lambda_1) \pi_{-1} - \gamma \left( \frac{u - u^*}{u - \Omega/\Lambda} \right); \quad \gamma \equiv \lambda_1 / \Lambda. \quad (\text{A6})$$

69. Note that from the above equation that an increase in nominal flexibility (increase in  $\lambda_1$ ) or an increase in real wage flexibility (smaller  $\Lambda$ ) raises the coefficient  $\gamma$  in the above expression. This equation is basically the specification in equation (3) in the case of inflation inertia.<sup>65</sup> The motivation for the assumption on  $h(\cdot)$  can be found in the implications of several labor market models. In many theories of unemployment, the degree of real wage resistance (and the wage gap) *increases* in the face of higher unemployment and market pressures for a wage decline.

70. For example, in incentive wage models, employers find it desirable to pay efficiency wages greater than the market-clearing wage in order to induce effort, sustain morale, reduce turnover, avoid adverse selection problems, etc., which places an effective floor (i.e., asymmetry) on adjustment in real wages regardless of the level of unemployment. The effect is

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<sup>65</sup>Note that in this very simple model that the lower bound on the unemployment rate  $\phi$  can be expressed solely as a function of the parameters  $\Omega$ ,  $\Lambda$  characterizing real wage rigidity, but perhaps unrealistically so, as a decrease in real wage rigidity *raises* this lower bound.

that the degree of real wage rigidity and wage gap would increase with the unemployment rate. Asymmetric wage bargaining could also generate a similar implication. In effect, once market rigidities respond to the level of activity and employment, we can no longer expect the wage-price mechanism to be linear.

71. In the presence of convexity in the Phillips curve,  $u^*$  no longer represents the natural rate of unemployment that would obtain in (stochastic) equilibrium. Instead, the economy would operate, on average, at a level of unemployment somewhat *above* the underlying NAIRU  $u^*$  associated with a deterministic equilibrium. Around  $u^*$ , disinflationary surprises lead to larger increases in unemployment than the decreases arising from symmetric inflationary shocks. Consequently, the extent to which the economy operates above the deterministic equilibrium level of unemployment depends on the variance of shocks, the effectiveness of stabilization policies, and the degree of convexity in the wage-price mechanism.



Table I-A1. Summary Statistics 1970-95 1/

	$u$			$\Delta u$			$\pi$			$\Delta \pi$			$\Delta y$		
	Mean	Var		Mean	Var		Mean	Var		Mean	Var		Mean	Var	
United States	6.67	1.65		0.08	1.19		5.04	4.80		-0.08	1.69		2.65	5.11	
Japan	2.18	0.30		0.08	0.04		4.06	17.47		-0.21	10.79		3.82	5.95	
Germany 2/	5.26	7.16		0.29	0.61		3.90	2.91		-0.08	1.43		2.57	3.83	
France	7.39	10.49		0.36	0.32		6.58	12.56		-0.18	1.53		2.57	2.85	
Italy	7.36	6.68		0.30	0.35		10.44	26.04		0.03	7.42		2.61	4.25	
United Kingdom	6.78	9.62		0.23	1.47		8.32	26.94		-0.11	15.07		2.06	5.40	
Canada	8.53	3.99		0.20	1.19		5.39	11.47		-0.11	4.28		3.20	5.85	
Denmark	7.44	11.98		0.33	1.10		6.38	11.25		-0.19	2.05		2.09	3.72	
Netherlands	5.63	7.81		0.24	1.02		4.21	9.74		-0.18	1.39		2.55	2.78	
Ireland	11.31	18.04		0.31	1.55		8.31	33.18		-0.32	16.55		4.17	5.77	
Spain	13.29	59.35		0.77	2.24		10.10	21.85		-0.01	5.75		2.89	5.06	

1/ Inflation  $\pi$  expressed in terms of the GDP deflator,  $y$  is log GDP; all variables expressed in percentage points.

2/ Data for West Germany; output series from 1970 to 1990 (period prior to unification).

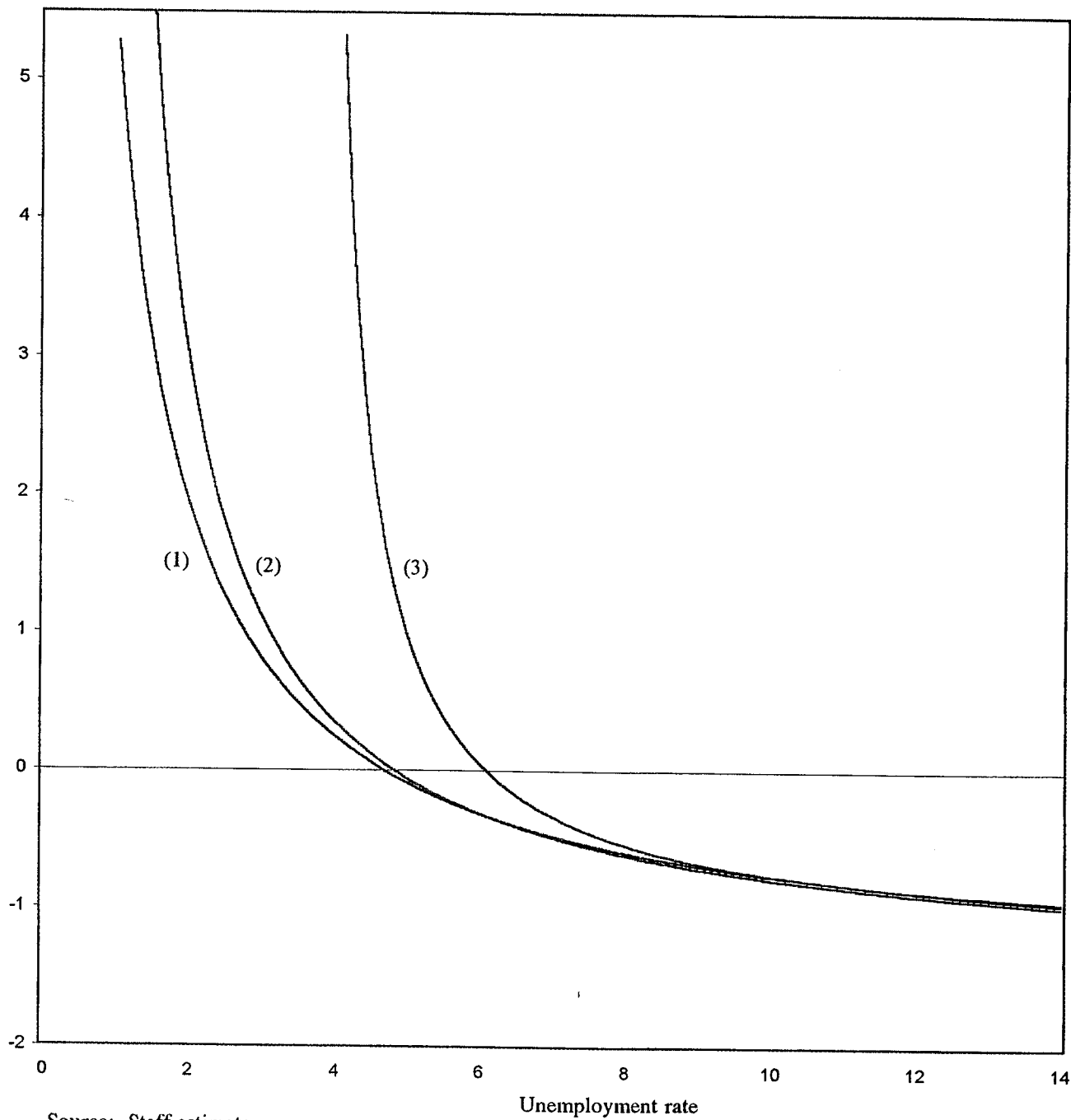
Table I-A2. Alternative (Convex) Phillips Curve Estimates

$$\text{Model: } \pi_t = \lambda \bar{\pi}_t + (1-\lambda)\pi_{t-1} - \gamma \left[ \frac{u_t - u_t^*}{u_t - \phi_t} \right] + \epsilon; \quad 0 \leq \phi < u^*$$

	Germany		France		Denmark	
	$\gamma$	$\lambda$	$\gamma$	$\lambda$	$\gamma$	$\lambda$
OECD data, 1972-90						
(1)	1.18**	0.59**	2.68**	0.34**	2.07**	0.25**
(2)	1.18**	0.59**	2.63**	0.36**	2.07**	0.25**
(3)	1.18**	0.59**	2.22**	0.52**	1.86**	0.22**
(4)	1.13**	0.59**	1.82**	0.29**	1.65**	0.24**
WEO data, 1967-90						
(1)	1.64**	0.55**	1.88**	0.30**	1.81**	0.21**
(2)	1.64**	0.55**	1.77**	0.31**	1.81**	0.21**
(3)	1.41**	0.51**	0.58	0.36**	1.49**	0.18**
(4)	1.51**	0.52**	1.48**	0.30**	1.47**	0.20**
W. Germany data, 1962-95						
(1)	1.43**	0.47**	...	...	...	...
(2)	1.42**	0.46**	...	...	...	...
(3)	1.23**	0.42**	...	...	...	...
(4)	1.35**	0.45**	...	...	...	...

Note: A \*(\*\*) indicates significance at the 5 (10) percent level.  
 Model (1):  $\phi_t = 0$ ; Model (2):  $\phi_t = u_t^* - 5$  percent;  
 Model (3):  $\phi_t = u_t^* - 2$  percent; Model (4):  $\phi_t = \min \{u_t\} / 2$ .  
 For comparability, estimates using WEO and OECD data cover the sample period prior to German unification.  
 The *non-oil* GNP price deflator is taken as the price measure in the WEO data; otherwise, inflation is in terms of the GDP deflator.

Chart I-A1.  
Germany 1/  
Alternative Convex Models



Source: Staff estimates.  
1/ Estimates refer to West Germany only.

## II. REAL LABOR COSTS, UNEMPLOYMENT, AND UNIFICATION<sup>1</sup>

72. The ratcheting up of the unemployment rate in Germany from the low levels of the 1960s to the high levels of the 1990s is a well-known and extensively-studied phenomenon. In chapter I, Germany was shown to have the greatest increase in structural unemployment among the G-7 countries and Denmark, Sweden, The Netherlands, Ireland and Spain. The Fund's staff has estimated the rate of structural unemployment at 8¾ percent for unified Germany in 1995.<sup>2</sup>

73. According to one view, this poor employment performance has been due in large part to inadequate real wage adjustment to input price shifts (e.g., brought on by the twin oil shocks, globalization, and labor-saving technical change), rather than to insufficient aggregate demand coupled with hysteresis effects in the labor market.<sup>3</sup> The observed increase in the unemployment rate and in the dependant labor income share from 1960 to the early 1980s, and their decline in the late 1980s, supports this view (Chart II-1). The wage bargaining process in Germany has been slow to adapt to changing demand conditions and productivity shifts. Indeed, the responsiveness of real wages to higher unemployment rates has been twice as slow in Germany as in France, The United Kingdom, and the United States.<sup>4</sup> This evidence, along with the results in chapter I that Germany has a relatively high degree of downward wage rigidity, suggests that real wages in Germany may indeed be too high.<sup>5</sup>

74. Unification in 1990 was a major shock to the factor markets in Germany. The integration of the new Länder resulted in an increase of 28 percent in the labor supply compared with an increase of 13 percent in the capital stock, according to recently released

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<sup>1</sup>Prepared by Victor Valdivia.

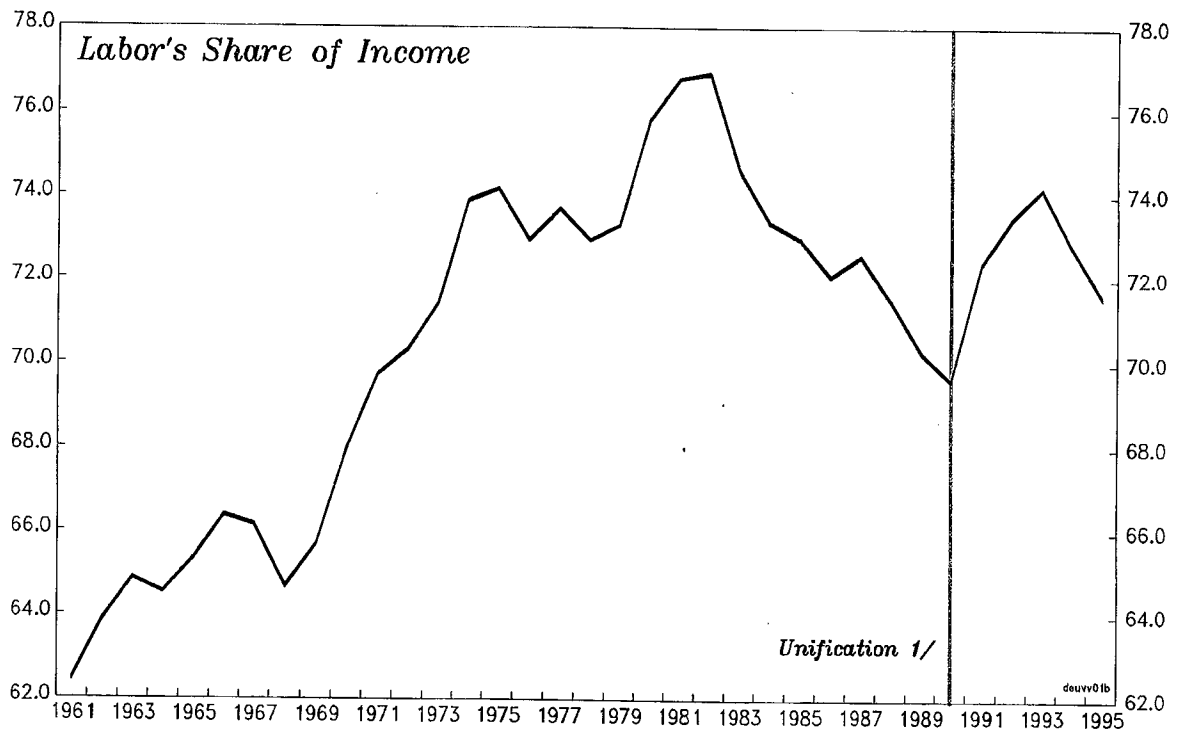
<sup>2</sup>The OECD's estimate for structural unemployment was even higher: 9 ½ percent (*OECD Economic Surveys: Germany 1996*, (Paris: OECD)).

<sup>3</sup>In this study, wages refer to total worker compensation including employers' contributions to social security funds and other social security expenditures by employers.

<sup>4</sup>*The OECD Jobs Study*, 1994, (Paris: OECD).

<sup>5</sup>A recent study revealed that Germany has the highest hourly compensation costs for production workers in manufacturing of all 28 countries included in the study. Costs in Germany were 80 percent higher than in the U.S. and the OECD average in 1996. See "International Comparison of Hourly Compensation Costs for Production Workers in Manufacturing, 1996", in *News*, Bureau of Labor Statistics (Washington, D.C.: U.S. Department of Labor).

Chart II-1. Germany: Unemployment and Labor's Share of Income  
(In percent)



Sources: IMF, World Economic Outlook; and Statistisches Bundesamt.

1/ Data prior to 1991 refer to West Germany only.

data.<sup>6</sup> Consequently, the ratio of capital to labor and labor productivity declined following unification (Chart II-2). If real wages were completely flexible and labor always earned its marginal product, real wages should have dropped with this decline in labor productivity. However, real wages in the eastern Länder rose and the labor's share of income also rose. In fact, in the period 1990-1995 real wages in the new and old Länder have risen by three percent whereas productivity declined by two percent. At the same time, unemployment rates have risen to record levels. This suggests that real wage rates did not adjust to reflect labor productivity.

75. This chapter measures the departure of observed real wages from the real wages "warranted" by a simple model of the German economy under the assumptions of competitive factor markets, flexible real wages, and full employment. This departure is termed the *wage gap*.<sup>7</sup> After the basic theory is presented, this paper explores the main empirical issues and computes a wage gap for Germany for the period 1960-1995. A wage gap is shown to have emerged in western Germany after the two oil price shocks but it had narrowed significantly by 1989. Following unification, the wage gap increased in western Germany but the wage gap for eastern Germany was even greater. The calculated wage gap for unified Germany is found to be significantly correlated with the observed unemployment rate for unified Germany. Halving the wage gap for unified Germany would reduce the German unemployment rate by approximately 3 percentage points.

### A. The Theory

76. The model economy has a production technology described by the aggregate production function,

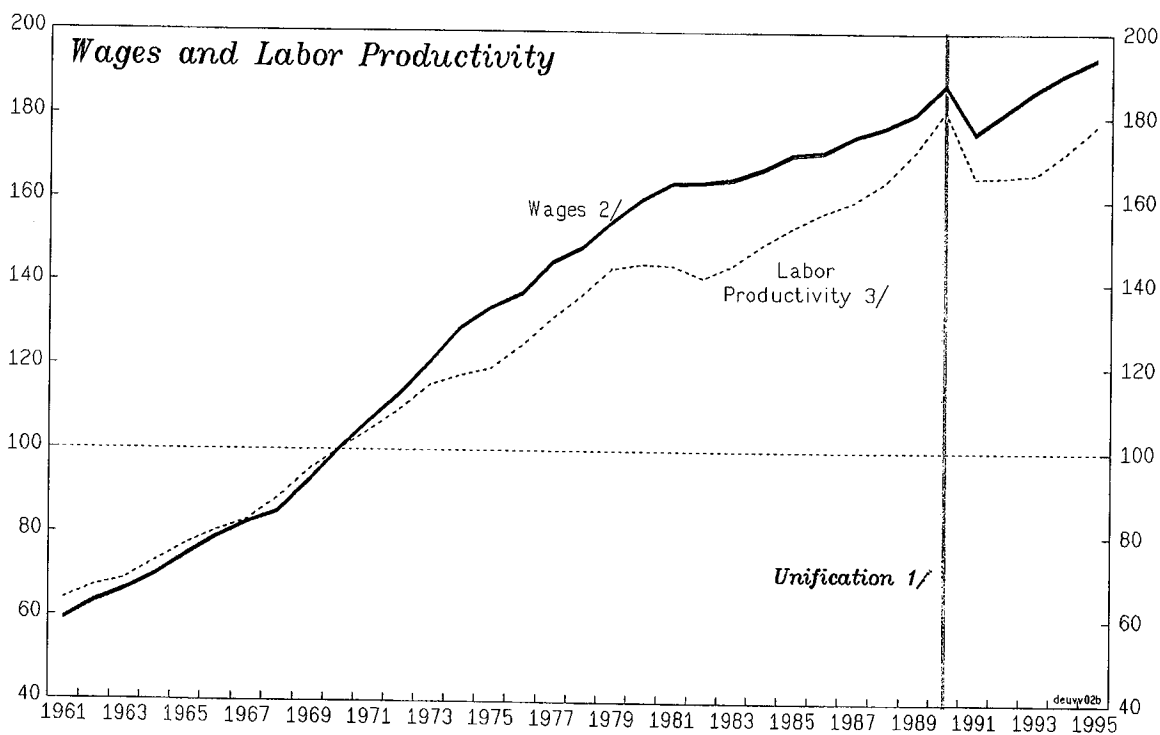
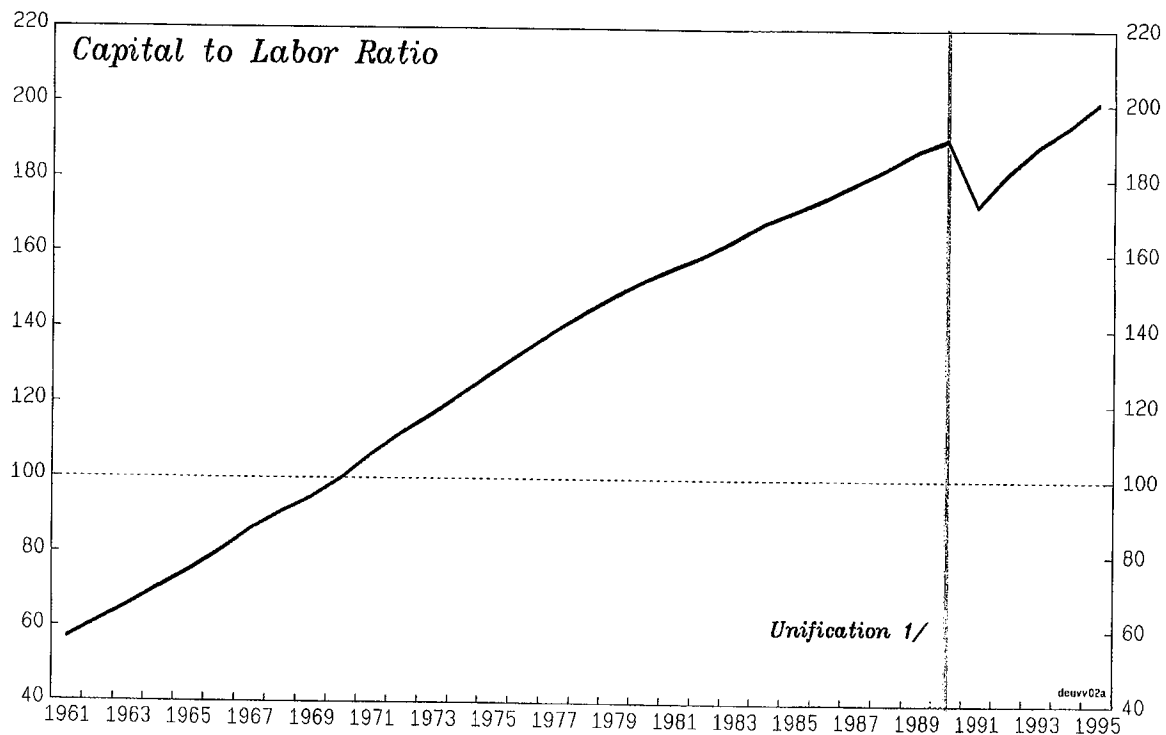
$$Y = f(K,L) \tag{1}$$

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<sup>6</sup>However, the increase in human and physical capital measured in effective units (i.e., old Länder equivalents) may not be the same.

<sup>7</sup>This study is an extension of the earlier work on wage gaps found in: Artus, Jacques, 1984, "The Disequilibrium Real Wage Hypothesis: An Empirical Evaluation," *Staff Papers*, International Monetary Fund, Vol. 31 (June), pp. 249-302; Lipschitz, Leslie, and Susan M. Schadler, 1984, "Relative Prices, Real Wages, and Macroeconomic Policies: Some Evidence from Manufacturing in Japan and the United Kingdom," *Staff Papers*, International Monetary Fund, Vol. 31, (June), pp. 303-338; and, more recently, Halikias, Ioannis, 1997, "An Analysis of the Wage Gap", in *Kingdom of the Netherlands-Selected Issues*, Country Report 97/139 (Washington: International Monetary Fund). The first two studies compute a wage gap only for the manufacturing sector, whereas this study and the one by Halikias estimate a wage gap for the whole economy. (Citations to the relevant economic literature can be found in these earlier papers.)

Chart II-2. Germany: Capital to Labor Ratio, Wages and Labor Productivity  
(Indices: 1970=100)



Sources: OECD Economic Indicators; and Statistisches Bundesamt.

- 1/ Data prior to 1991 refer to West Germany only.
- 2/ Total labor income per hour worked.
- 3/ Based on hours worked.

where  $Y$  is output and  $K$  and  $L$  are the capital and labor inputs, respectively. The production function is concave, increasing in  $K$  and  $L$ , and has the property that,

$$\lim_{K \rightarrow 0} f_K(K, L) = \infty, \quad \lim_{L \rightarrow 0} f_L(K, L) = \infty \quad (2)$$

so the firm uses all the available inputs. Hence, the only unemployment in this model would be frictional, resulting from job search, and  $L$  corresponds to the *natural* rate of employment. Assuming that firms maximize profits, and that the markets for labor and capital are competitive, the properties of the production function in (2) imply that the real wage equals the marginal product of labor,

$$W = f_L(K, L) \quad (3)$$

and the share of total income earned by labor is,

$$S_L = \frac{W \cdot L}{Y} \quad (4)$$

77. To illustrate how a wage gap might arise, consider the case where real wages initially reflect labor productivity. If wages are maintained constant by wage bargaining after the economy has been hit by a negative exogenous productivity shock, then real wages would exceed the marginal productivity of labor and a wage gap would develop. The wage gap concept is admittedly simple as many potentially important factors are left out of the model, such as the effects of wage dispersion, skill and regional mismatching, and labor supply. In particular, changes in demographics and labor market policies, such as the level and duration of unemployment benefits, could have considerable influence on labor supply at a given real wage. Thus, the wage gap is only a partial measure of wage rigidity and of the lack of competition in the labor market.

78. Computing the wage gap is a two-step process. First, the parameters of a production function are estimated using data for actual labor supply,  $L^*$ , output,  $Y^*$ , capital,  $K^*$ , and the observed labor's share of income,  $S_L^*$ .<sup>8</sup> In this paper, labor supply is measured by both employment and total hours worked. The second step involves the calculation of the labor's share of income,  $S_L$ , when the actual labor supply is equal to the warranted labor supply,  $L$  or

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<sup>8</sup>In the notation of this paper,  $X^*$  stands for the actual (observed) value of a variable and  $X$  is the value of the variable under the assumptions of the model.



the natural rate of employment. The natural rate was calculated based on the Fund staff's estimate of the NAIRU. Therefore,  $L$  can be computed using,

$$L = \frac{1-u}{1-u^*} L^* \quad (5)$$

where  $u$  is the NAIRU,  $u^*$  is the actual unemployment rate, and  $L^*$  is the actual labor supply.<sup>9</sup> Finally, the wage gap is calculated as,

$$wage\ gap \equiv S_L^* - S_L \quad (6)$$

## B. Wage Gap Estimation

79. In the first part of this section, the widely used Cobb-Douglas (CD) production function with constant returns to scale is estimated. Subsequently, a constant elasticity of substitution (CES) production function is estimated. (The CD production function is a special case of the CES production function corresponding to an elasticity of substitution of one.) The CES specification is frequently preferred to the CD form because under the latter, factor shares are constant over time and are not affected by changes in the capital-labor ratio. These restrictions could produce misleading estimates of the wage gap over time.

80. Assume that the aggregate production function in (1) is a constant returns to scale **Cobb-Douglas** function,

$$f(K,L) = \gamma L^\alpha K^{1-\alpha} \text{ with } \alpha \in (0,1) \quad (7)$$

Using (3) and (4), the labor's share of income is simply,

$$S_L^* = \alpha \quad (8)$$

The marginal product of a factor or its partial elasticity with respect to output is also equivalent to that factor's income share. The parameter  $\gamma$  is the efficiency parameter or scalar.

81. The log version of (7) could be estimated directly. However, this approach is problematic because the error in measuring factor inputs is likely to be considerable, and

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<sup>9</sup>When hours worked are used as a measure of labor supply, the series is adjusted using (4) as well.

because this procedure faces the econometric problems of multicollinearity and heteroskedasticity. To avoid these problems and the need for data on inputs, the factor shares' approach is often utilized.<sup>10</sup> Under the factor shares' approach the following equation is estimated,<sup>11</sup>

$$\log(Y^*/L^*) = \log\gamma + (1-\alpha)\log(K^*/L^*) \quad (9)$$

82. Before estimating (9), an augmented Dickey-Fuller test was performed on the data in levels. This test failed to reject the presence of a unit root. Therefore to produce stationary time series, first differences were taken prior to the estimation.<sup>12</sup> The estimation period was 1965-1989, and labor was measured by alternatively employment and hours worked (regressions A and B in Table II-1). Both versions of the estimated equation fit the data quite well (adjusted R<sup>2</sup> of more than 0.99), although the fit for hours worked was slightly better gauging by the higher value for the F-statistic. The labor coefficient was 0.70 using employment and 0.66 using hours worked. Both were statistically significant at the 99 percent confidence interval. The mean value of labor's share of income during the estimation period (1965-89) was 0.714. Using a Wald test, the equality of these estimates to the sample mean were tested. In both cases, the null hypothesis of equality could not be rejected.

83. Because the hours worked equation fitted the data marginally better and the value of  $\alpha=0.66$  is closer to the mean of labor's share of income during the 1960s, the warranted labor's share of income was set at  $S_L=0.66$ . The resulting wage gap,  $S_L^*-S_L$ , is shown in Chart II-3. The wage gap rose from 1960 to 1982, peaking at around 10 percent before declining to below 5 percent in 1989 prior to unification.

84. The estimated production function for pre-unification western Germany is then utilized for out-of-sample calculations of the wage gap for unified Germany. This assumes that the measured capital, labor, and the production technology of eastern Germany are the same as for western Germany so that aggregation is possible. To check whether the production function was unchanged after unification, the estimation period was extended from 1965-1989

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<sup>10</sup>For an overview of alternative econometric approaches to estimating production functions refer to Intriligator, Michael, Bodkin, Ronald and Hsiao, Cheng, 1996, *Econometric Models, Techniques, and Applications*, second edition (Upper Saddle River: Prentice-Hall).

<sup>11</sup>The shares method was used by Artus, Jacques, 1984, op cit., and, more recently, by the U.S. Congressional Budget Office for the United States.

<sup>12</sup>If a unit root is indeed present in the data, then the stochastic trend must be removed by first differencing. Incorporating a deterministic trend in the regression fails to remove the stochastic trend and also results in a mis-specification error.

Table II-1. Estimation Results for a CD Production Function

**A. Measure of Labor Supply: Employment (Sample period: 1965-1989)**

Included observations: 25

$$D(\text{LOGY\_L})=C(1)+(1-C(2))*D(\text{LOGK\_L})$$

	Coefficient	Std. Error	T-Statistic	Prob.		
C(1)	0.014325	0.007679	1.865480	0.0749		
C(2)	0.707221	0.175233	4.035881	0.0005		
R-squared		0.992303	Mean dependent var		-2.697061	
Adjusted R-squared		0.991969	S.D. dependent var		0.180864	
S.E. of regression		0.016209	Akaike info criterion		-8.167795	
Sum squared resid		0.006043	Schwartz criterion		-8.070285	
Log likelihood		68.62397	F-statistic		2965.247	
Durbin-Watson stat		1.490963	Prob(F-statistic)		0.000000	

**B. Measure of Labor Supply: Hours Worked (Sample period: 1965-1989)**

Included observations: 25

$$D(\text{LOGY\_H})=C(1)+(1-C(2))*D(\text{LOGK\_H})$$

	Coefficient	Std. Error	T-Statistic	Prob.		
C(1)	0.018208	0.007337	2.481602	0.0208		
C(2)	0.659625	0.138101	4.776403	0.0001		
R-squared		0.996409	Mean dependent var		-3.290760	
Adjusted R-squared		0.996253	S.D. dependent var		0.245223	
S.E. of regression		0.015010	Akaike info criterion		-8.321457	
Sum squared resid		0.005182	Schwartz criterion		-8.223947	
Log likelihood		70.54475	F-statistic		6382.763	
Durbin-Watson stat		1.185843	Prob(F-statistic)		0.000000	

**C. Measure of Labor Supply: Hours Worked (Sample period: 1965-1994, excluding 1991)**

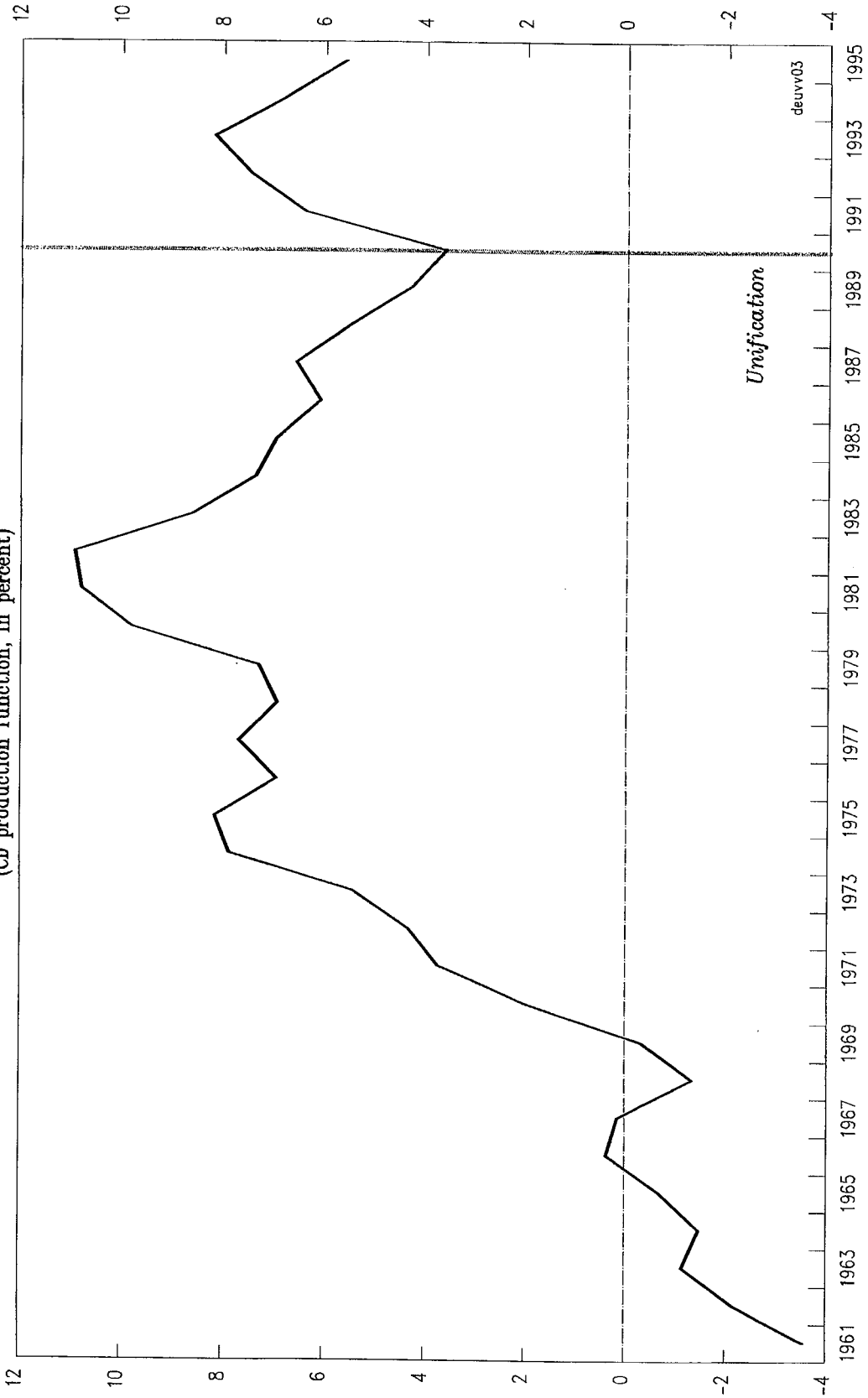
Included observations: 29

$$D(\text{LOGY\_H})=C(1)+(1-C(2))*D(\text{LOGK\_H})$$

	Coefficient	Std. Error	T-Statistic	Prob.		
C(1)	0.020258	0.007043	2.876564	0.0078		
C(2)	0.709357	0.135648	5.229397	0.0000		
R-squared		0.996538	Mean dependent var		-3.244361	
Adjusted R-squared		0.996410	S.D. dependent var		0.256226	
S.E. of regression		0.015353	Akaike info criterion		-8.286475	
Sum squared resid		0.006364	Schwartz criterion		-8.192179	
Log likelihood		81.00468	F-statistic		7772.066	
Durbin-Watson stat		1.107092	Prob(F-statistic)		0.000000	

### Chart II-3. Germany: Wage Gap

(CD production function, in percent)



Source: IMF staff estimates.

to 1965-1994 (regression C in Table II-1).<sup>13</sup> The estimated value of  $\alpha$  is 0.709 when the sample period is 1965-1994 compared with 0.707 for the period 1965-1989. Using a Wald test, the hypothesis that  $\alpha$  is the same in both estimations is not rejected at conventional confidence levels.<sup>14</sup> This result justifies the use of the same production function to calculate the wage gap since unification. The resulting wage gap for unified Germany was found to have jumped up immediately following unification but it appears to be slowly trending downwards since 1993 (see Chart II-3).

85. The calculated wage gap is sensitive to the definition of labor income. In this study, employee compensation (inclusive of employers' contributions to social security funds and other social security expenditures by employers) was utilized, which implicitly treats entrepreneurial income as capital income. Changes in the distribution of wage income from entrepreneurial to dependent sources could distort wage gap calculations over time. When the share of labor's income is adjusted for changes in self employment, the resulting wage gap calculations yield a negative wage gap in the 1990s.<sup>15</sup> This result is implausible given the well-documented high wage costs in Germany<sup>16</sup>, the high structural unemployment and recent wage gap calculations for several European countries.<sup>17</sup> Additional evidence is provided below, utilizing the less restrictive constant elasticity of substitution production function.

86. The **constant elasticity of substitution (CES)** aggregate production function has a constant elasticity which can take a value other than unity. A CES production function with constant returns to scale is written,<sup>18</sup>

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<sup>13</sup>The series have a break in 1991 caused by unification and the splicing of the time series. This break is an outlier in the estimation because the estimation is done in first differences. Therefore, 1991 data are omitted from the estimation.

<sup>14</sup>Chow tests could not be used to check for the stability of the estimate because the splicing of data for the old Länder and the new Länder in 1990-1991 introduced a series break. When a Chow breakpoint test was applied to the original estimation using the sample period 1965-1989, breaks were also detected in the years 1974-1975 and 1977-1980.

<sup>15</sup>Since the adjusted series has a downward trend, it is not surprising that a negative wage gap emerges. Under the CD specification, the wage gap is nothing more than the deviation of the labor's share of income from its mean. Hence, a decreasing series will have a negative wage gap.

<sup>16</sup>See footnote 4.

<sup>17</sup>Halikias, Ioannis, 1996, op cit.

<sup>18</sup>Artus, Jacques, 1984, op cit., also estimated a CES production function with constant

(continued...)

$$f(K,L) = \gamma[\alpha L^\rho + (1-\alpha)K^\rho]^{1/\rho} \quad (10)$$

As before, capital and labor are the two factors of production and the technology exhibits constant returns to scale. The parameter  $\alpha$  is the distribution parameter as in the CD production function and determines the relative factor shares in production. The other parameter  $\rho$  is the substitution parameter and determines the value of the elasticity of substitution. Then, under perfect competition and profit maximization, the real wage is given by,

$$W = \frac{dY}{dL} = \gamma^\rho \alpha (Y/L)^{1-\rho} \quad (11)$$

So the following relation can be estimated,

$$\log(Y^*/L^*) = a + \frac{1}{1-\rho} \log(W^*) \quad (12)$$

where  $W^*$  is the real wage.<sup>19</sup> The coefficient,  $1/(1-\rho)$ , is the elasticity of substitution and if it were unity (or if  $\rho$  were zero), the CES production function would collapse to a CD production function.

87. As before, first differences were taken to ensure stationarity of the variables. The results for equation (12) using employment and hours worked are shown in regressions A and B in Table II-2. Again both versions yielded good results with the hours-worked equation appearing to have a marginally better fit. The coefficients are statistically significant at the 99 percent confidence interval. Moreover, the coefficients are virtually identical.

88. The two parameters,  $a$  and  $\rho$ , are sufficient to compute  $S_L$  and the wage gap. This is done by solving for  $S_L$  from the following equation,

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<sup>18</sup>(...continued)

returns to scale. Estimates of aggregate production functions for industrial countries generally exhibited constant returns to scale.

<sup>19</sup>Details of the specification are given in Intriligator, Michael, Bodkin, Ronald and Hsiao, Cheng, 1996, op cit.

$$\log(Y/L) = \alpha + \frac{1}{1-\rho} \log(S_L \cdot Y/L) \quad (13)$$

Here, the relation  $W=S_L \cdot Y/L$  from equation (4) was used. Therefore, potential output,  $Y$ , and full employment labor supply,  $L$ , are required to obtain  $S_L$  from (13) using the parameters estimated from equation (12). Potential output is obtained by adjusting actual output by the Fund staff's estimate of the output gap, and full employment is obtained using equation (5).<sup>20</sup>

89. The calculation of the wage gap does not require the estimation of all the parameters of the CES production function in (10), because equation (12), with only two parameters, is estimated instead.<sup>21</sup> Since the estimation was performed in first differences, equation (13) cannot be employed directly to obtain  $S_L$ , rather it yields only changes in  $S_L$ . Therefore, to construct the  $S_L$  series a further assumption is needed regarding the *level* of  $S_L$ . For example, it could be assumed that  $S_L^* = S_L$  for a particular year or for a period of years. For the calculations made in this paper, it was assumed that  $S_L^*$  equals  $S_L$  during the 1960s when the annual unemployment rate averaged less than 1 percent.<sup>22</sup>

90. The estimated values of  $S_L$  are shown in the top panel of Chart II-4, and calculated wage gaps are plotted in the bottom panel. As in the CD specification, the wage gap rose during the 1970s and early 1980s, spiking upwards with the twin oil price shocks and reaching 10 percent in 1983. (Focusing only on the manufacturing sector, previous estimates of the real wage gap in Germany, showed that the gap reached about 10 percentage points in 1982.<sup>23</sup>) The calculated wage gap then declined to 5 percent in 1990. With unification, the wage gap

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<sup>20</sup>Using actual output instead of potential output introduces only a small error in the value of the wage gap (e.g. the error is less than 2 percent in the 1990s wage gap).

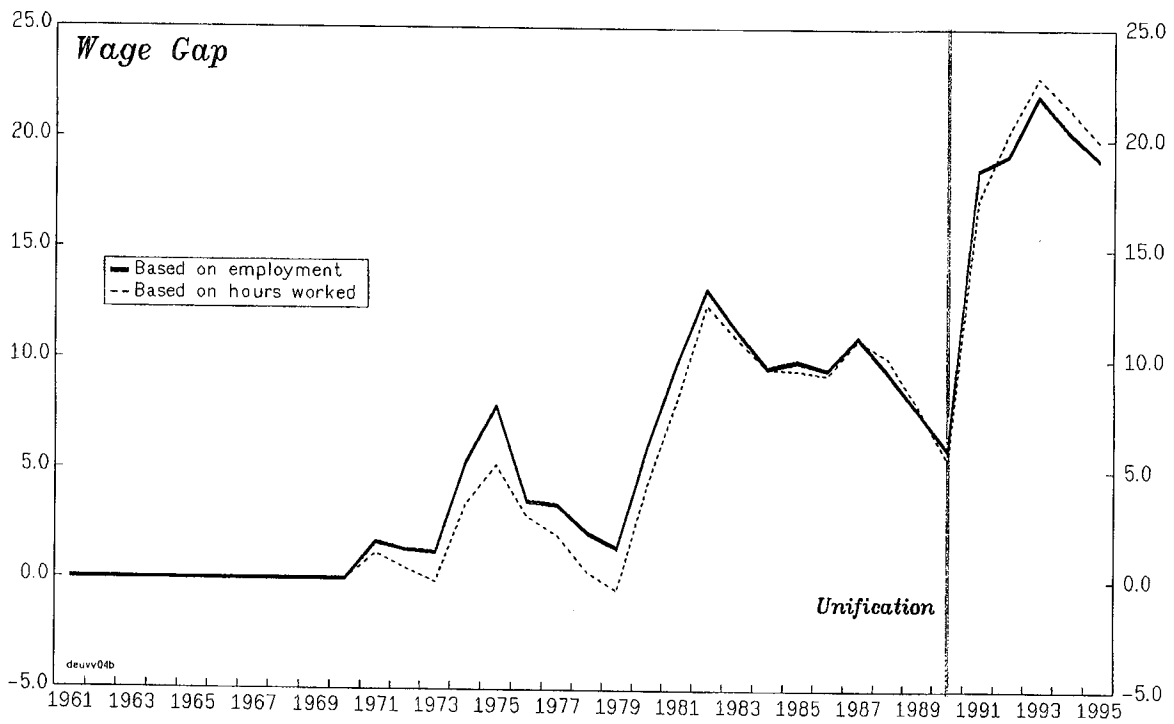
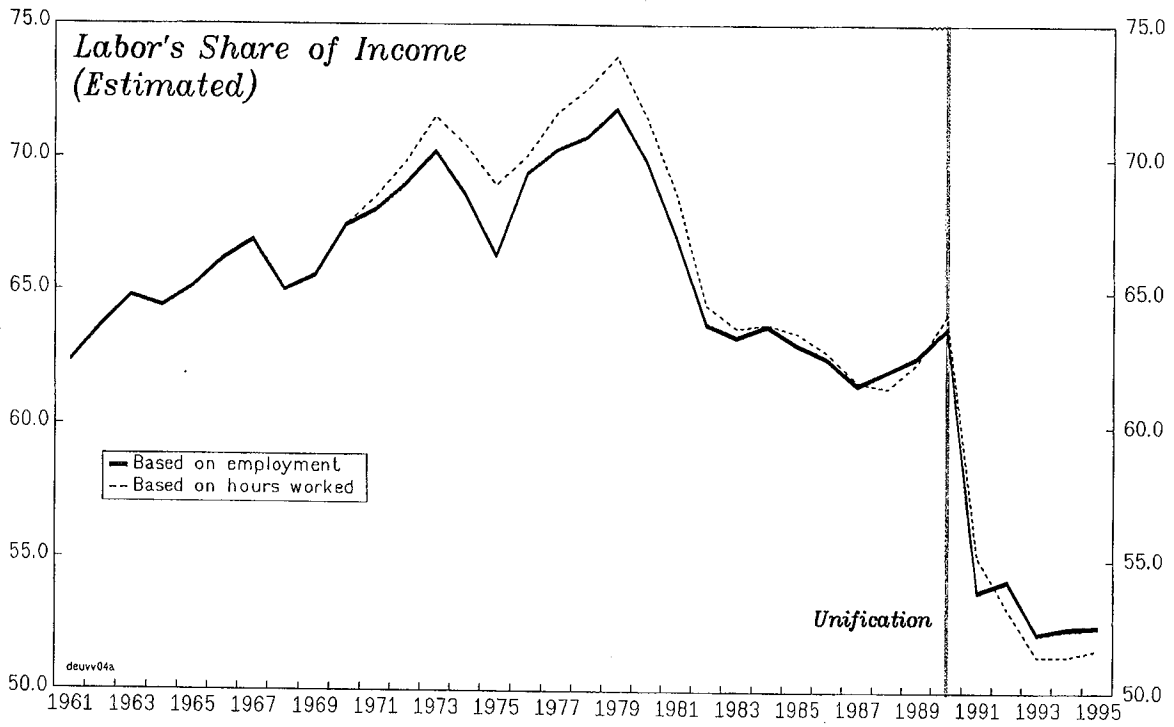
<sup>21</sup>A CES production function for western Germany for the period 1971-94 was estimated in Ziebarth, Gerhard, 1995, "Methodology and Technique for Determining Structural Budget Deficits", Discussion Paper 2/95, Economic Research Group of the Deutsche Bundesbank. He estimates a scalar elasticity ( $\lambda$ ) of 1.11, indicating increasing returns to scale. His estimate for the substitution parameter ( $\rho$ ) differs from the results reported here. Also, the estimated labor share parameter,  $\alpha$ , is 0.38, which is considerably lower than would be expected from the data. Possible explanations for these differences in estimated parameters may be the deterministic de-trending use by Ziebarth compared with first differences used here (see footnote 9) and the a priori restriction of constant returns to scale employed in this study.

<sup>22</sup>The same assumption was made by Artus, Jacques, 1984, op cit.

<sup>23</sup>Artus, Jacques, 1984, op cit.

Chart II-4. Germany: Labor's Share of Income and Wage Gap

(CES production function, in percent)



Source: IMF staff estimates.



surged upward to more than 20 percent. This result is obtained when either employment or hours worked are used as the measure of labor supply.<sup>24</sup>

91. To check whether the production function estimated using 1965-1989 data from the old Länder is unchanged after unification, the sample period of the estimation is extended to 1994 (regression C in Table II-2). A Wald test was used to formally test the equality of the pre- and post-unification production functions, and the coefficients were found not to be significantly different.<sup>25</sup>

92. To understand the higher wage gap since unification, recall that the wage gap increases with a rise in  $S_L^*$ , which clearly rose in the 1990s, or a decline in  $S_L$ , which fell sharply after unification. The drop in the warranted share of labor income was due to the fall in labor productivity following unification. This relation between the share of labor and productivity is obtained by rearranging equation (13),

$$S_L = \gamma^\rho \alpha \left[ \frac{Y}{L} \right]^{-\rho} \quad \text{with } \rho < 0 \quad (14)$$

93. To examine the fraction of the higher wage gap following unification due to the drop in  $S_L$  (as opposed to the fraction due to the rise in  $S_L^*$ ), the wage gap was recalculated assuming that labor productivity remained at its 1990 level. Under this assumption, the wage gap would have been more than halved to 5-10 percent (see Chart II-5).

94. In addition to estimating the wage gap for unified Germany, the wage gap for the old Länder alone can be estimated. Using the observed labor productivity for the old Länder and the estimated CES production function, a wage gap for the old Länder was calculated at about 5 percent in 1991 (Chart II-6). By 1994 the wage gap in western Germany exceeded

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<sup>24</sup>As in the CD case, the estimated wage gap depends on the definition of labor income. The estimated wage is smaller when the labor share of income is adjusted for changes in the distribution of income (from entrepreneurial to dependant workers). This wage gap rose after unification, peaked at 13 percent in 1993, and then dropped to 11 percent by 1995.

<sup>25</sup>As before, data for 1991 are excluded from the sample because of the break in the time series associated with unification (and the splicing of time series). This, however, prevents the use of Chow tests to check for the stability of the production function. Alternatively, a Wald test was used to test whether the estimation coefficients from the different sample periods were different. In contrast to the CD case, when a Chow breakpoint test was applied to the original estimate using the sample period 1965-1989, no breaks were detected (see footnote 11).

Table II-2. Estimation Results for a CES Production Function

**A. Measure of Labor Supply: Employment (Sample period: 1965-1989)**

Included observations: 25

$$D(\text{LOGY\_L})=C(1)+C(2)*D(\text{LOGW\_L})$$

	Coefficient	Std. Error	T-Statistic	Prob.		
C(1)	0.012671	0.004625	2.739812	0.0117		
C(2)	0.452150	0.126492	3.574532	0.0016		
R-squared		0.994451	Mean dependent var		-2.697061	
Adjusted R-squared		0.994210	S.D. dependent var		0.180864	
S.E. of regression		0.013762	Akaike info criterion		-8.495060	
Sum squared resid		0.004356	Schwartz criterion		-8.397550	
Log likelihood		72.71479	F-statistic		4122.207	
Durbin-Watson stat		1.563870	Prob(F-statistic)		0.000000	

**B. Measure of Labor Supply: Hours worked (Sample period: 1965-1989)**

Included observations: 25

$$D(\text{LOGY\_H})=C(1)+C(2)*D(\text{LOGW\_H})$$

	Coefficient	Std. Error	T-Statistic	Prob.		
C(1)	0.017476	0.004775	3.659735	0.0013		
C(2)	0.451896	0.106273	4.252218	0.0003		
R-squared		0.997459	Mean dependent var		-3.290760	
Adjusted R-squared		0.997348	S.D. dependent var		0.245223	
S.E. of regression		0.012627	Akaike info criterion		-8.667144	
Sum squared resid		0.003667	Schwartz criterion		-8.569634	
Log likelihood		74.86584	F-statistic		9028.089	
Durbin-Watson stat		1.355561	Prob(F-statistic)		0.000000	

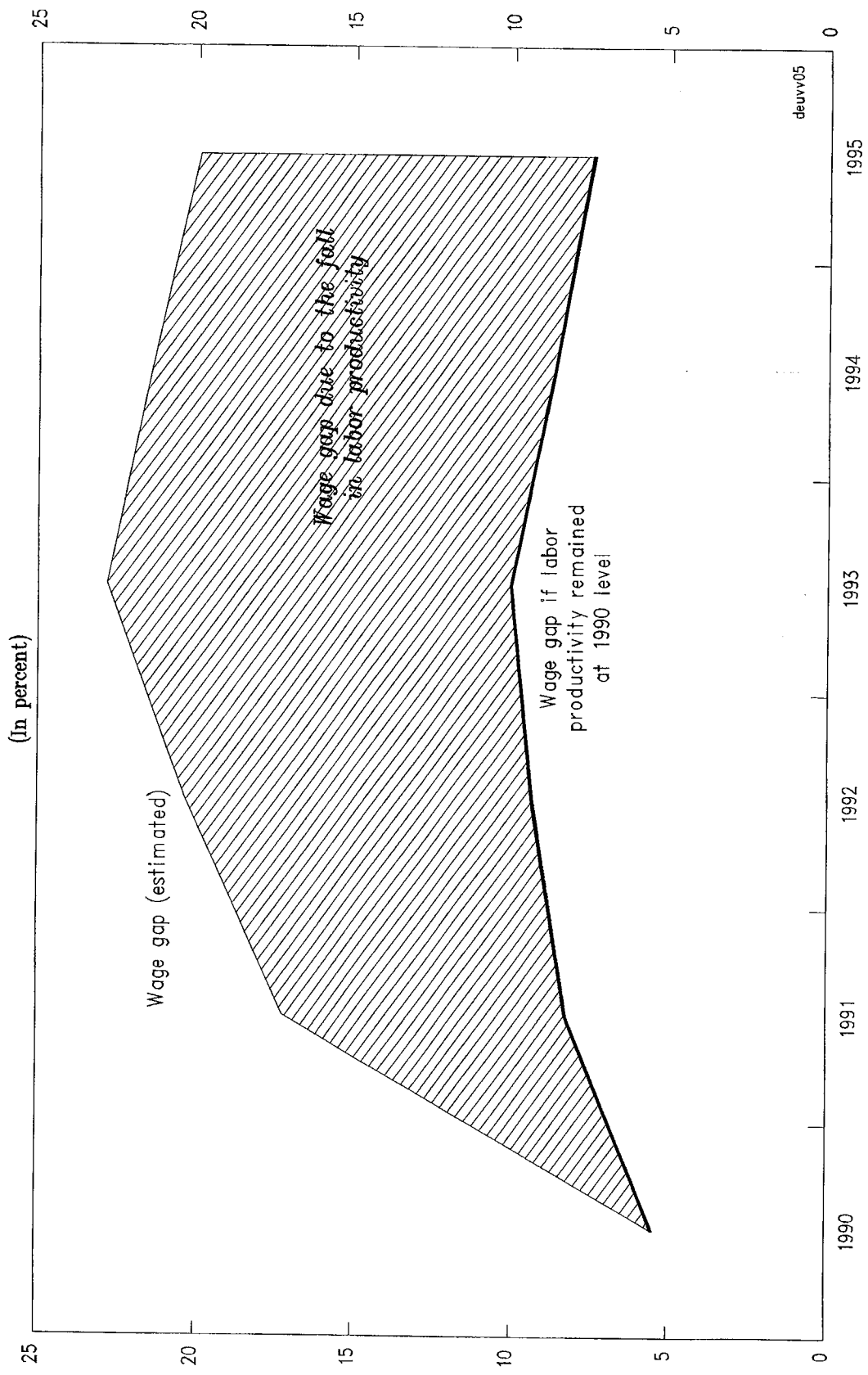
**C. Measure of Labor Supply: Hours Worked (Sample period: 1965-1994, excluding 1991)**

Included observations: 29

$$D(\text{LOGY\_H})=C(1)+C(2)*D(\text{LOGW\_H})$$

	Coefficient	Std. Error	T-Statistic	Prob.		
C(1)	0.017262	0.004584	3.765747	0.0008		
C(2)	0.455518	0.106277	4.286143	0.0002		
R-squared		0.997590	Mean dependent var		-3.244361	
Adjusted R-squared		0.997500	S.D. dependent var		0.256226	
S.E. of regression		0.012811	Akaike info criterion		-8.648481	
Sum squared resid		0.004431	Schwartz criterion		-8.554185	
Log likelihood		86.25376	F-statistic		11174.08	
Durbin-Watson stat		1.321874	Prob(F-statistic)		0.000000	

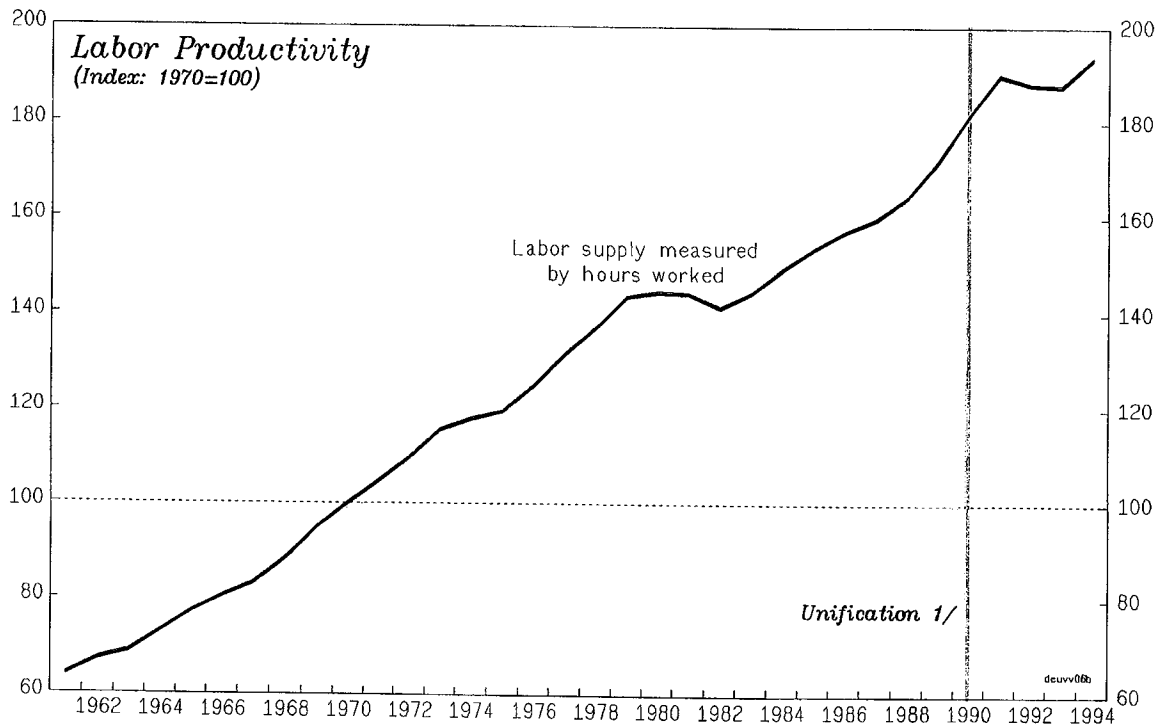
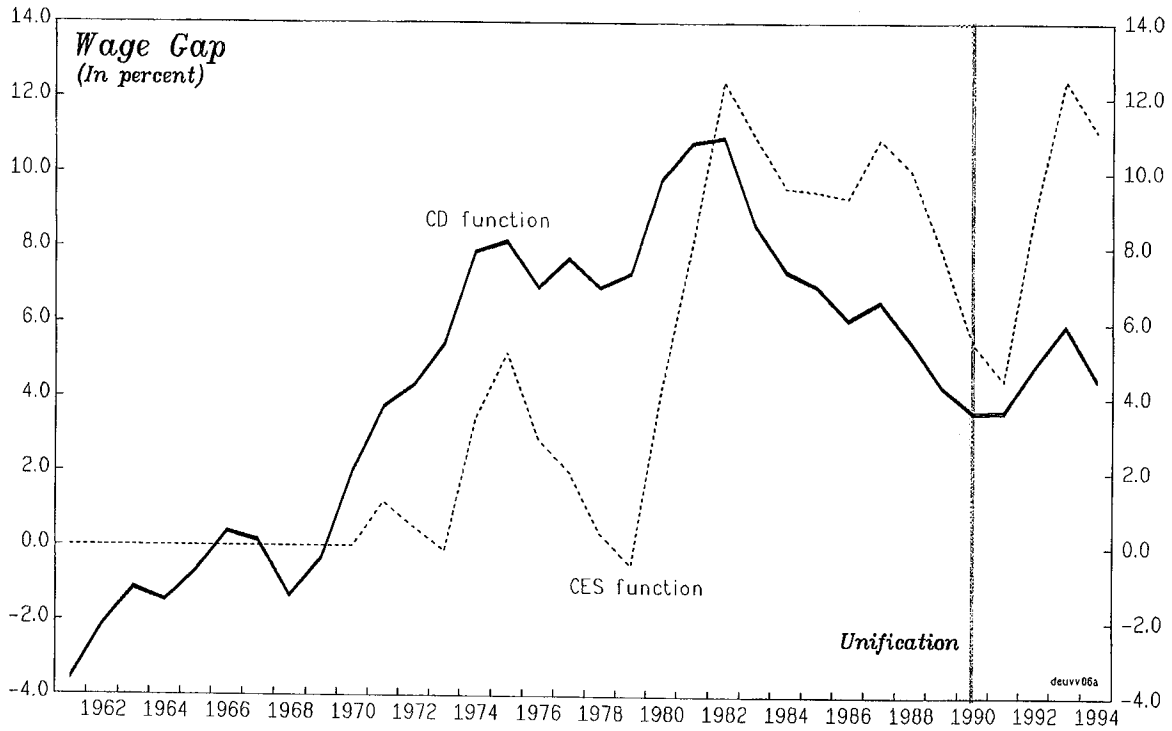
Chart II-5. Germany: Effect of Unification on Wage Gap



Source: IMF staff estimates.

deuvv05

Chart II-6. West Germany: Wage Gap and Labor Productivity



Source: IMF staff estimates; and Statistisches Bundesamt.

1/ Data prior to 1991 refer to West Germany only.

10 percent.<sup>26</sup> This analysis suggests that the wage gap problem for unified Germany does not stem from the wage gap in the new Länder alone. Still, the new Länder contribute a disproportionate amount to unified Germany's wage gap. A disaggregated analysis of developments in wages and labor productivity in the new Länder is presented in the following chapter.

### C. The Unemployment Rate and The Real Wage Gap

95. Under the assumptions of the model, the wage gap measures the magnitude of the discrepancy between actual real wages and real wages warranted by competitive labor markets when wages are perfectly flexible. The large wage gap found for unified Germany points to substantial labor market frictions which are reflected in the high unemployment rate. Indeed, a casual comparison of Charts II-1 and II-4 suggests a positive correlation between the unemployment rate and the wage gap. In addition, the unemployment rate is known to vary over the business cycle, and to be negatively correlated with the output gap.

96. To quantify these correlations, a regression was run with the unemployment rate as the dependant variable, and the following explanatory variables: the estimated wage gap, the Fund staff's estimate of the output gap, and a dummy in 1990 related to unification. The results are shown in Table II-3. The estimated coefficients for the output and wage gaps have the expected signs and are statistically significant at the 98 percent level. The coefficient on the output gap is negative indicating that the unemployment rate falls as the output gap is closed or rises above potential. A positive correlation exists between the calculated wage gap and the actual unemployment rate. The regression has an adjusted R<sup>2</sup> of only 77 percent, which is not surprising given the absence of additional explanatory variables particularly related to labor supply. Although definite statements cannot be made based on these equations alone (since omitted variables could bias the estimates), it is, nonetheless, instructive to observe that a lowering of the wage gap for unified Germany from 20 percent to 10 percent would reduce the unemployment rate in unified Germany by approximately 3¼ percentage points. In contrast, closing the output gap in 1996 would reduce the unemployment rate by almost 1¼ percentage points. The impact of unification, captured by the dummy variable, accounts for approximately 3 percentage points of the unemployment rate.<sup>27</sup>

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<sup>26</sup>Due to the lack of separate data for the old and new Länder after 1994, the wage gap can only be estimated for unified Germany after this year.

<sup>27</sup>Note that the dummy variable and the complete closing of the wage and output gaps would return the unemployment rate to the level prevailing in the 1960s. This result is consistent with the assumption underlying the calculation of the wage gap. Namely, that the unemployment rate in the 1960s corresponds to a zero wage gap.

Table II-3. Unemployment and the Wage Gap

**Measure of Labor Supply: Hours Worked (Sample Period: 1970-1995)**

Included observations: 26

$$U = C(1) + C(2) * YGAP + C(3) * WGAPH + C(4) * DUM$$

	Coefficient	Std. Error	T-Statistic	Prob.
C(1)	3.015585	0.467225	6.454242	0.0000
C(2)	-0.403814	0.151558	-2.664417	0.0142
C(3)	0.329610	0.044927	7.336539	0.0000
C(4)	2.941780	1.568146	1.875960	0.0740
R-squared	0.799285	Mean dependent var	6.000000	
Adjusted R-squared	0.771915	S.D. dependent var	3.132922	
S.E. of regression	1.496230	Akaike info criterion	0.946535	
Sum squared resid	49.25146	Schwartz criterion	1.140088	
Log likelihood	-45.19735	F-statistic	29.20270	
Durbin-Watson stat	0.519578	Prob(F-statistic)	0.000000	

### III. THE CONVERGENCE PROCESS IN EASTERN GERMANY<sup>1</sup>

#### Introduction and Overview

97. This chapter reviews economic developments in eastern Germany (the new Länder) and discusses prospects for revitalizing the convergence process. Seven years after unification, integrating the new Länder remains a major item on Germany's policy agenda. The initial unification strategy sought a rapid transformation to a market economy through swift privatization of the former state-owned enterprises. It was hoped that sufficient capital investments would raise labor productivity in the east to the levels in the west. With comparable labor productivity, similar real wages and income could prevail without undue public support and full economic integration would have been achieved.

98. After a sharp contraction in 1990-91, real GDP per capita in eastern Germany rose substantially but sectoral output developments were, however, uneven (Chart III-1, Table III-1 and Table III-2). The convergence process for the new Länder has been much slower than anticipated and capital per worker has risen only to about half of that in the old Länder. Excessively rapid wage convergence—well beyond productivity gains—has been the main problem. The high-priced workforce in the east discouraged private sector investment because rates of return were not sufficiently high (without public subsidy). Indeed, tax subsidies for construction activities led to overbuilding of commercial office spaces and directed investment capital toward residential housing instead of expanding of productive capital. Moreover, extension of western Germany's social welfare system has increased reservation wages and consumption.

99. These factors have left the new Länder with two large macroeconomic imbalances: (1) Aggregate demand in the east has exceeded production by a large margin, giving rise to a historically unprecedented "absorption gap" (or "current account deficit") of over 50 percent of east German GDP;<sup>2</sup> (2) Real wage levels in the east exceed labor productivity, causing a large "unit labor cost gap" to emerge which has placed east German labor at a severe competitive disadvantage and has itself become a key impediment to a more dynamic convergence process by lowering the expected profitability of capital investment.<sup>3</sup> In this

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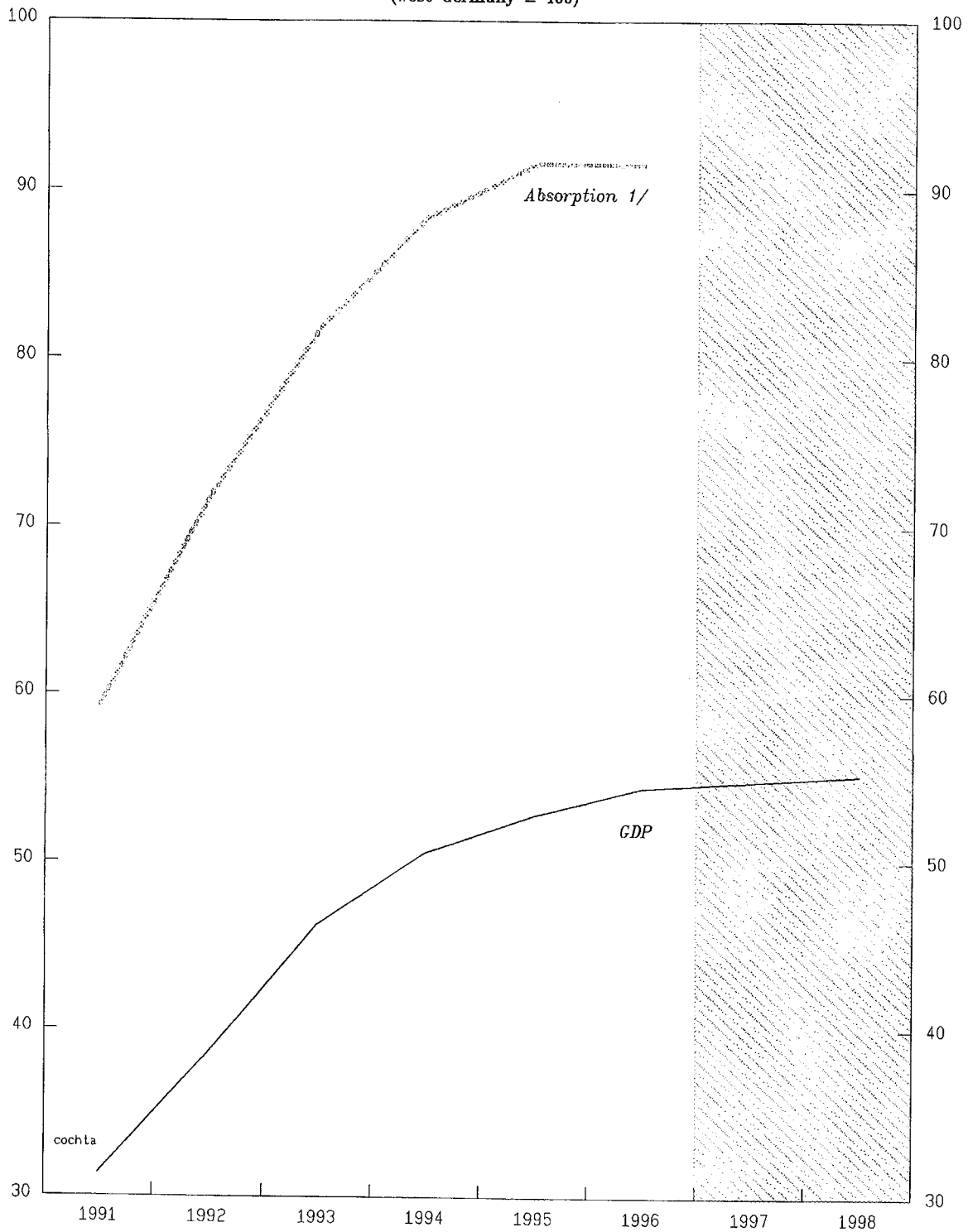
<sup>1</sup>Prepared by Albert Jaeger.

<sup>2</sup>This absorption gap was present across all main spending components of aggregate demand (Chart III-2, Table III-1). For comparison, rough estimates for Italy's southern region (the *Mezzogiorno*) indicated an absorption gap of some 19 percent of regional GDP in 1988. See Andrea Boltho, Wendy Carlin, and Pasquale Scaramozzino, "Will East Germany Become a New Mezzogiorno?", CEPR Working Paper No. 1256 (London: Centre for Economic Policy Research, 1996).

<sup>3</sup>The difficulties in implementing the convergence strategy, especially the likely harmful

(continued...)

Chart III-1  
Germany  
Eastern Germany: Convergence of GDP and Absorption  
(Per Capita)  
(West Germany = 100)



Sources: Federal Statistical Office; staff estimates of per capita absorption in 1995-96; and spring 1997 projections of per capita GDP in 1997-98 by the six research institutes.

1/ Absorption (or final domestic demand) is defined as total spending on consumption and investment; values for 1995-96 are staff estimates.



Table III-1. Germany: Eastern Germany—Convergence Indicators  
(West Germany = 100)

	1991	1992	1993	1994	1995	1996	1997 1/	1998 1/
Nominal GDP and absorption 2/								
Private consumption	51.0	58.5	64.0	65.7	68.7	69.0	...	...
Public consumption	77.3	91.0	99.0	100.8	98.9	99.0	...	...
Gross fixed investment	65.5	89.7	117.5	144.9	155.1	156.3	...	...
Machinery and equipment	63.6	75.3	99.5	111.7	113.0	112.7	...	...
Construction	67.2	100.8	129.1	164.9	180.6	184.5	...	...
Absorption	59.3	71.7	81.7	88.4	91.6	91.5	...	...
GDP	31.3	38.5	46.2	50.6	52.8	54.4	54.8	55.2
Wages and social benefits								
Wage level 3/	46.8	60.7	67.9	70.4	72.4	73.8	74.7	75.6
Pension benefits 4/	50.9	58.8	67.8	73.7	77.6	81.3	...	...
Unemployment benefits 5/	55.6	63.5	73.8	77.1	77.6	81.5	...	...
Social assistance benefits 6/	87.0	91.6	93.0	96.7	98.0	98.1	...	...
Memorandum items:								
Population	24.8	24.2	23.9	23.6	23.4	...	...	...
Labor force	27.7	25.5	24.8	25.2	25.3	...	...	...

Sources: Federal Statistical Office; Ministry of Economics; projections by the six research institutes; and staff estimates.

1/ Spring 1997 projections by the six research institutes.

2/ In per capita levels.

3/ Gross wage bill divided by dependent employment.

4/ Pension benefit of average wage earner with 45 contribution years.

5/ Average unemployment insurance and assistance benefits per recipient.

6/ Social assistance benefits for single household.

Table III-2. Germany: Eastern Germany—Sectoral Output Growth and Shares

(In percent)

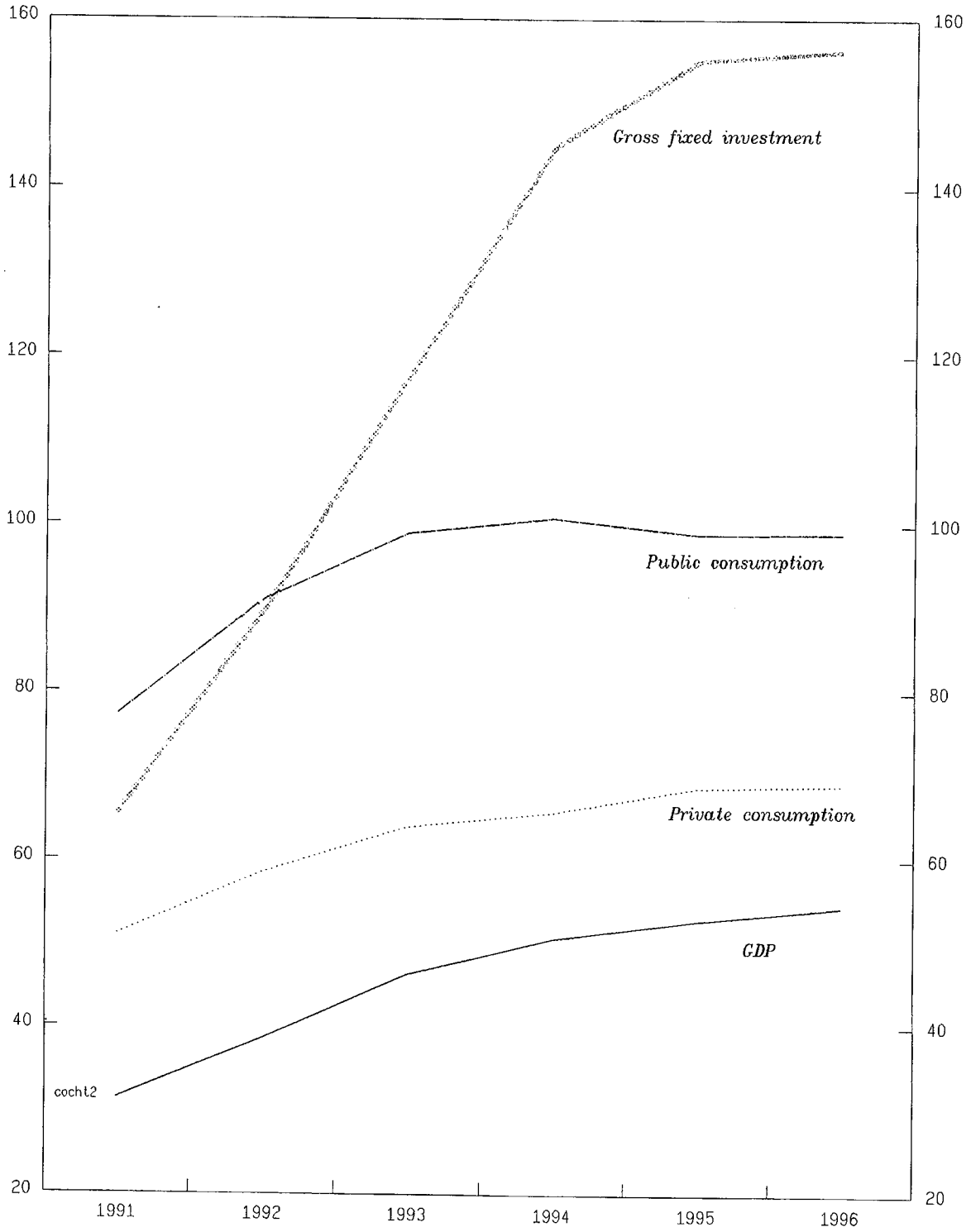
	1992	1993	1994	1995	1996	1997 1/
<b>Real output growth</b>						
Total economy	7.8	8.9	9.9	5.3	2.0	2.4
Manufacturing	5.2	11.7	15.5	6.7	6.1	7.4
Construction	30.4	12.8	24.5	8.4	-2.0	-4.5
Trade and transportation	4.5	12.1	7.3	4.2	2.3	1.2
Other private services	19.1	6.5	8.6	7.5	5.7	5.8
Other sectors 2/	-4.4	4.1	-1.1	1.4	0.6	1.1
<b>Real output shares</b>						
Total economy	100.0	100.0	100.0	100.0	100.0	100.0
Manufacturing	16.4	17.0	17.9	18.1	18.8	19.6
Construction	14.1	14.8	16.7	17.2	16.6	15.4
Trade and transportation	13.7	14.2	13.9	13.7	13.8	13.6
Other private services	24.2	23.9	23.7	24.1	25.0	25.7
Other sectors 2/	31.6	30.1	27.9	26.8	25.8	25.7
<b>Memorandum item</b>						
West Germany: Real output growth	1.8	-1.9	2.2	1.6	1.3	2.3

Sources: Federal Statistical Office; and projections by the Institute for Economic Research Halle.

1/ Projections.

2/ Includes agriculture, energy, mining, and public sector services.

Chart III-2  
Germany  
Eastern Germany: Convergence of Absorption Components  
(Per Capita)  
(West Germany = 100)



Sources: Federal Statistical Office; and staff estimates of absorption components in 1995-96.

difficult situation, the key policy challenge is to establish more propitious conditions for self-sustaining growth based on private investment.

100. Section A of this chapter provides an overview of convergence developments in the new Länder, highlighting the size and persistence of the absorption and unit labor cost gaps. It also discusses developments in wage setting and its implications for the cost competitiveness of east German labor. Labor market conditions are examined in Section B, while developments in official budgetary transfers to eastern Germany, which contributed to the over-sized public sector in the new Länder, are reviewed in Section C. The final section presents an analysis of convergence prospects and recent government initiatives. Because growth in the new Länder has mainly been supported directly or indirectly by government subsidies, the prospective withdrawal of support (including the prospective lowering of pension and unemployment benefits) opens the question of whether additional private-sector investment will compensate for the likely drop in consumption.

#### A. Convergence Developments

101. At the time of unification, the initial conditions for rapid “catch up” growth in the new Länder were considered propitious. Western Germany enjoyed low inflation, a balanced structural fiscal position, a high domestic savings rate, and a large current account surplus. Reflecting, inter alia, a long-standing constitutional mandate to reunify, substantial resources were pledged to integrate the new Länder and a transfer of legal and administrative structures would avoid some of the vexing governance problems that plagued other transition economies. On the side of the former GDR, the high level of general and technical education of the labor force was considered a valuable asset. The principal economic obstacles were highly distorted relative prices and an obsolete capital stock. To optimistic commentators, a new *Wirtschaftswunder* (economic miracle) appeared to be in the offing.

102. The initial transformation strategy sought to achieve the free play of market forces within a secure and unobtrusive legal and financial framework based on the principles of *Ordnungspolitik*. The speedy transition to a market economy would be softened by the extension of western Germany’s comprehensive social safety net to the east. Moreover, the transition would be supported by intergovernmental transfers to the new states and municipalities, to finance infrastructure investments, business promotion programs, and active labor market policies. Although these government programs involved untidy departures from *Ordnungspolitik*, the historic transformation task was thought to justify temporary deviations.

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<sup>3</sup>(...continued)

consequences of substantially misaligned wages for the medium-term convergence process in the new Länder were noted in the collection of studies edited by Leslie Lipschitz and Donogh McDonald, *German Unification: Economic Issues*, Occasional Paper No. 75 (Washington: International Monetary Fund, December 1990).

103. At the inception of economic, monetary, and social union on July 1, 1990, wages and salaries in eastern Germany were converted from GDR mark to deutsche mark at the rate GDR M 1 = DM 1. After the conversion, the actual wage level in eastern Germany averaged about one third of the west German level, broadly in line with estimates of relative labor productivity levels in eastern Germany.<sup>4</sup> The average relative wage level appeared to be in line with relative productivity, particularly given the expectation of further labor productivity gains as labor dishoarding would take place.

104. In the wage bargaining following unification, union and employer representatives quickly agreed to multi-year contracts that envisaged raising tariff wage rates in eastern Germany quickly to west German levels, without linking actual wage adjustments to future developments in labor productivity. The metal and electronics industry was especially aggressive; the initial wage bargaining agreement envisaged increasing tariff wage rates in four stages from about 65 percent of the west German level in April 1991 to 100 percent by spring 1994. Even when subsequent modifications delayed full tariff wage convergence to mid-1996, tariff wages in this sector rose by over 100 percent from 1991 to 1996. Indeed, by end-1996, tariff wages in most industries in the new Länder had reached at least 80 percent of west German levels.<sup>5</sup> The rapid convergence of tariff wages in eastern Germany has not, however, been reflected in a corresponding convergence of effective wages.<sup>6</sup>

105. Collective wage bargaining in the east also sought to achieve the relatively narrow sectoral and regional wage dispersion patterns observed in the west (Table III-3 and Table III-4). In fact, the sectoral wage dispersion in the new Länder appears to be narrower than in the old Länder. The narrow wage dispersion in west Germany has often been cited as a factor underlying the high unemployment rate of unskilled persons in the face of skill-biased

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<sup>4</sup>See Deutsche Bundesbank, "The Trend in Agreed Pay Rates and Actual Earnings Since the Mid-Eighties," Monthly Report August 1994, Vol. 46, No. 8, pp. 29-44.

<sup>5</sup>Ministry of Labor and Social Affairs, *Tarifvertragliche Arbeitsbedingungen im Jahre 1996* (Bonn: Ministry of Labor and Social Affairs, February 1997).

<sup>6</sup>Several reasons account for the incomplete convergence: the tariff agreements do not cover non-wage remuneration and other benefits, including leave pay and bonuses that have remained significantly below west German levels; effective wage payments in the old Länder include past positive wage drift, while wage drift in the east has been negative (averaging 1½ percent per annum during 1993-96); the payment of below-tariff wages, while exceptional in western Germany, appears to be a widespread practice in the east; and firms facing financial difficulties have applied for exceptions to labor agreements (including those related to wages and work conditions) or in extremis, some firms have ignored their agreements often with the tacit consent of the unions.

Table III-3. Germany: Eastern Germany—Sectoral Labor Cost Competitiveness Indicators

(West Germany = 100)

	1991	1992	1993	1994	1995	1996	1997 1/	1998 1/
<b>Wage level 2/</b>								
Total economy	46.8	60.7	67.9	70.4	72.4	73.8	74.7	75.6
Manufacturing	37.0	52.1	56.6	63.4	67.0	68.7	...	...
Construction	59.6	71.1	75.4	77.3	77.7	78.0	...	...
Trade and transportation	46.2	62.9	71.0	72.4	73.0	73.7	...	...
Other services	55.6	63.4	69.9	69.3	74.0	75.6	...	...
<b>Labor productivity 3/</b>								
Total economy	31.0	43.1	51.6	54.3	55.2	56.8	57.9	58.6
Manufacturing	19.6	32.1	42.5	49.0	50.7	54.6	...	...
Construction	48.4	60.5	65.0	73.4	77.1	77.2	...	...
Trade and transportation	34.0	41.5	47.2	48.9	49.8	50.9	...	...
Other services	34.6	44.0	51.2	51.4	50.8	51.1	...	...
<b>Unit labor cost 4/</b>								
Total economy	150.7	140.9	131.7	129.8	131.2	130.0	129.1	128.9
Manufacturing	189.0	162.1	133.3	129.5	132.2	126.0	...	...
Construction	123.2	117.6	115.9	105.4	100.7	101.1	...	...
Trade and transportation	136.1	151.6	150.5	147.9	146.6	144.7	...	...
Other services	160.7	144.2	136.7	134.8	145.8	147.9	...	...

Sources: Federal Ministry of Economics; and projections by the six research institutes.

1/ Spring 1997 projections by the six research institutes.

2/ Gross wage bill divided by dependent employment.

3/ Nominal value added divided by total employment. A measure of "nominal labor productivity"—as opposed to "real labor productivity"—is used to take account of the distorted reunification price structure in east Germany, which may have included many below-market prices.

4/ Gross wage per employee divided by nominal value added per employed person. A measure of "nominal unit labor cost"—as opposed to "real unit labor cost"—is used to take account of the distorted reunification price structure in east Germany.

Table III-4. Germany: Eastern Germany—Sectoral and Regional Wage Dispersion, 1995

	West	East
Intersectoral wage dispersion 1/	10.5	9.4
Intrasectoral wage dispersion 2/	2.8	2.7
Regional wage dispersion 3/	4.8	6.0

Source: *Statistisches Jahrbuch 1996*, Table 22.7.

1/ Coefficient of variation measuring the standard deviation of average monthly wage of male white-collar workers across all sectors divided by the average (in percent).

2/ Unweighted average across all sectors of ratio between highest and lowest tariff grade for white-collar workers.

3/ Coefficient of variation measuring the standard deviation of average monthly wages across the Länder (in percent).

technological progress.<sup>7</sup> For eastern Germany, limited wage dispersion has also been inconsistent with significant differences in labor productivity across sectors and firms within a sector.

106. Labor costs in the old Länder are an appropriate yardstick to measure integration of the new Länder. However, this yardstick may obscure two other dimensions of eastern Germany's competitiveness problem: (1) Labor costs in the west—as measured by hourly manufacturing wages converted at prevailing exchange rates—exceeded labor cost in other industrial countries by considerable margins during the 1990s (see Table III-4); (2) Labor costs in the new Länder are high relative to those in neighboring transition economies and the rapidly growing economies of southeast Asia, which may offer alternative production locations for west German and foreign investors (Table III-5).

107. The sharp rise in wages relative to productivity has opened up a large gap in unit labor costs between east and west, placing east German industries at a severe competitive disadvantage (Chart III-3; see Table III-3).<sup>8</sup> Unit labor costs have declined since 1991, from about 150 percent of the west German level, but have remained some 30 percent above west German levels during the period 1994-96—and projections by the Halle Institute for 1997-98 foresee no marked decline.

108. Unit labor costs show significant variation across sectors and within sectors, reflecting variations in labor productivity but also deliberate wage restraint. In 1996, unit labor costs for eastern Germany exceeded the west German level by 30 percent, but sectoral unit labor costs ranged from close to parity in the construction sector to a unit labor cost gap of almost 50 percent in the service sector (see Table III-3). Unit labor costs also differ significantly across industries within the manufacturing sector, as illustrated by a comparison of labor cost data for the metal and electronics industry and the chemical industry (Table III-6). By contrast with the previously mentioned metal and electronics industry, wage agreements for the chemical industry in eastern Germany eschewed a direct link to west German tariff wage levels. More

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<sup>7</sup>See, e.g., Kornelius Kraft (1994), "Wage Differentials Between Skilled and Unskilled Workers," *Weltwirtschaftliches Archiv*, Vol 130, pp. 329-47.

<sup>8</sup>The measures of unit labor cost reported in Tables III-3 and III-6 are defined as labor cost per employee divided by nominal value added per employed person. This "nominal unit labor cost" measure—as opposed to the conventional "real unit labor cost" measure which are based on real labor productivity—has been employed to avoid overstating the loss of labor competitiveness following the equalization of prices in the east with those in the west. In particular, it has been argued that the distorted price structure in the east before unification (on which real labor productive would be based) included many below-market prices that were subsequently adjusted to market levels without loss of competitiveness. However, this is unlikely to apply to all goods. Thus, the real measure is likely to overstate the true magnitude of the unit labor cost gap, while the nominal measure is likely to understate it.



Table III-5. Germany: Eastern Germany—Hourly Compensation Costs in Manufacturing in East Germany and Selected Countries

(West Germany=100)

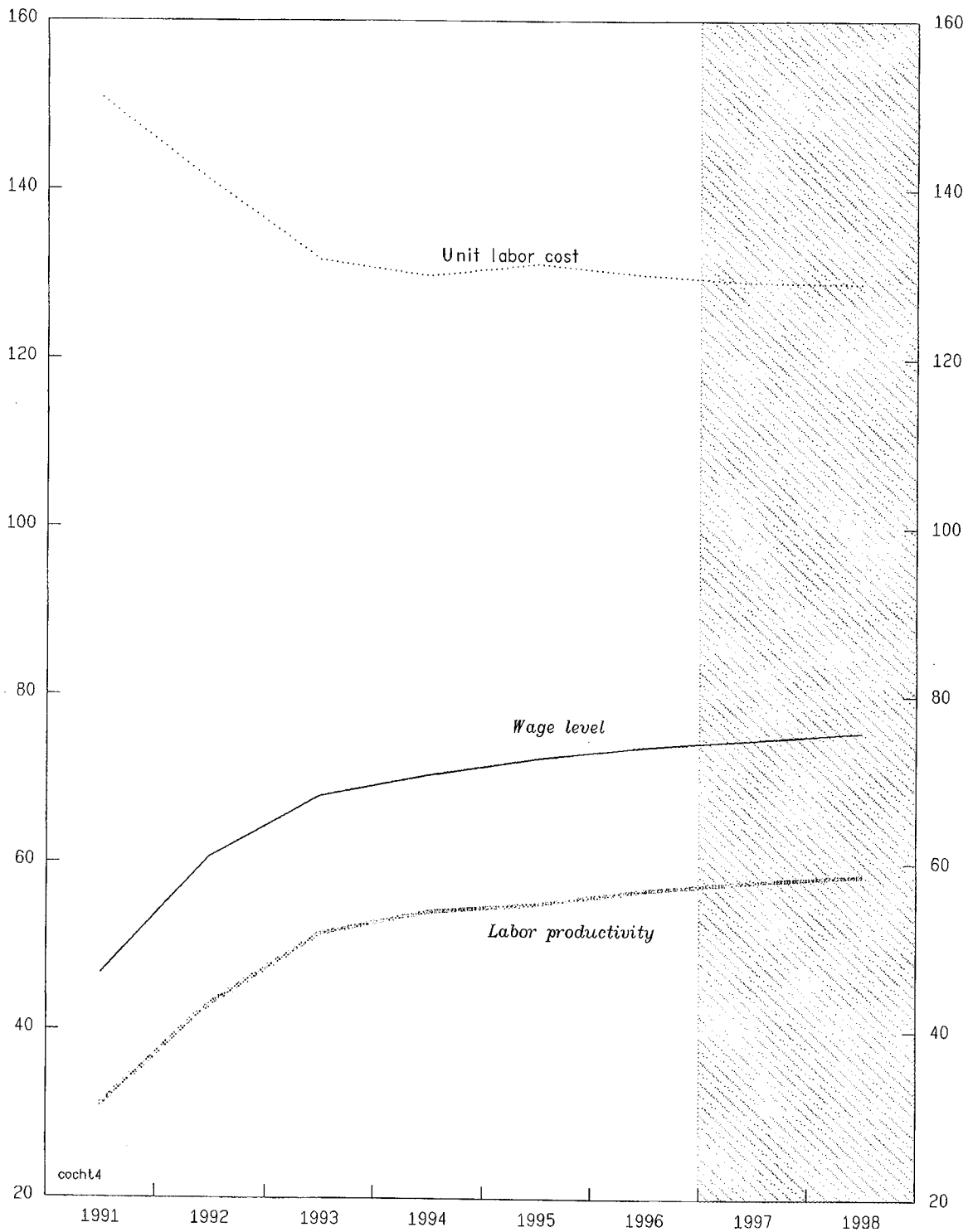
	1990	1996
East Germany 1/	...	63.2
Austria	80.8	78.3
Belgium	87.5	81.8
Denmark	81.8	76.5
France	69.4	60.7
Ireland	53.6	44.3
Italy	80.8	56.7
Netherlands	83.3	73.2
Portugal	17.0	...
Spain	51.6	41.7
Sweden	95.3	77.1
United Kingdom	57.9	44.5
Canada	72.1	52.3
Japan	58.3	66.0
United States	67.9	55.7
Korea	16.9	25.8
Singapore	17.2	26.1
Taiwan Province of China	17.9	18.4
Czech Republic 2/	...	7.6
Hungary 2/	...	6.6
Poland 2/	...	6.2

Sources: U.S. Bureau of Labor Statistics (BLS); OECD data base; and staff estimates.

1/ Staff estimates based on data for manufacturing wages in Table 4 adjusted for difference in effective work hours in east and west Germany.

2/ Staff estimates for 1995 based on OECD data; due to different definitions and conventions, these estimates may not be fully comparable with BLS data.

Chart III-3  
Germany  
Eastern Germany: Convergence of Wages, Labor  
Productivity and Unit Labor Cost  
(West Germany = 100)



Sources: Ministry of Economics; and spring 1997 projections by the six research institutes.

Table III-6. Germany: Eastern Germany—Labor Cost Competitiveness in Selected Industries

	1992	1993	1994	1995	1996
<b>Metal and electronics industry</b>					
Tariff wages: Index end-1991=100 1/	119.4	147.0	165.4	167.2	206.4
Tariff wages: West Germany=100 1/	63.5	75.0	82.8	83.5	97.0
Effective wages: West Germany=100 2/	46.9	54.0	61.8	69.3	...
Labor productivity: West Germany=100 2/	22.6	29.4	39.3	44.6	...
Unit labor cost: West Germany=100 2/	207.6	183.8	157.3	155.4	...
<b>Chemical industry</b>					
Tariff wages: Index end-1991=100 1/	119.8	136.9	141.8	143.0	172.2
Tariff wages: West Germany=100 1/	59.8	67.0	68.6	69.0	80.0
Effective wages: West Germany=100 2/	40.1	50.1	51.7	58.1	...
Labor productivity: West Germany=100 2/	10.2	25.9	40.2	55.3	...
Unit labor cost: West Germany=100 2/	393.0	193.4	128.5	105.0	...

Source: Ministry of Labor; Institute for Economic Research Halle; and staff estimates.

1/ Based on *Tarifvertragliche Arbeitsbedingungen in 1996* by Ministry of Labor (1997).

2/ Data provided by the Institute for Economic Research Halle.

restrained wage rounds in the chemicals industry combined with more rapid gains in labor productivity reduced unit labor costs by 1995 to almost the west German level.<sup>9</sup>

109. The extension of the social security system in western Germany to the east led to even faster convergence of social benefits (compared to wages). This underpinned a sharp rise in living standards, but it also raised the reservation wage in the new Länder (Chart III-4; see Table III-1). For a representative average wage earner with 45 contribution years, pension benefits in eastern Germany reached more than 80 percent of the level in the west in 1996.<sup>10</sup> Average unemployment benefits per recipient rose to 80 percent of the west German level by 1996.<sup>11</sup> Finally, the level of social assistance benefit payments had already practically converged to the level in the west by 1996.

110. The competitiveness problem in the new Länder has slowed the convergence process. Since 1994, growth rates for the new Länder have progressively declined toward growth rates in the old Länder. In 1996, real GDP growth for the new Länder (2 percent) was only marginally higher than those in the old Länder (1¼ percent), raising the specter that convergence has stalled. This virtual halt in GDP convergence is also projected by the Halle Institute to continue in 1997 and 1998.

111. Absorption has surged ahead of east German production levels and is estimated to have reached some 90 percent of western Germany's per capita level in 1996.<sup>12</sup> As a consequence, eastern Germany's absorption gap—or if it were a country, a “current account” deficit—that has averaged some 65 percent of GDP in the new Länder during 1991-96, about two thirds of which were financed by “official transfers” and the remainder by private capital flows, which were in part induced by generous fiscal investment incentives. Although on a

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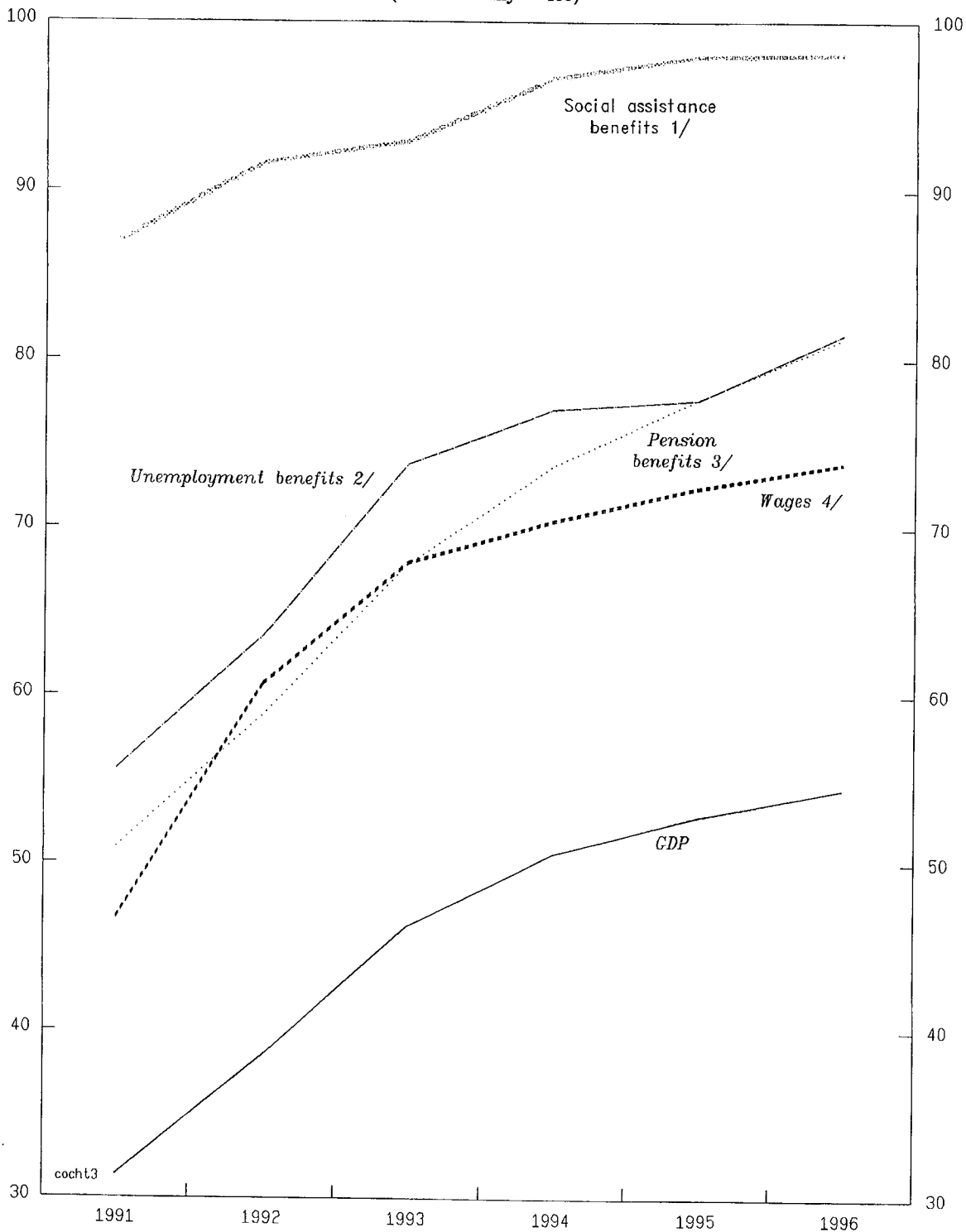
<sup>9</sup>It has been pointed out that low labor productivity levels in some sectors in the new Länder may also reflect low capacity utilization levels due to the lack of successful marketing of products. In support of this hypothesis, it has been noted that industries with a large share of companies owned by west German firms and therefore with better market access—such as the chemicals industry—have performed significantly better than other industries. See Hilmar Schneider, “Die ostdeutsche (Maschinenbau-)Industrie im Transformations- und Globalisierungsprozess,” in: Rüdiger Pohl and Hilmar Schneider (eds.), *Wandeln oder Weichen: Herausforderung der wirtschaftlichen Integration für Deutschland* (unpublished, 1997).

<sup>10</sup>The ratio for effective average pension benefits in eastern Germany is even higher, reflecting the longer average pension contribution records of wage earners in the east.

<sup>11</sup>Including both unemployment insurance benefits (*Arbeitslosengeld*) and unemployment assistance (*Arbeitslosenhilfe*).

<sup>12</sup>Official data on absorption in the new Länder are only available through 1994, and the data for 1995-96 represent staff estimates.

Chart III-4  
Germany  
Eastern Germany: Convergence of Wages  
and Social Benefits  
(West Germany = 100)



Sources: Ministry of Labor; and staff estimates.

- 1/ Single household social assistance benefits.
- 2/ Average unemployment insurance and assistance benefits.
- 3/ Average wage earner with 45 contribution years.
- 4/ Gross wage bill divided by dependent employment.

moderate downward path, the absorption gap was estimated at about 54 percent of east German GDP in 1996. This gap was spread across all the main spending components of aggregate demand (see Chart III-2). Private consumption reached about 70 percent of the west German per capita level in 1996, underpinned by a concomitant rise of disposable income in eastern Germany to about 70 percent of the level in western Germany. Thus, the private household savings rate appears to have become aligned with the level in western Germany.<sup>13</sup> Public consumption spending per capita reached west German levels already in 1993, reflecting, inter alia, the higher civil service staffing levels in eastern Germany. Finally, spending on gross fixed investment exceeded west German per capita levels by 1994; spending on construction in particular exceeded west German spending levels by some 85 percent in 1996.

112. Estimates of the capital-labor ratio for eastern Germany indicate a sharp rise relative to the ratio for western Germany during the period 1991-96 (Chart III-5, Table III-7).<sup>14</sup> The convergence speed for the capital-labor ratio—as measured by the reduction in the lagged gap between capital-labor ratios in east and western Germany—was exceptionally high by historical standards.<sup>15</sup> For example, the average convergence speed of the east German capital-labor ratio during 1994-95 was estimated at about 11 percent, requiring gross fixed investment ratios in eastern Germany of about 60 percent of GDP. This convergence speed is also high by international standards.<sup>16</sup> Nevertheless, actual developments in the east German capital-labor ratio clearly fell short of the investment level required to achieve the rapid

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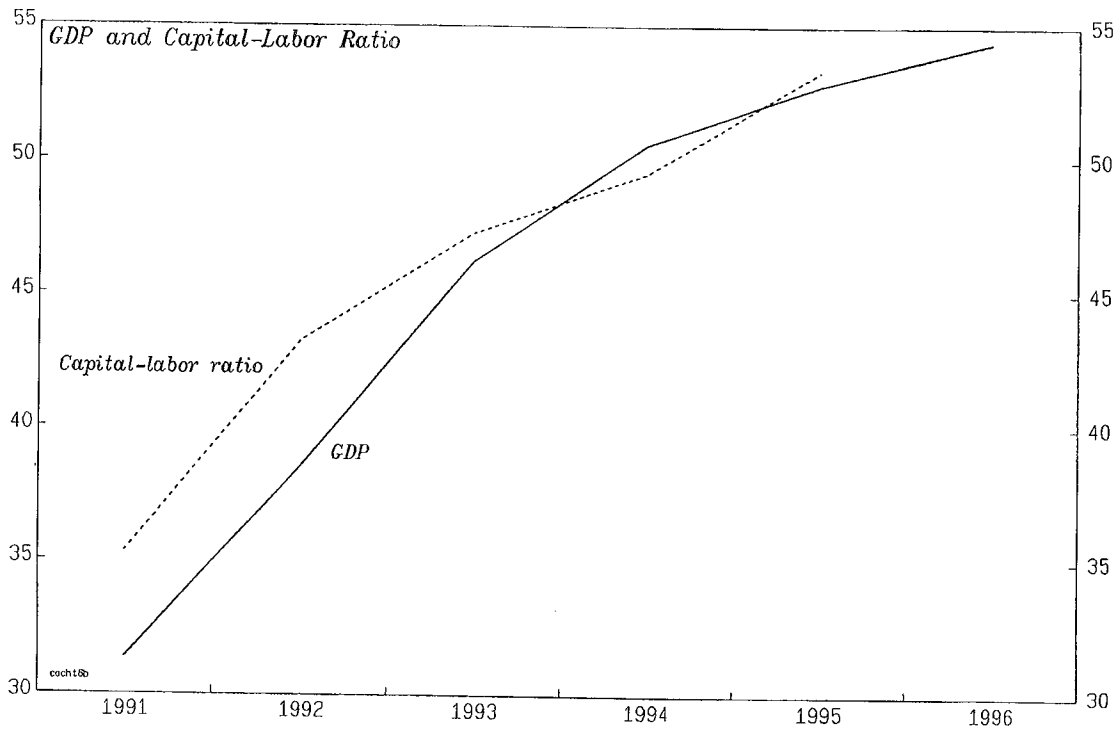
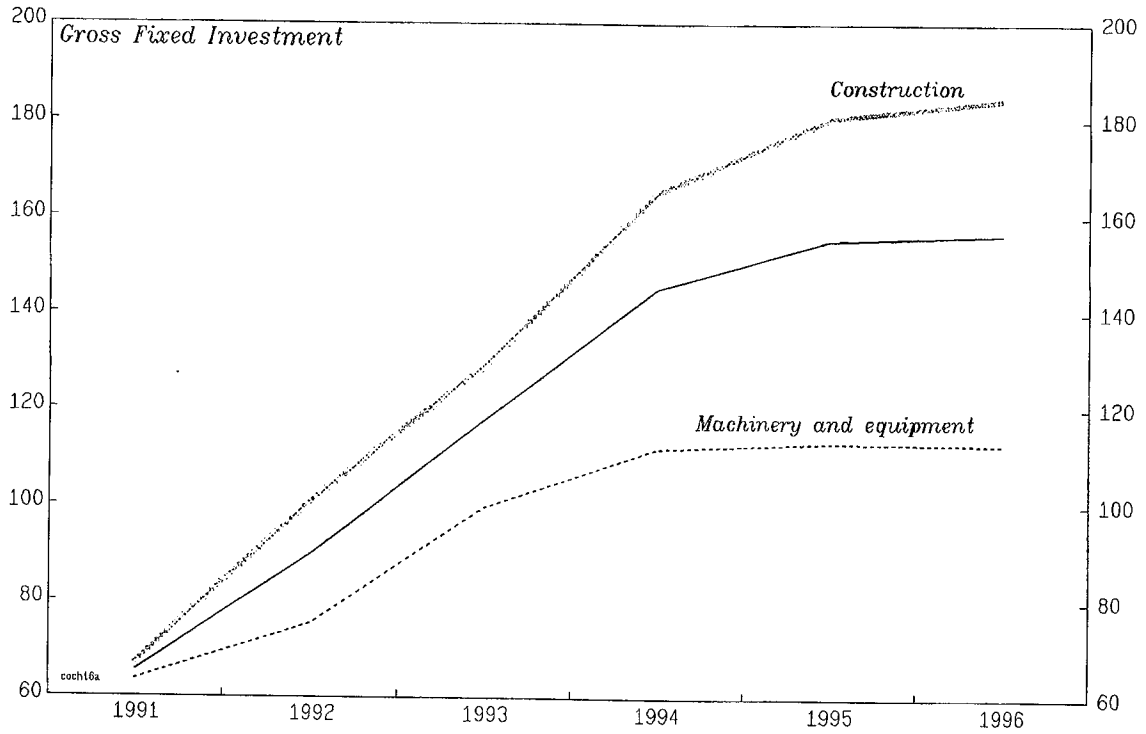
<sup>13</sup>However, net financial assets of private households in eastern Germany lagged far behind west German levels—reaching only about 30 percent of the west German level in 1994. See Deutsche Bundesbank, “Overall Financial Flows in Germany in 1994,” *Monthly Report May 1995*, Vol 47, No. 5, pp. 17-42.

<sup>14</sup>The official estimates of the east German capital stock are sensitive to the initial value of capital in 1991 and include the value of residential buildings. Capital stock estimates based on a production function approach indicated that the initial east German capital stock was probably some 30 percent below the official estimates used in this chapter. See Christian Thimann, *Aufbau von Kapitalstock und Vermögen in Ostdeutschland: Der lange Weg zur Einheitlichkeit der Lebensverhältnisse* (Tübingen: J.C.B. Mohr, 1996). Investments in residential buildings do not add directly to the productive capacity. About 22 percent of gross fixed investment in eastern Germany during 1991-94 was investment in residential buildings (compared to a share of 30 percent in western Germany).

<sup>15</sup>For example, a convergence speed ( $\beta$ ) of 0.10 means that in each period 10 percent of the gap in the capital-labor ratios in the previous period is closed.

<sup>16</sup>See Robert J. Barro and Xavier Sala-I-Martin, *Economic Growth* (New York: Mc Graw-Hill, 1995) for evidence on convergence speeds for low-income regions in the United States, Europe, and Japan. The reported convergence speed estimates are generally around 0.02-0.03 per year.

Chart III-5  
Germany  
Eastern Germany: Convergence of Capital Endowments  
(West Germany = 100)



Sources: Federal Statistical Office; and staff estimates and projections.

Table III-7. Germany: Eastern Germany—Capital Investment and Capital-Labor Ratios

	1991	1992	1993	1994	1995	1996
<b>Actual developments</b>						
Capital-labor ratio 1/	38.0	45.1	47.7	48.1	50.1	53.7
Gross fixed investment 2/	44.5	53.2	56.2	61.4	58.9	
Convergence speed ( $\beta$ ) 3/	0.31	0.11	0.02	0.08	0.14	
<b>Counterfactual catch up scenario 4/</b>						
Capital-labor ratio 1/	38.0	49.6	61.6	73.0	82.6	90.0
Gross fixed investment 2/	106.3	145.7	137.6	108.0	68.0	
Convergence speed ( $\beta$ ) 3/	0.50	0.50	0.50	0.50	0.50	

Sources: Federal Ministry of Economics; and staff estimates of capital-labor ratio in 1996.

1/ Total real capital stock including residential buildings at the beginning of the year as a ratio to actual employment (in persons).

2/ In percent of east German GDP.

3/ Convergence speed ( $\beta$ ) measures the reduction in the gap between the capital labor ratio in east and west Germany in the previous year. For example, a constant convergence speed of 0.10 would mean that in each time 10 percent of the lagged gap between capital labor ratios in east and west is closed.

4/ This scenario assumes counterfactually convergence of the east German capital-labor ratio to 90 percent of the west German level by the beginning of 1996. The employment data used to calculate capital-labor ratios are actual employment in east and west Germany during the period 1991-96.



convergence envisaged initially. For example, achieving a capital-labor ratio in the new Länder that was 90 percent of the level in the old Länder in 1996, would have required a convergence speed of 0.50 over the period 1991-95. The required gross fixed investment would have exceeded total east German GDP during those years (see Table III-7).<sup>17</sup>

113. A comparison of eastern Germany's GDP growth with that in selected eastern European countries—using purchasing power parity (PPP) adjusted per capita GDP estimates— suggests that the real GDP of eastern Germany rebounded quickly from the initial sharp drop in production levels in 1990-91 (Chart III-6). Thus, the per capita GDP rankings that prevailed before 1990 appear to have been largely restored. At the same time, taking account of eastern Germany's massive absorption gap, average living standards in the new Länder have moved far ahead of those in other transition economies.

### B. Unemployment

114. Unemployment in eastern Germany rose sharply after unification, and it has become entrenched at a high level (Chart III-7, Table III-8). In 1992, the number of registered unemployed persons climbed to 1.2 million persons or 15.5 percent of the labor force. However, broader measures indicate that registered unemployment substantially underestimates the actual slack in the labor market in the new Länder. More comprehensive measures of labor market slack that take account of persons in job creation, retraining, and other active labor market programs, indicate "underemployment" rates of up to 25 percent in 1996. Somewhat surprisingly, statistics of flows into and out of registered unemployment suggest that a significant number of workers change their labor market status in eastern Germany each month; flows in and out of registered unemployment were at, or above, those in the old Länder and far higher than observed in transition economies (Table III-9).<sup>18</sup> However, this churning could reflect "circular flows" between registered unemployment and the secondary labor market, which includes persons in job creation and retraining programs.<sup>19</sup>

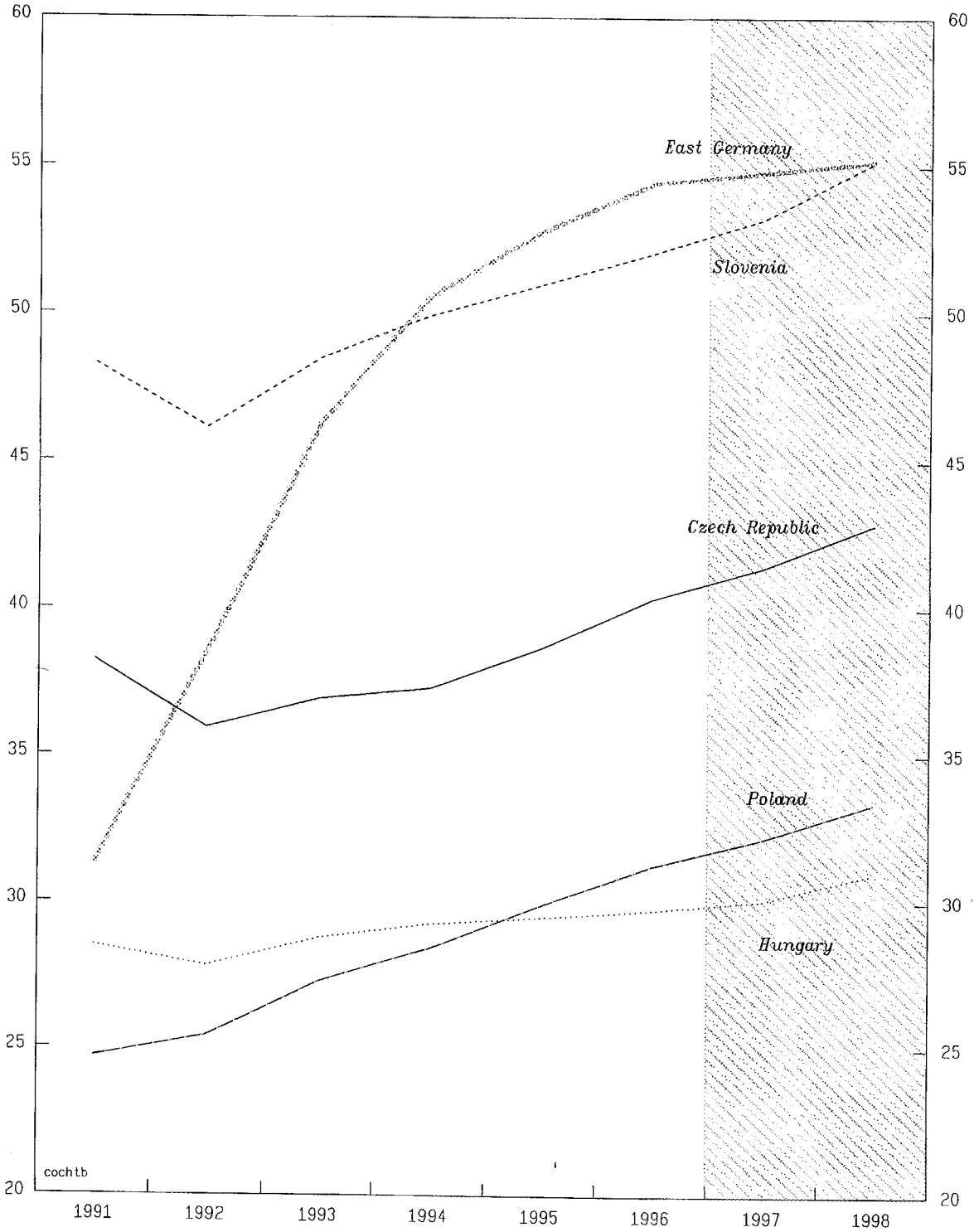
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<sup>17</sup>This scenario was based on actual employment during the period 1991-96. To achieve higher employment in eastern Germany, and thereby reduce unemployment, the investment requirements would have to increase substantially.

<sup>18</sup>On average during 1992-96, the inflow into unemployment expressed as a percent of employment amounted to 2¼ percent per month, while outflows from unemployment expressed as a percent of unemployment averaged to 12½ percent per month.

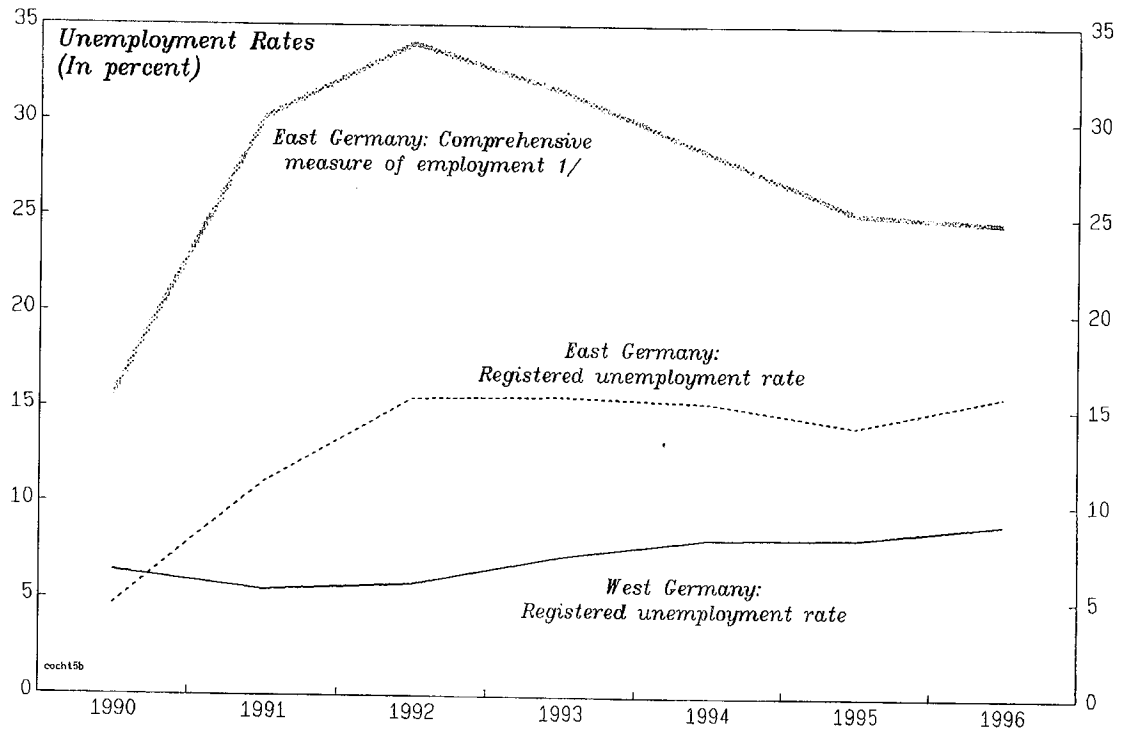
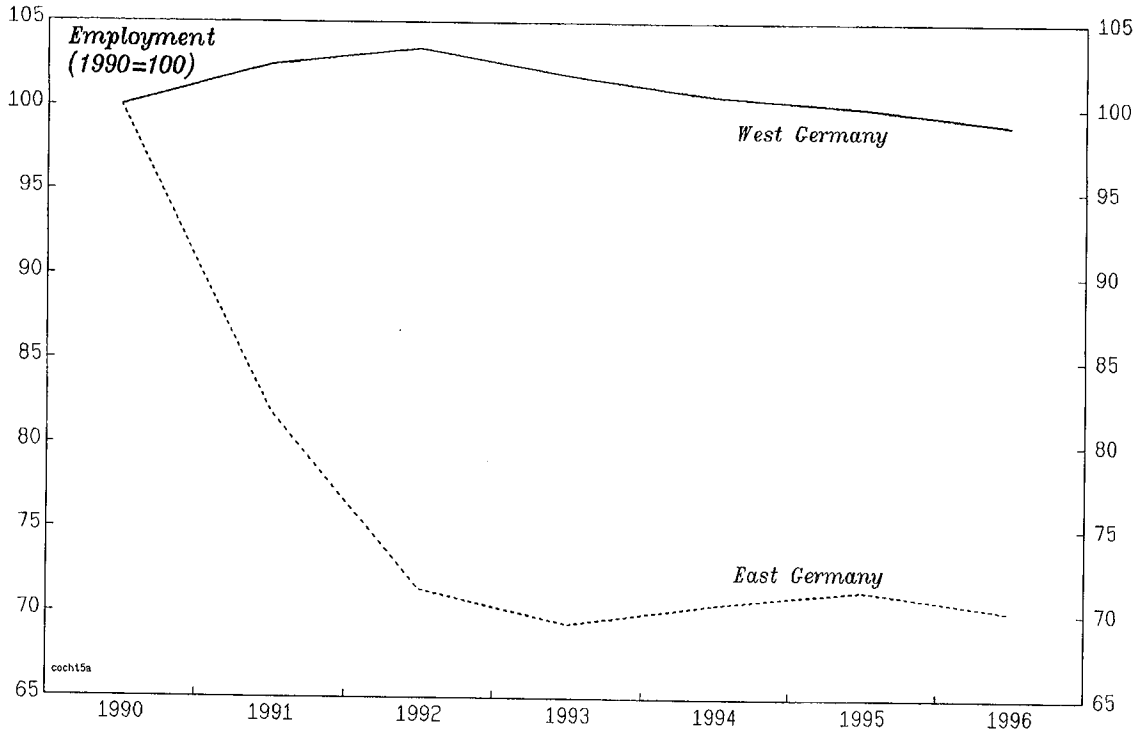
<sup>19</sup>An earlier analysis of unemployment flow dynamics in eastern Germany, reported that substantial "circular flows" between job creation programs and registered unemployment could have occurred during 1991-92. See Michael C. Burda, "Modeling Exits from Unemployment in Eastern Germany: A Matching Function Approach," CEPR Working Paper No. 800 (London: Centre for Economic Policy Research, 1993). This paper also provides evidence on unemployment flow dynamics in other eastern European economies.

Chart III-6  
Germany  
Eastern Germany: Per Capita GDP in East Germany and in  
Selected Eastern European Countries (PPP Adjusted)  
(West Germany=100)



Sources: WEO Database; Federal Statistical Office; and staff estimates and projections.

### Chart III-7 Germany Eastern Germany: Employment and Unemployment



Sources: Federal statistical office; and staff estimates.

1/ Including short-term workers etc.

Table III-8. Germany: Eastern Germany—Labor Market Developments

	1990 1/	1991	1992	1993	1994	1995	1996
	(In thousands)						
Registered unemployed persons	433	913	1,170	1,149	1,142	1,047	1,169
Persons in:							
Short-term jobs	1,516	1,616	370	181	97	71	71
Job creation programs	7	183	388	262	280	312	278
Retraining programs	39	280	491	381	259	256	230
Early retirement programs	381	554	811	853	650	374	186
Other programs	0	162	127	74	83	92	122
	(In percent)						
Registered unemployment rate	4.7	11.1	15.5	15.6	15.3	14.1	15.7
Underemployment rate A 2/	11.8	19.6	17.6	16.7	15.9	14.5	16.1
Underemployment rate B 3/	12.2	23.9	26.2	23.4	21.6	20.6	21.5
Underemployment rate C 4/	15.7	30.2	34.0	31.6	28.4	25.2	24.8
Memorandum items:							
Commuter balance net (in thousands) 5/	80	269	338	325	326	328	328
Vacancies (in thousands)	...	31	33	36	51	55	57
Labor force participation rates 6/							
East Germany	...	84.4	81.4	78.6	78.2	78.7	77.0
West Germany	...	70.5	71.1	71.0	71.1	70.7	70.3

Sources: Federal Statistical Office; German Council of Economic Experts; and staff estimates.

1/ Second half of 1990.

2/ Registered unemployment rate adjusted for short-time jobs weighted by average non-working time.

3/ Alternative underemployment rate A adjusted for persons in job creation and retraining programs.

4/ Alternative underemployment rate B adjusted for persons in early retirement and other programs.

5/ East German residents working in west Germany minus west German residents working in east Germany.

6/ In percent of population aged 15-65 years.

Table III-9. Germany: Eastern Germany—Average Monthly Unemployment Flows

(In percent)

	1992	1993	1994	1995	1996
Eastern Germany					
Inflows into unemployment 1/	2.0	2.0	2.1	2.4	2.9
Outflows from unemployment 2/	10.8	10.3	12.9	14.1	15.0
Western Germany					
Inflows into unemployment 1/	1.1	1.3	1.3	1.4	1.5
Outflows from unemployment 2/	16.9	14.8	14.6	14.7	13.9

Source: Federal Labor Office; and staff estimates.

1/ Average monthly inflow as a percent of employment.

2/ Average monthly outflow as a percent of unemployment.

115. Although labor market dislocations may have been inevitable, underemployment is clearly linked to the severely misaligned wage structure.<sup>20</sup> In addition, the combination of the withdrawal of social assistance payments along with other aspects of the social security and tax system implies a very high implicit marginal tax rate on labor earnings for low-income earners (poverty traps).<sup>21</sup> Reflecting the convergence of social assistance payments, estimates of the implicit marginal tax rates on monthly gross labor earnings at income levels ranging up to DM 2,000 are similar for east and western Germany (Chart III-8).<sup>22</sup> However, given the lower average wage levels in eastern Germany, a relatively larger share of the working age population may be adversely affected by poverty traps in eastern Germany.

116. Since unification, labor force participation rates in the new Länder have declined sharply, reflecting a normalization process and unfavorable labor market conditions in the east. During the period 1991-96, the labor force participation rate (measured as a percent of the population aged 15-65 years) in eastern Germany dropped by about 7½ percentage points to 77 percent in 1996. Nevertheless, participation rates were still about 7 percentage points above the level in western Germany. This lower participation rate is, in part, a “normalization” of labor force participation to west German levels from the artificially high levels in the former GDR but it has also been due to discouraged worker effects. In addition, the extension of western Germany’s social security system to the new Länder may have induced a withdrawal from the labor force through, e.g., early retirement.

### C. Official Transfers

117. Budgetary transfers to the new Länder from the old Länder covered on average about two thirds of the absorption gap in the new Länder. In 1996, net official transfers to the new Länder (DM 150 billion) represented 4.2 percent of overall German GDP, equivalent to about 38 percent of east German GDP (Table III-10). About two thirds of gross official transfers comprise two components that are broadly mandated by constitutional requirements for maintaining relatively uniform social safety net conditions throughout Germany: spending on

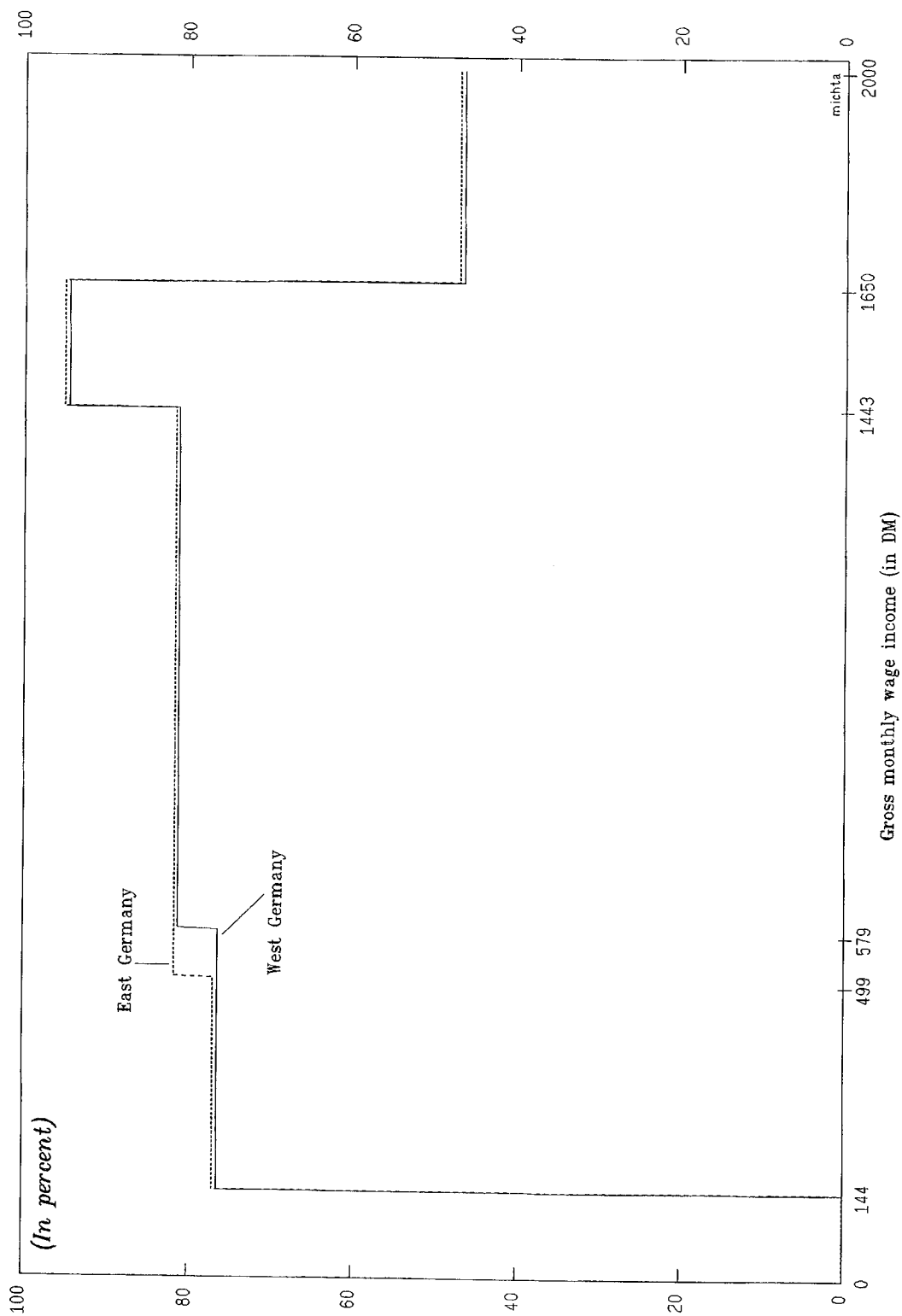
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<sup>20</sup>To soften potential labor market dislocation, the privatization of firms by the *Treuhandanstalt* was often tied to temporary employment guarantees (usually in the range of 2-5 years) by the new owner. About 80 percent of these employment guarantees expired by 1996 or earlier. Some 10 percent of the guarantees is scheduled to expire in 1998 or later (information provided by the Economic Research Institute Halle).

<sup>21</sup>See, e.g., Christian Thimann, “Effective Taxation for Recipients of Social Assistance in Germany and the Consequences of the 1996 Tax Reform,” IMF Working Paper 95/120 (Washington: International Monetary Fund, 1995).

<sup>22</sup>The differences in estimates of the implicit tax rate in 1996 are due to differences in the earnings ceiling exempt from social security contributions (DM 580 in western Germany and DM 500 in eastern Germany) and the somewhat higher social assistance payments in western Germany.

Chart III-8  
Germany  
Eastern Germany: Marginal Implicit Tax Rates on  
Additional Labor Earnings in West and East Germany in 1996 1/



Source: Staff estimates based on Thimann (1995).

1/ Combined marginal tax burden on additional labor earnings representing the combined effect of wage income tax, employees' social security contribution rate, and the withdrawal rate of social assistance payments.

Table III-10. Germany: Eastern Germany—Official Transfers

	1991	1992	1993	1994	1995	1996	1997 1/
(In billions of DM)							
Gross transfers	156.0	194.0	215.0	212.0	198.0	203.0	193.0
Social expenditures	49.6	73.8	76.8	73.2	79.7	84.7	72.6
Intergovernmental transfers	40.0	38.9	39.2	38.5	44.7	46.0	47.0
Infrastructure programs	19.8	20.2	19.1	23.9	29.6	28.1	26.4
Business promotion programs	7.0	12.9	18.9	20.5	23.4	25.3	22.9
<i>Of which</i>							
Tax expenditures	3.2	7.4	9.2	10.0	12.9	16.0	13.0
<i>Treuhandanstalt</i> and successor agencies	19.9	29.6	38.1	34.4	1.17	0.50	1.4
Other official transfers	19.7	18.6	22.9	21.5	19.5	18.4	22.7
Receipts	-34.0	-40.0	-43.0	-47.0	-50.0	-53.0	-52.0
Net transfers	122.0	154.0	172.0	165.0	148.0	150.0	141.0
(In percent of nominal GDP) 2/							
Gross transfers	5.5	6.3	6.8	6.4	5.7	5.7	5.3
Social expenditures	1.7	2.4	2.4	2.2	2.3	2.4	2.0
Intergovernmental transfers	1.4	1.3	1.2	1.2	1.3	1.3	1.3
Infrastructure programs	0.7	0.7	0.6	0.7	0.9	0.8	0.7
Business promotion programs	0.2	0.4	0.6	0.6	0.7	0.7	0.6
<i>Of which</i>							
Tax expenditures	0.1	0.2	0.3	0.3	0.4	0.5	0.4
<i>Treuhandanstalt</i> and successor agencies	0.7	1.0	1.2	1.0	0.0	0.0	0.0
Other official transfers	0.7	0.6	0.7	0.6	0.6	0.5	0.6
Receipts	-1.2	-1.3	-1.4	-1.4	-1.4	-1.5	-1.4
Net transfers	4.3	5.0	5.4	5.0	4.3	4.2	3.9
Memorandum item:							
Net transfers (percent of east German GDP)	59.2	58.6	54.8	46.5	38.9	37.7	34.3

Source: Data provided by the authorities.

1/ Official projections.

2/ Percent of German GDP.



social benefit entitlements for recipients in eastern Germany and transfers deriving from Germany's intergovernmental revenue sharing and financial equalization system. The remaining one third of gross transfers is comprised of spending on infrastructure programs, business promotion schemes, and other official transfers. Net transfers crested in 1994—reflecting the peak in transfers required to finance the privatization activities of the *Treuhandanstalt*. Since 1994, official transfers have been on a moderate downward trend.

118. The main social benefits in eastern Germany including pensions, unemployment benefits, and social assistance have converged close to west German levels (see Chart III-4 and Table III-10). The rapid rise of social benefits combined with widespread labor market slack boosted the number of benefit recipients. These developments have kept social expenditure transfers at a high plateau of some 2¼ percent of unified Germany's GDP since 1992. In 1996, official transfers related to social expenditures were equivalent to more than 20 percent of east German GDP. High benefit levels and early retirement have boosted pension expenditure in the new Länder.

119. Since 1995, intergovernmental transfers to the new Länder have been based on a new financial equalization scheme. This scheme provides the new local governments in the east with a high level of support equivalent to about 1¼ percent of GDP of unified Germany or 1½ percent of east German GDP.<sup>23</sup> Transfers to finance investment in transportation infrastructure and communal infrastructure have been stable at around ¾ percent of GDP. The intergovernmental transfers and infrastructure programs have allowed the east German Länder and communes to finance high levels of public consumption and public investment spending.

120. Official transfers to finance business promotion programs were about ¾ percent of unified German GDP per year since 1993. The major "special support" instruments included investment allowances, special depreciation provisions, equity capital supports, and interest subsidies. The 1996 Annual Tax Act extended many of the main tax expenditure programs until 1998. Investment allowances amounted to 5 percent of the costs of the investment project for manufacturing firms in general and 10 percent for small- and medium-sized manufacturing and trade firms. Special depreciation allowances provided up to 40 percent write-offs in addition to linear depreciation in the first five years and have been available for investment in machinery and equipment as well as investment in structures in manufacturing. Additional investment allowances and grants have been offered through a variety of regional promotion programs.

#### **D. Prospects**

121. Significant progress has been made toward integrating the new Länder into the German economy. Creating self-sustaining growth based on private investment remains, however, a key policy challenge. Indeed, failure to do so, would impose a drag on the entire

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<sup>23</sup>Before 1995, a large share of intergovernmental transfers to eastern Germany were received from the German Unity Fund, which ceased operation at end-1994.

German economy. While the task is daunting, broad agreement exists within Germany that reinvigorating the convergence process requires a substantial narrowing of the unit labor cost gap and more wage differentiation across sectors and firms. Continued public support to alleviate infrastructure bottlenecks and to promote investment and business start ups are also viewed as needed to overcome the locational disadvantage of the new Länder.<sup>24</sup>

122. The *Joint Initiative for More Jobs in East Germany* (1997) by the federal government, business, and the unions has appropriately called for durable wage moderation as the key building block for revitalizing the convergence process. Effective wage moderation at the firm level appears to have begun, as indicated by substantial, and often widening deviations between tariff and effective wage levels.<sup>25</sup> For example, the latest tariff agreement for the construction sector in the new Länder contained several important signals: (1) nominal tariff wages were frozen at the level of October 1996; (2) the agreement to achieve wage parity with the west by October 1997 was suspended; and (3) financially-distressed firms would be allowed to pay wages as much as 10 percent below the tariff level.

123. The Government also announced an overhaul of the special support programs for businesses in the new Länder.<sup>26</sup> While maintaining funding for such programs at their present levels, the Government intends to reduce the large number of schemes and to impose an explicit sun-set clause on them. In particular, the duration of the revised special support programs would be 1999-2004. To compensate for the locational disadvantages of production activities in eastern Germany, a basic investment grant of 10 percent would be provided for manufacturing, production-related services, crafts, and retail traders inner-urban areas. Grants for small-and medium-sized companies in manufacturing and production-related services are 20 percent.) This grant scheme would replace the present system of investment and special depreciation allowances. Additional investment grants would be available for regional promotion schemes. Special support programs would continue to provide credit for new

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<sup>24</sup>See the *Fifteenth Report on Economic Developments in East Germany* by the German Institute for Economic Research Berlin, the Institute for World Economics Kiel, and the Institute for Economic Research Halle (1997).

<sup>25</sup>A strategy of temporary wage subsidies has often been proposed as a promising approach to mitigate the labor market distortions in eastern Germany. See, e.g., the analyses in Akerlof and others, "East Germany in from the Cold: The Economic Aftermath of Currency Union," *Brookings Papers on Economic Activity*, 1991, pp. 1-87. The wage subsidy proposal has, however, not found much public support in view of fears that it could impose severe additional distortions on factor allocation and prove ineffectual if unions were to press for still higher wages.

<sup>26</sup>See "Mittelfristiges Förderkonzept der Bundesregierung für die wirtschaftliche Entwicklung in den neuen Ländern nach 1988," *Aktuelle Beiträge zur Wirtschafts- und Finanzpolitik* (Bonn: Presse- und Informationsdienst der Bundesregierung, May 1997).

enterprises to promote start ups and public loan guarantees for existing firms with insufficient collateral.

124. The initial hopes for a quick convergence process in the new Länder were clearly too sanguine. Recent developments have given rise to new pessimism about the likely time horizon and costs of convergence. However, several considerations suggest one should guard against both excessive optimism and pessimism:

125. First, simulations employing different assumptions for the convergence speed of the capital-labor ratio in eastern Germany suggest that convergence in per capita GDP in the east to 90 percent of level in the west, would take at least 20 years. A convergence speed ( $\beta$ ) of 8 percent—close to the average for the period 1992-96—would reach this convergence target around the year 2020 (Chart III-9).<sup>27</sup> Slower convergence speeds (4 percent and 2 percent) would lengthen considerably the time horizon required, as illustrated in Chart III-9. Convergence speed is hard to project, depending as it does on the expected profitability of investments in the new Länder. This underscores the need for a credible and sustained wage moderation and increased labor market flexibility.

126. Second, part of the growth slowdown in the new (and old) Länder may be overstated, particularly the unavoidable temporary retrenchment of the oversized construction industry caused by now-expired tax incentives. The impact is felt disproportionately larger in the east compared with the west because of the relatively large size of the construction sector there (in 1995 about 17 percent of east German GDP compared to 7 percent of west German GDP respectively) (Table III-11).

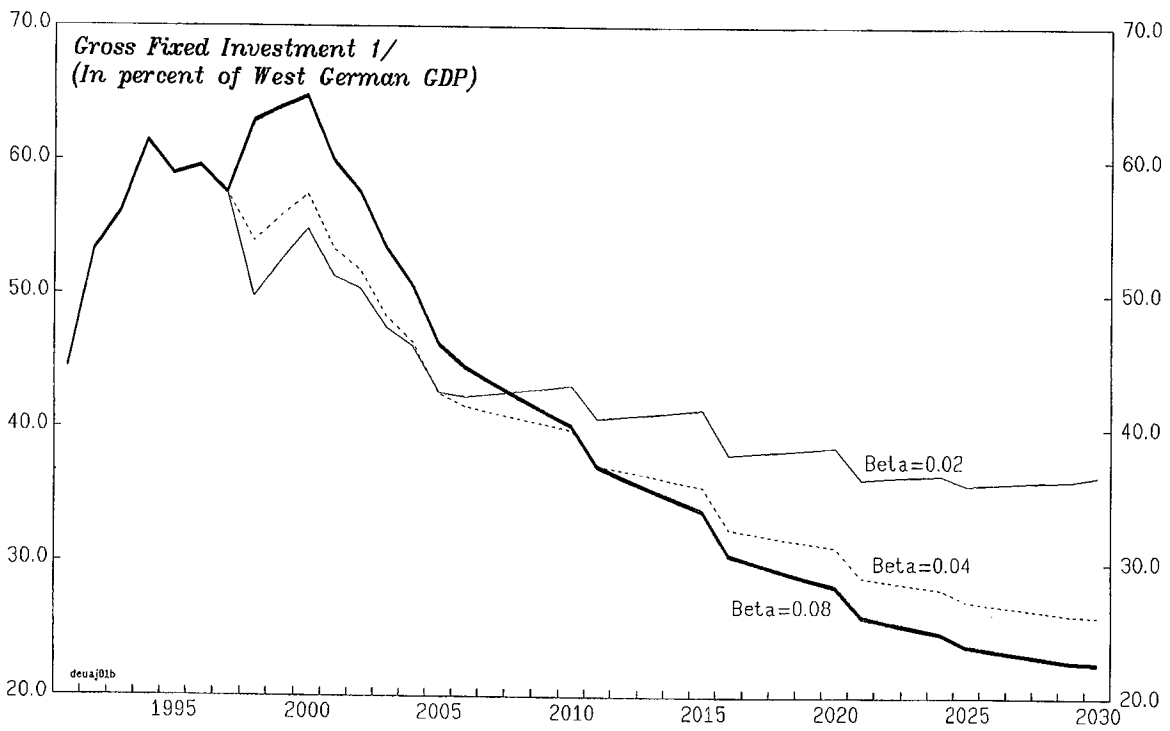
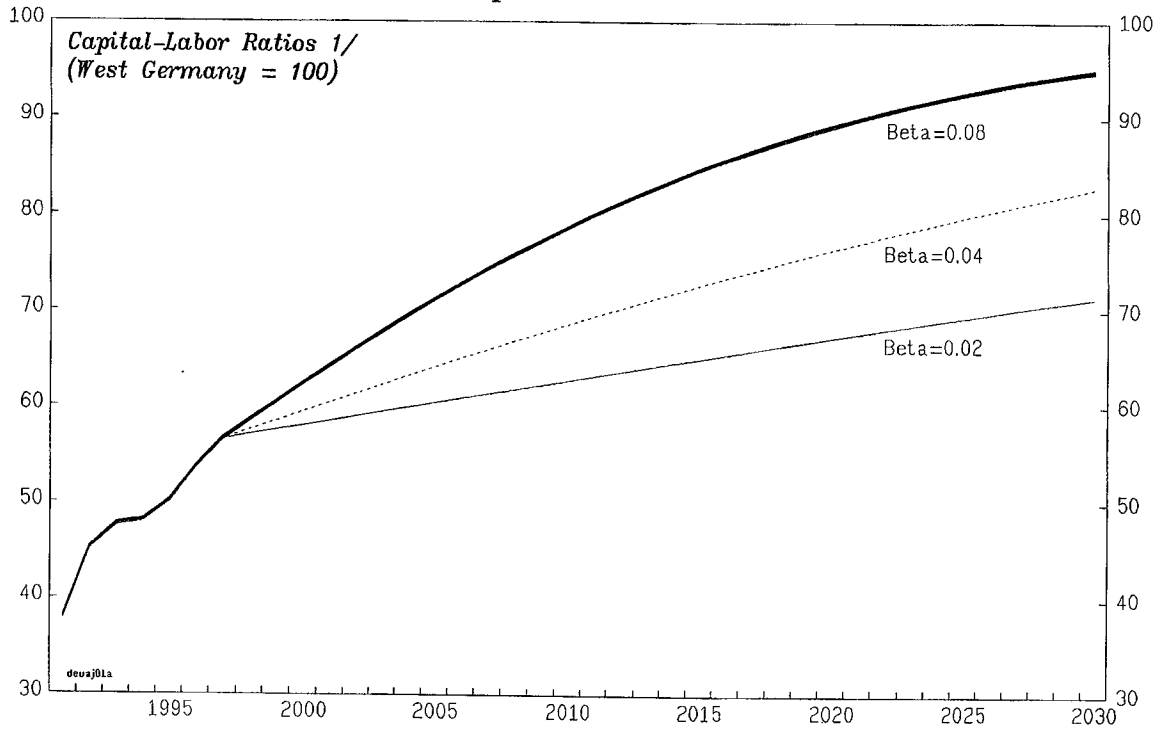
127. Third, sustained wage moderation in eastern Germany could help establish the conditions for more rapid convergence than was experienced during 1994-97. The catch-up growth of Ireland since the early 1970s—which was accompanied by a sharp decline in the share of wages in national income (Chart III-10) and significant net EU transfers to Ireland—supports this view.<sup>28</sup>

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<sup>27</sup>These simulations are based on the long-term employment projections underlying the staff's pension expenditure projections reported in Chapter V and assume an identical depreciation rate (4 percent) for the capital stock in east and western Germany.

<sup>28</sup>The *World Economic Outlook* (May 1997, pp. 62-63) provides a brief description of Ireland's catch up growth experience.

Chart III-9  
Germany  
Eastern Germany: Catching-Up Scenarios  
for Capital-Labor Ratios



Source: Staff estimates.

1/ The convergence speed beta measures the reduction in the gap between capital-labor ratios in West and East Germany. For example, beta=0.08 indicates that 8 percent of the lagged gap between the capital-labor ratios in West and East Germany is closed in a given time period.

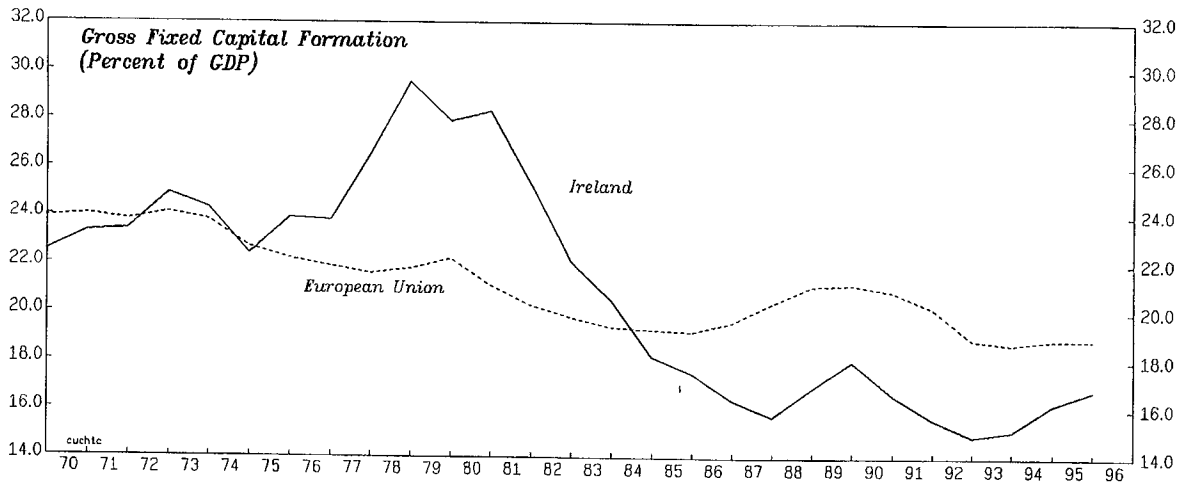
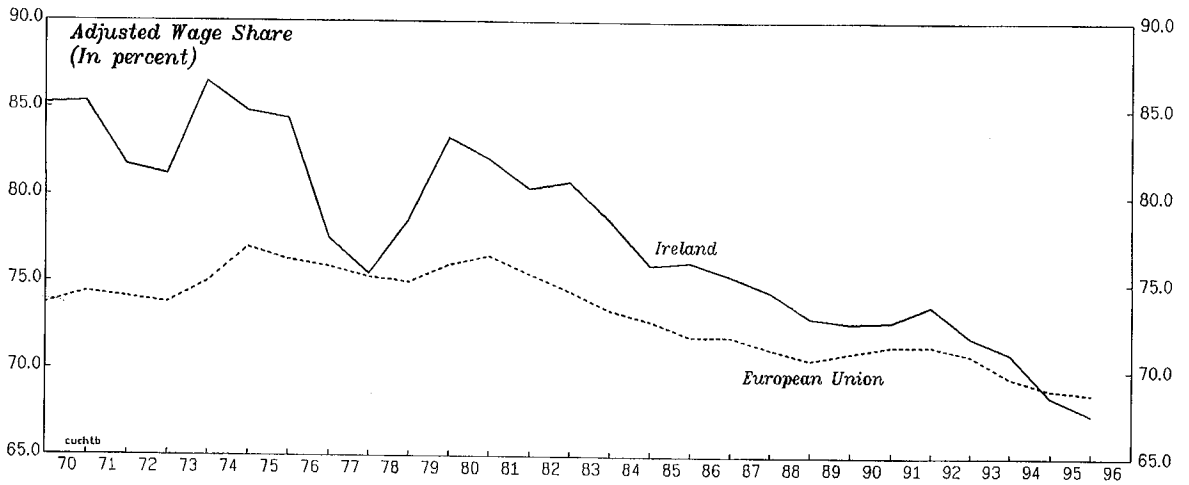
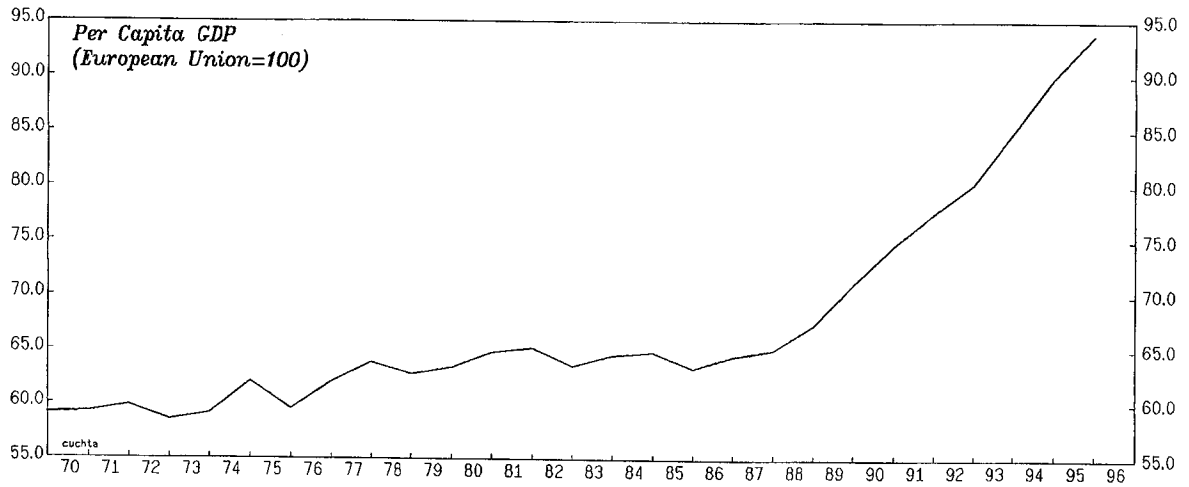
Table III-11. Germany: Eastern Germany—Sectoral Shares of GDP and Employment, 1995

	<u>Real GDP</u>		<u>Employment</u>	
	East	West	East	West
Manufacturing	18.1	29.1	16.4	29.1
Construction	17.2	7.0	17.3	7.0
Trade and transport	13.7	18.4	16.9	18.4
Other private sector services	24.2	20.4	18.6	20.4
Public sector services	17.2	16.6	20.5	16.6
Other sectors 1/	9.6	8.4	10.3	8.4
Total	100.0	100.0	100.0	100.0

Source: Federal Statistical Office.

1/ Includes agriculture, mining, energy, and private household services.

### Chart III-10 Germany Catch-Up Growth in Ireland



Source: European Economy 1996, No. G1, Statistical Appendix.

#### **IV. TAX REFORM IN GERMANY<sup>1</sup>**

##### **A. Introduction and Overview**

128. Weak macroeconomic performance, including record high unemployment and sluggish growth, and an erosion of the tax yield have made it more difficult for the Government to meet its fiscal objectives in recent years and have brought the weaknesses in the German income tax code to the fore. By comparison with the rest of the OECD, Germany places a higher burden of taxation on labor income and a lower tax burden on capital income. Indeed, distortions from the uneven taxation of income from labor and capital and the lack of transparency (given the multiplicity of exemptions and allowances) in the tax code have helped to skew output growth toward higher capital intensity and away from relatively high-cost labor. With the presence of international tax competition, large German corporations have increasingly booked their profits abroad in countries with lower corporate tax rates. The globalization of manufacturing has also made decisions concerning production location more sensitive to relative costs, including taxes. Consequently, shifts in income and demand patterns have contributed to an erosion of tax revenues and have made revenue projections less reliable.

129. The German income tax code is characterized by numerous tax breaks motivated by economic and social policy objectives, by a personal income tax schedule with a high entry hurdle at the low end and very high marginal rates at the top end, and by unequal taxation of different types of income (e.g., wage income, business income, capital gains). The resulting tax arbitrage possibilities have led to a marked deterioration in taxes on assessed income and corporate income over the years. The tax rules are too complex and relatively opaque—to the point of undermining government tax estimates and the conduct of fiscal policy. The proliferation of preferential rules—not least in connection with support for the new Länder—have distorted investment decisions, while the extensive use of tax shelters has created the perception of a lack of tax equity.

130. These elements have contributed to a relatively low effective tax yield from corporate and nonwage incomes, while the reliance on wage taxes (and social security contributions) has been high and rising (Chart IV-1). By international standards, the effective tax rate on labor income in Germany is among the highest in the G-7 countries, while the effective tax on capital is relatively low. The high taxation of labor (both wage taxes and social security contributions) has contributed to labor-saving technologies and less employment intensive growth—and thus ultimately to lower revenues and larger social expenditures.

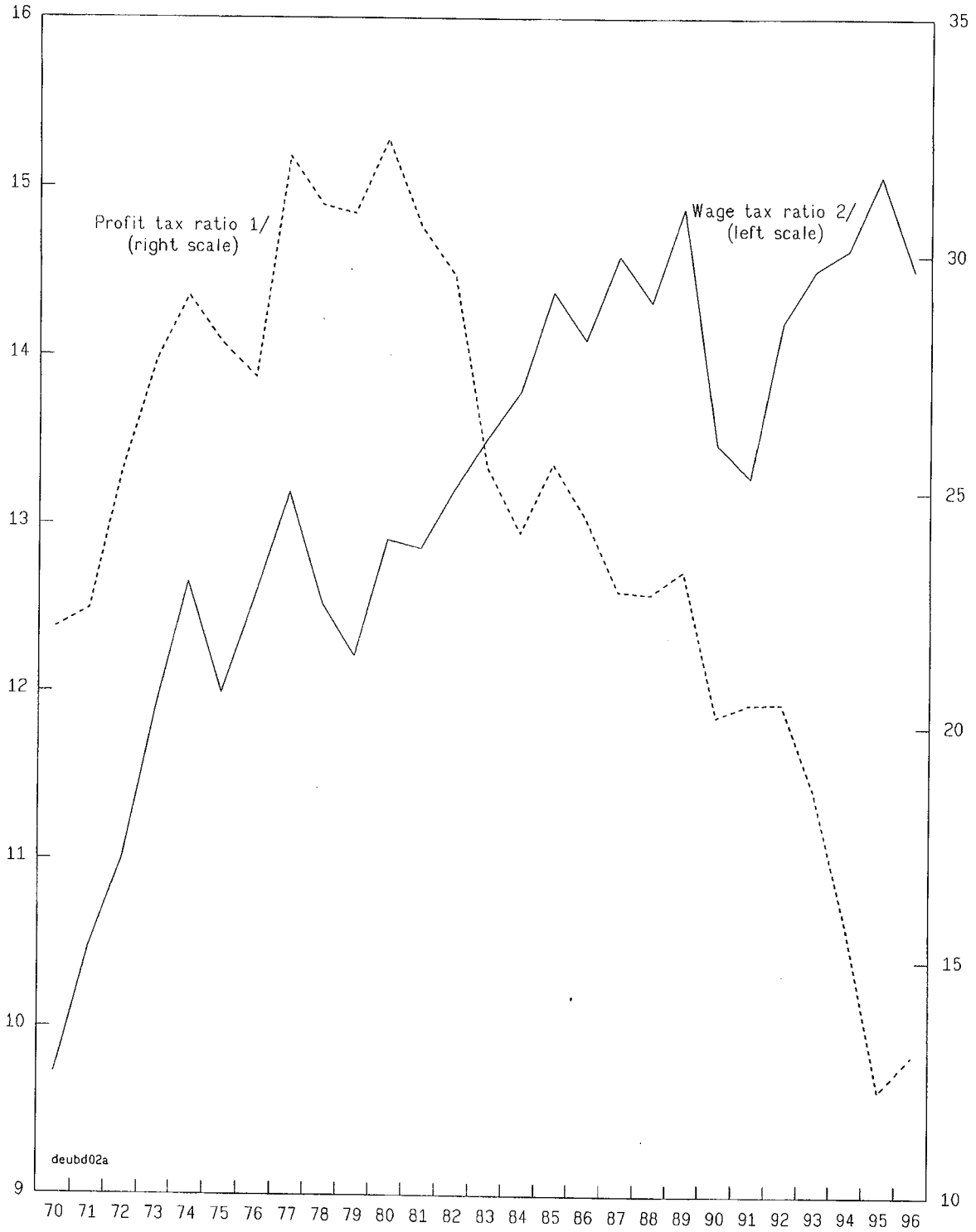
131. To address these shortcomings, in early 1997 the Income Tax Reform Commission headed by Finance Minister Waigel (the Waigel Commission) presented proposals to reform the income tax system; these would take full effect in 1999. The proposals envisaged

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<sup>1</sup>Prepared by Burkhard Drees and Wolfgang Merz.

CHART IV-1  
GERMANY

Wage and Profit Tax Ratios  
(In percent)



Source: Deutsche Bundesbank and staff calculations.

1/ Profit taxes are defined here as consisting of the assessed income tax, the corporate tax, capital income tax, and local trading tax. The ratio is expressed as percent of gross entrepreneurial and property income.

2/ The wage tax ratio is calculated as wage tax receipts divided by gross compensation from dependent employment.



(a) reducing the top marginal income tax rate from 53 percent to 39 percent<sup>2</sup>, (b) lowering the corporate income tax rate on retained earnings from 45 percent to 35 percent, and (c) cutting tax allowances, reducing depreciation rules, and tightening corporate accounting rules. The local trading tax on capital would also be abolished. Part of the income tax relief would be financed by an increase in indirect taxes, which would effectively shift the tax burden toward consumption taxes. In total, these measures would result in net tax relief of  $\frac{3}{4}$  percent of GDP in 1999.<sup>3</sup> With some amendments, the Waigel Commission proposals were incorporated into legislation that passed the *Bundestag*—Germany's Lower House—in June 1997. This legislation, however, was vetoed in the *Bundesrat*—the Upper House—where the opposition SPD has a majority. A mediation committee of both houses of Parliament failed to reach a compromise in late July. But the Government intends to resubmit a tax reform package to Parliament in September.

132. The Government's reform initiative—following a pattern pursued in many other countries—seeks to lower marginal income tax rates, while broadening the tax base. Though optimal tax theory suggests that some differentiation in the tax base may be desirable, the Government's tax reform plan is motivated by the conviction that a comprehensive tax base with fewer preferential rules and lower marginal tax rates would improve equity, simplicity, and efficiency. Although the reform proposals (unlike the 1986 tax reform in the United States<sup>4</sup>) are not designed to be distributionally neutral, vertical equity would be broadly maintained—despite lowering the top marginal tax rate substantially—by closing tax shelters and imposing a slightly greater tax burden on the corporate sector. More importantly, the elimination of special tax preferences and opportunities for tax avoidance would improve horizontal equity. Not only would the elimination of special tax preferences improve the simplicity of the tax code directly, lower marginal tax rates would also reduce incentives to engage in complicated transactions purely for tax reasons. A broader tax base and a more

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<sup>2</sup>Including the solidarity surcharge on income tax, which would be cut by 2 percentage points, the top income tax rate would drop from 57 percent to 41 percent.

<sup>3</sup>The opposition SPD's income tax reform plan, which was released in May 1997, envisaged tax relief of  $\frac{1}{4}$  percent of GDP. It would fully offset an increase in the basic personal income tax allowance, a lower entry rate on personal income (with the top marginal tax rate kept unchanged), and a reduced tax rate on retained corporate earnings by broadening the corporate tax base and by a new wealth tax on personal assets. The SPD has also proposed to lower social security contributions by 2 percentage points (equivalent to  $\frac{3}{4}$  percent of GDP) financed by higher VAT and mineral oil taxes ( $\frac{1}{2}$  percent of GDP). An increase in child benefits would be financed by a special program to combat tax evasion.

<sup>4</sup>For an analysis of the 1998 U.S. tax reform, see A. J. Auerbach and J. Slemrod, "The Economic Effects of the Tax Reform Act of 1986", *Journal of Economic Literature*, XXXV (June 1997), pp. 589-632.

uniform taxation of different types of income would also reduce the scope for tax arbitrage and improve efficiency—in particular by reducing the tax-induced misallocation of investment. More generally, the tax reform aims at improving supply-side conditions and enhancing Germany's international standing as a location for production.

133. In Germany, statutory corporate tax rates, which are high by international standards, have attracted much attention and have reportedly even influenced *Standort* decisions, i.e. the location of investment. But while statutory rates are high, the effective corporate tax rate is not high internationally, owing to an exceptionally narrow corporate tax base caused by generous depreciation allowances and liberal accounting standards. (In fact, in some studies the effective corporate tax rate in Germany is found to be the lowest among the G-7 countries.) The Government's reform proposal would rebalance the relationship between tax rates and the tax base, and bring it more into line with international standards by reducing tax rates, while lowering depreciation allowances and tightening accounting rules. On balance, although the tax burden on the corporate sector would rise slightly, the proposed changes would lower the marginal tax burden on investment—albeit with some variation across industries.

134. In contrast to corporate tax rates, the top marginal tax rate on personal income (53 percent) is close to the international average, but the entry marginal tax rate (25.9 percent) is high by international standards. Moreover, the tax code contains structural weaknesses (such as differential taxation of income from different sources) that offer broad scope for tax arbitrage and that have narrowed the tax base—especially as high-income earners appear to have been increasingly able to shelter their taxable incomes.<sup>5</sup> These tax avoidance strategies are facilitated by the tax exemption of capital gains on personal assets. It is generally recognized that the income tax code has increasingly been overburdened with provisions motivated by economic and social policy objectives that have severely reduced the transparency of the tax system and have contributed to a public perception of horizontal inequity.

135. The reform plan is guided by sound principles: reductions in marginal tax rates, a broadening of the tax base, and a shift from direct to indirect taxation. The significant reduction in marginal income tax rates would improve incentives generally: at the lower end of the income distribution, it would help alleviate unemployment traps; at the upper end of the income distribution it would reduce the incentive for tax avoidance. Although many tax shelters would be eliminated, tax allowances reduced, and accounting rules tightened, the plan

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<sup>5</sup>The narrowing of the tax base has been in part due to tax incentives designed to benefit the new Länder. Reform of these tax measures was not within the terms of reference of the Waigel Commission. The Government intends to replace numerous special depreciation allowances by direct investment grants from 1998 onward.

leaves scope for a further broadening of the income tax base, both on personal and corporate income.

136. The reform plan also constitutes progress toward improving the equity, efficiency, and simplicity of the tax code. The effects on vertical equity stemming from lowering marginal tax rates would be cushioned by reducing the scope of tax shelters that have primarily benefitted high-income earners. The smaller room for tax avoidance and the reduction of special tax preferences would also create the perception of improved horizontal fairness. The tax reform proposals are a welcome step toward rebalancing the focus of taxation away from income taxes, which have fallen increasingly on wages, toward consumption taxes. This shift would both solidify the tax base and promote saving. Moreover, the proposed reduction in corporate tax rates in combination with a more transparent calculation of profits would improve the allocation of capital. Staff analysis suggests that the simultaneous cut in corporate (and personal) tax rates and the scaling back of depreciation allowances would lower the marginal effective tax rates on investment and would lessen the distortions among different types of investment and modes of finance. These calculations also indicate that the proposed tax reform—by reducing effective marginal tax rates—could be expected to boost investment despite less favorable depreciation allowances. Nonetheless, enterprises that are heavy users of capital would be adversely affected by the broadening of the tax base. Rental housing would face a markedly higher tax burden as a result of less generous depreciation rules and the longer holding period required to qualify for tax-exempt capital gains.

137. The overall macroeconomic effects of the proposed tax reform would depend on the ultimate magnitude of the net tax relief (currently about  $\frac{3}{4}$  percent of GDP) and how it would be financed. The short-run demand impact would be positive. Over the longer run, assuming that some of the net income tax relief would dampen labor costs, the lower effective tax rates on investment and the shift to consumption taxes would likely raise both output and employment. Lower labor costs would tend to reverse recent trends in the capital-labor ratio, improve the marginal productivity of capital and thus stimulate capital accumulation and growth.

138. The tax reform plan, however, falls short in at least three respects. One, the unequal treatment of different types of income and substantial tax loopholes would remain. In particular, the differential tax treatment of personal and business incomes and of capital gains would maintain incentives for income shifting to lessen the tax burden. The reluctance to tax capital gains on personal assets (gains on business assets are subject to taxation) permits the continued sheltering of taxable income. Such income shifting—helped by the special tax breaks for investment in eastern Germany—is highly regressive and appears to have contributed to the erosion of the personal income tax base in the 1990s. Two, the tax treatment of provisioning for old age pensions, through the publicly run occupational pension funds as well as private, or company, pension funds should be streamlined and contributions should be made fully tax deductible. At the same time, pension income should be taxed as ordinary income. Three, the proposed reform does not directly address issues concerning the

taxation of resident and non-resident corporations. This could pose problems particularly as regards the single internal market within the EU and intensifying international tax competition.

139. This chapter is organized as follows. In the next section, the current German income tax code is described, and it is placed in an international perspective in section C. The main elements of the Government's tax reform proposals are presented in section D, and the economic effects of the proposed tax reform are discussed in section E.

### **B. The Current Code of the German Income Tax**

140. Despite a three-stage income tax reform in the second half of the 1980s (which flattened the marginal tax rate schedule and raised basic tax allowances), the income tax code has become increasingly complex, the tax base has narrowed owing to numerous tax breaks, and marginal tax rates remain high.<sup>6</sup> The key features of the income tax code and related issues are:

- The 1996 Tax Act by increasing the basic tax exemption to the level of subsistence income created a high hurdle at the entry marginal tax rate; the marginal tax rate for upper incomes is high internationally.
- The tax code contains a large number of tax breaks, most designed to promote non-fiscal objectives.
- Many of the tax rules, primarily those motivated by special economic objectives, have severely reduced the transparency of the tax system.
- Under the current tax code, different types of income are *de facto* not taxed equally (e.g., ordinary personal income, business income, capital gains), widening the scope for tax arbitrage.
- The taxation of pension income and life insurance payouts is not consistent with the correspondence principle, according to which contributions would be tax exempt and future income would be fully taxed.
- The increased globalization of corporate activities, including international tax shifting, tax avoidance and the erosion of the tax base have contributed to declining tax revenues and less reliable tax estimates, complicating fiscal management.

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<sup>6</sup>For an outline of the reforms, see L. Lipschitz, J. Kremers, T. Mayer, and D. McDonald, *The Federal Republic of Germany: Adjustment in a Surplus Country*, IMF Occasional Paper No. 64, January 1989 (Washington: International Monetary Fund).

141. The schedule of income tax rates has high entry and top marginal tax rates. The tax reform of the late 1980s established a “linear-progressive” marginal tax rate schedule and eliminated the bulge in the middle-income range. The 1996 Tax Act created, however, a hurdle at the lower end of the tax schedule by raising the entry tax rate from 19.0 percent to 25.9 percent (Chart IV-2). At the same time, the basic personal tax exemption was raised from DM 5,616 to the subsistence income of DM 12,042. The high top marginal tax rate (53 percent at incomes of DM 120,000 for a single tax payer and DM 240,000 for a one-earner married couple)—in combination with the differential taxation of various types of income—exerted strong incentives for tax avoidance that fell on fertile ground given the numerous possibilities for sheltering income by investing in the new Länder and some selected sectors (e.g., shipbuilding).

142. Under the present tax code, different types of income are *de facto* not taxed equally. The top marginal income tax rate on ordinary personal income is 53 percent/57 percent (including the solidarity surcharge on income taxes) compared with marginal tax rates on business income (*gewerbliche Einkünfte*) of 47 percent/50.5 percent and on retained earnings (*Thesaurierungssatz*) of 45 percent.<sup>7</sup> Business income is additionally subject to a local trading tax on profits. This tax, in combination with the trading tax on capital, is the most important tax for municipalities. The tax rate on profits is set by local governments and can reach as high as 18 percent; the local tax is deductible from taxable income. Capital gains on non-business assets are tax-exempt if held beyond a minimum span of time—the “speculation period” (e.g., six months for financial assets and two years for real estate). Furthermore there are income-specific tax allowances and deductions (e.g., a tax-free savers’ allowance for income on capital assets of DM 12,000 for married couples), and exemptions for overtime premia for work on Sundays, holidays, and at night. Unemployment benefits and social assistance income are also not taxed—though they are considered in determining the (marginal) tax rate (*Progressionsvorbehalt*). Pension income is taxed only to the extent that it constitutes a return on investment, which under the present tax code is calculated to be on average 27 percent of pension benefits. Income from agriculture and forestry is also treated favorably.

143. The tax code is also characterized by a large number of tax allowances. Some tax allowances adjust the tax base to better measure ability to pay more accurately—such as tax allowances for outlays necessary to produce taxable income (*Werbungskosten*). But even *Werbungskosten* allowances include tax breaks for expenses that are directly determined by the tax payer, e.g., the deduction for commuting costs is proportional to the commuting distance. Other special allowances (*Sonderausgaben*) are granted, for example, to defray the cost of employing domestic help.<sup>8</sup> In the wake of unification, special depreciation allowances

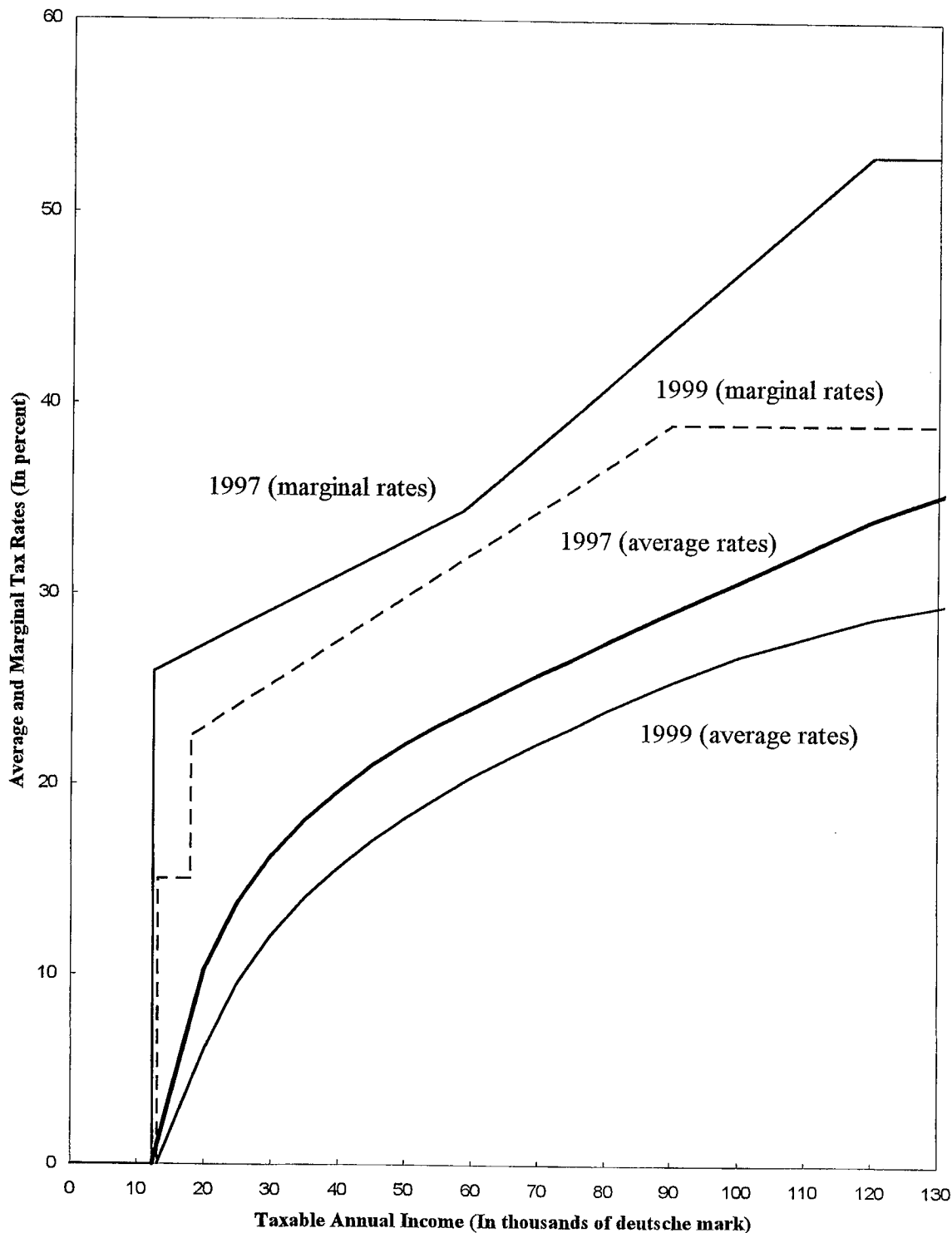
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<sup>7</sup>Since 1995, a solidarity surcharge of 7.5 percent of the income tax liability has been imposed.

<sup>8</sup>In the 1997 Tax Act, the maximum deduction from taxable income for expenses in

(continued...)

Chart IV-2  
Germany  
Personal Income Tax Schedules



(*Sonderabschreibungen*) expanded opportunities for tax write-offs significantly. Investment in shipbuilding and rental property also offer extensive possibilities for tax shelters. Moreover, any loss can be used to offset any other taxable income with unlimited carry forward into the future. The interplay of overly generous write-offs, unlimited loss carry forward, and tax-exempt capital gains permit substantial tax arbitrage by channeling normal—i.e., taxable—income into tax-exempt capital gains.<sup>9</sup>

144. Many of the income tax rules, primarily those motivated by special economic objectives, have severely reduced the transparency of the tax system and have made it difficult to assess the implicit subsidy component in most policy-oriented tax breaks. A number of tax rules also tend to violate both horizontal fairness (mainly due to the unequal treatment of different sources of income) and vertical tax fairness (in part because the benefits of tax breaks typically increase with the marginal tax rate).<sup>10</sup>

145. In the corporate sector, retained earnings are subject to a 45 percent corporate income tax and the local trading tax on profits. Distributed profits are taxed at a 30 percent corporate tax. However, this tax rate is mainly relevant for profit distributions to nonresidents (including foreign corporations); domestic shareholders receive a tax credit for the income tax paid by the corporation (full imputation) and are taxed according to their personal income tax rate. For businesses, tax accounting is based on commercial accounting standards, which traditionally have been liberal in Germany, since they are guided by the notion of creditor protection. As a result, accounting rules leave ample scope to build up hidden reserves in balance sheets. Losses can be carried forward indefinitely and for an unlimited amount.<sup>11</sup> The leeway that German accounting standards provide, together with special depreciation rules for eastern Germany and increased cross-border shifting of taxation, has significantly impaired the accuracy of government estimates of revenues from corporate taxes in recent years.

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<sup>8</sup>(...continued)

connection with employment of domestic help was raised from DM 12,000 to DM 18,000.

<sup>9</sup>As an example, heavily debt-financed real estate investments may record tax losses, which can be deducted from taxable income, due to their financing costs and an annual depreciation allowance of 5 percent during the first seven years. In addition, if the property is later sold, the capital gains are tax-exempt.

<sup>10</sup>Horizontal fairness treats taxpayers with similar incomes in a comparable way, while vertical fairness treats taxpayers according to their ability to pay.

<sup>11</sup>Losses of up to DM 10 million can be carried backward a maximum of two years. A huge overhang of potential corporate loss carry-overs exists—official estimates were more than DM 200 billion in 1997—that can be used at any time to reduce tax liabilities.

146. Allowances and tax exemptions—and tax avoidance—have impaired tax collections. Large income segments are not reported to the tax authorities. Survey data for 1983 (more recent data are not available) indicate that only 64 percent of national income was declared, of which 22 percent was tax-exempt.<sup>12</sup> As a result, barely half of national income was subject to taxation. Similar conclusions are supported by the Council of Experts (*Sachverständigenrat*) calculations, that indicated that just 57.4 percent of national income in 1989 was subject to taxation.<sup>13</sup> Even prior to the special tax preferences for investment in the new Länder, the scope for tax avoidance was significant.

147. Even though the top marginal income tax rate was 56 percent in 1983, the estimated effective marginal tax rate peaked at 34 percent (at an annual income of DM 80,000) and then declined toward an effective marginal tax rate of 30 percent for higher income levels as tax breaks were exploited increasingly.<sup>14</sup> Revenues from the assessed income tax on high-income earners and the self-employed (*veranlagte Einkommensteuer*) have also declined sharply. Assessed income tax revenues (adjusted for tax refunds) dropped from the equivalent of 37.3 percent of wage tax revenues (*Lohnsteuer*) in 1990 to 21.5 percent in 1996. While revenues from wage taxes have been stable since the 1990 Tax Reform, the yields (as percent of GDP) from the corporate income tax and the assessed income tax have fallen, (Chart IV-3). This reflects more sophisticated tax avoidance, but also the enlarged scope for tax avoidance in the wake of unification. Corporate carry-over of losses and increasing international tax shifting by corporations have likely contributed to the erosion of the corporate tax base. Moreover, there is evidence that large corporations have shifted tax liabilities abroad by booking profits in countries with lower corporate tax rates.<sup>15</sup>

### C. International Comparisons and Recent Trends in German Tax Yields

148. In international comparisons, the German tax code presents a differentiated picture. In terms of personal income taxation, Germany was somewhat above the EU average for both the top marginal rate (52.5 percent) and for the effective average tax rate on labor income—

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<sup>12</sup>O. Lang, K.-H. Nöhrbass, and K. Stahl, "On Income Tax Avoidance: The Case of Germany", ZEW Discussion Paper No. 93-05, March 1993 (Mannheim: Zentrum für Europäische Wirtschaftsforschung). This study was based on the 1983 German Income and Consumption Survey.

<sup>13</sup>See Council of Economic Experts, *Im Standortwettbewerb*, Annual Report 1995 (Stuttgart: Sachverständigenrat), p. 203.

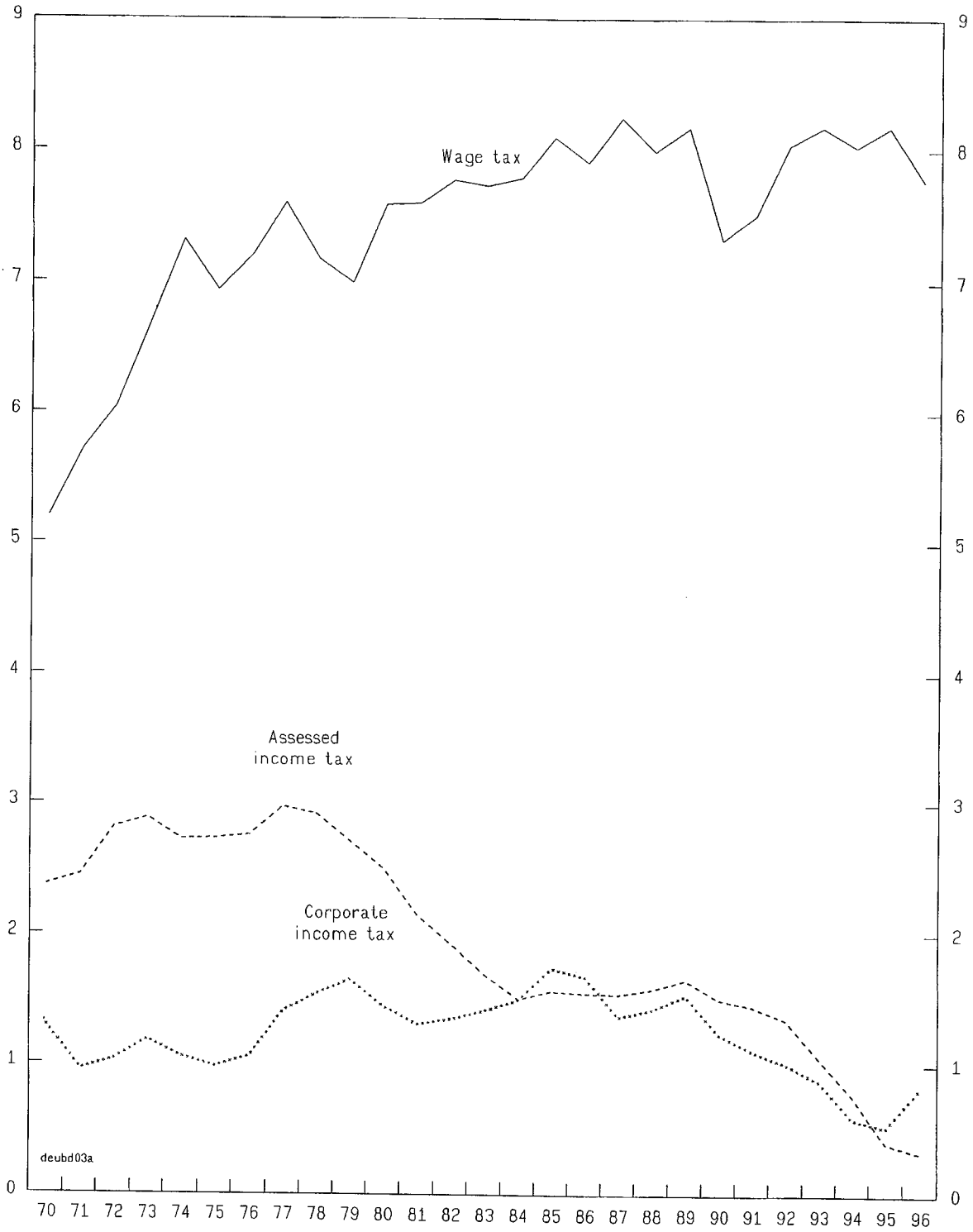
<sup>14</sup>Lang et al., "On Income Tax Avoidance".

<sup>15</sup>The 20 largest listed companies in Germany have reduced their effective tax rate by 11 percentage points since 1991, partly by shifting the taxation of profits abroad; see German Brief, 5/2/97, published by the Frankfurter Allgemeine Zeitung GmbH Information Services.



CHART IV-3  
GERMANY

Income Taxation  
(In percent of GDP)



Source: Deutsche Bundesbank and staff calculations.

calculated on macroeconomic data and actual tax receipts during the 1980s (Chart IV-4).<sup>16</sup> The burden on labor income has, however, risen markedly in the wake of unification as the tax base related to nonwage personal income eroded further. By contrast, on the corporate side, Germany has the highest statutory income tax rate among major industrial countries, but the lowest effective average tax rate (calculated as corporate income tax as a share of the operating surplus of corporations) largely because of the liberal use of the tax breaks and relatively flexible accounting rules (Chart IV-5).<sup>17</sup> Similarly, effective marginal tax rates on investment, which capture the tax wedge between the before and after-tax returns on a project, are relatively low by international standards, particularly compared with the United States, France, and the United Kingdom. The tax burden on consumption is also low in Germany by EU standards, which is evident in a 15 percent standard VAT rate in Germany, compared with an EU average of 20 percent.

149. Mendoza, Razin, and Tesar have developed a methodological approach to assess the average tax burden on labor income, capital and corporate income, and on consumption (Chart IV-6).<sup>18 19</sup> This approach relies on actual tax revenue and national accounts data. They compute effective average tax rates by expressing the wedge between pre- and post-tax prices and income as ratios of national accounts measures of consumption and income from labor and capital. Although this approach has some drawbacks, it effectively encapsulates international differences in tax burdens. For Germany, this approach supports other evidence that the tax burden on consumption is comparably moderate while labor income bears a relatively high tax burden. Effective average tax rates on capital and corporate incomes are low.

150. The effective tax burden on consumption fluctuated in a narrow range around 15 percent of the pre-tax value of private consumption throughout the 1970s and 1980s. This tax rate placed Germany below many European countries, which was nonetheless higher than the average effective rate for the U.S. and Japan (with an average tax rate of about 5 percent). Subsequent to unification, however, the effective tax rate on consumption in Germany rose to

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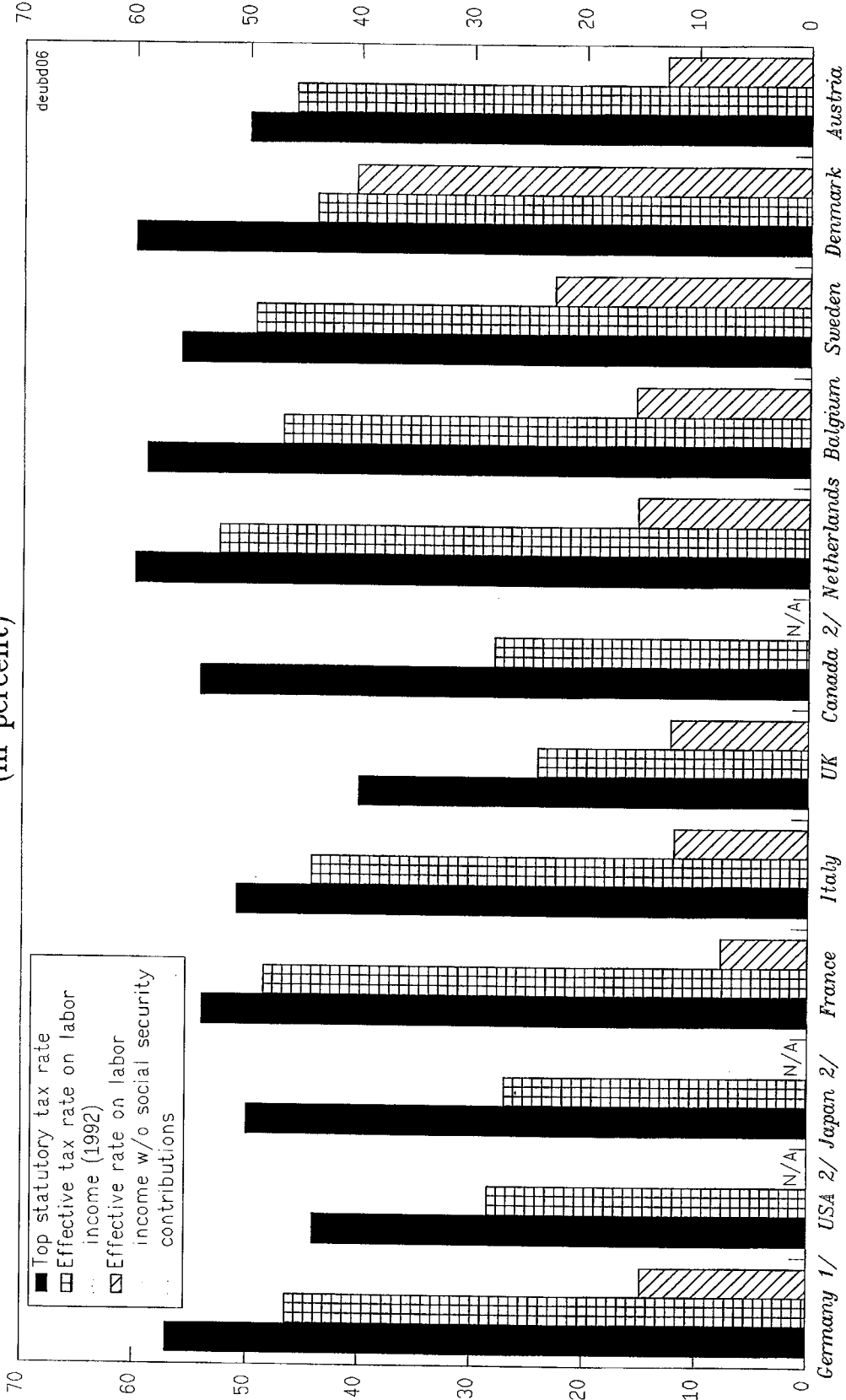
<sup>16</sup>In Chart IV-4, the data on statutory tax rates are from Price Waterhouse, "Individual Taxes: A Worldwide Summary," (New York, 8/1996), and Deloitte Touche, "Taxation in Western Europe," (New York, October 1996).

<sup>17</sup>In Chart IV-5, data on statutory tax rates are from Price Waterhouse, "Corporate Taxes: A Worldwide Summary," (New York, 8/1996), and Deloitte Touche, "Corporate and Withholding Tax Rates Between Major Trading Nations," (New York, April 1995).

<sup>18</sup>E. G. Mendoza, A. Razin, and L. L. Tesar, "Effective Tax Rates in Macroeconomics: Cross-country Estimates of Tax Rates on Factor Incomes and Consumption," *Journal of Monetary Economics*, Vol. 34, 1994, pp.297-323.

<sup>19</sup>This method is briefly described in annex I of this chapter.

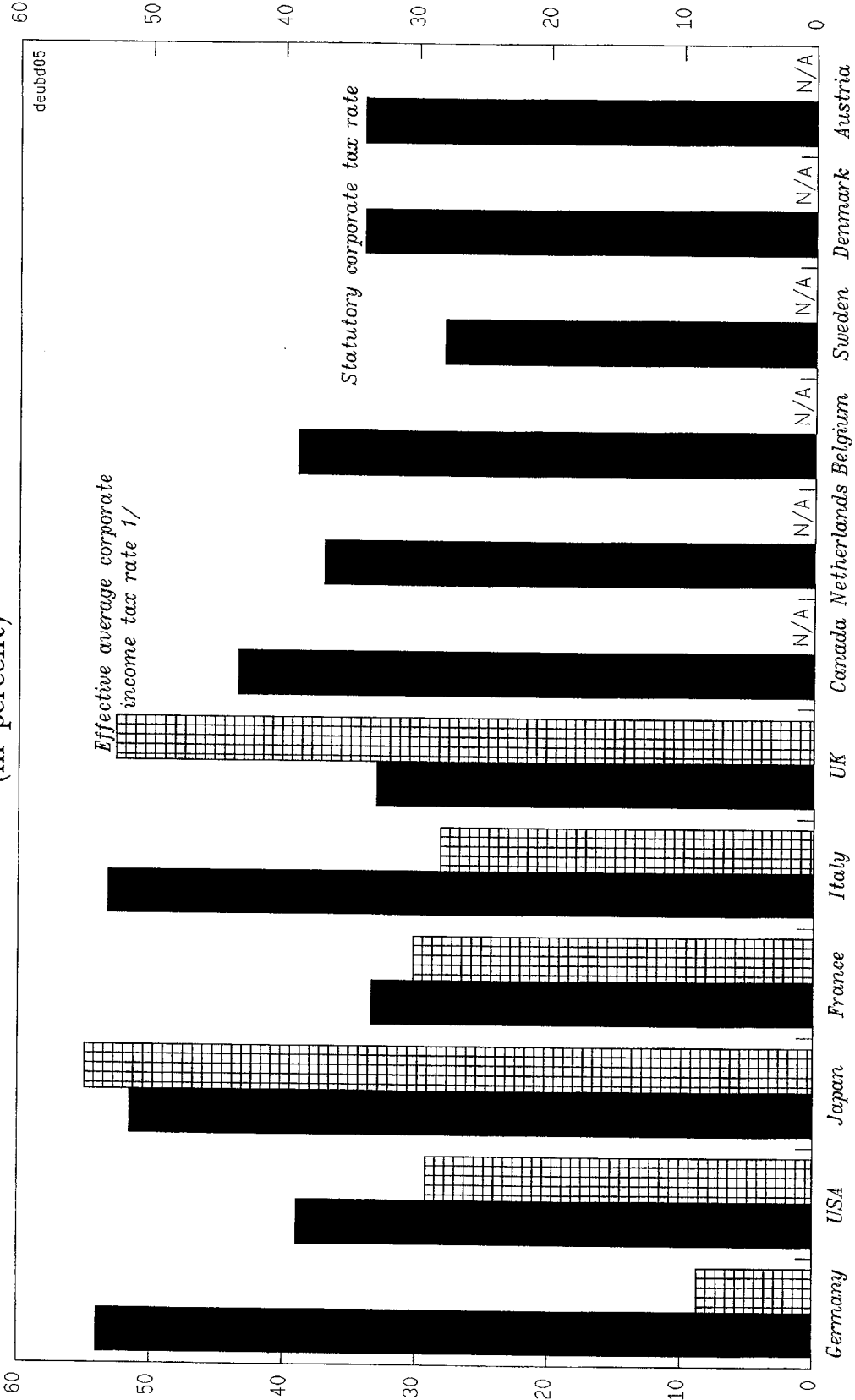
Chart IV-4  
GERMANY  
Statutory and Effective Average Personal Income Tax Rates  
(In percent)



Sources: Price Waterhouse (1996), Deloitte and Touche (1995), Lassen and Nielsen (1996), and Ministry of Finance.

- 1/ Includes Solidarity Surcharge (4%).
- 2/ Effective income tax rates are the average for the period 1986-90.
- 3/ Includes local surcharge (4%).

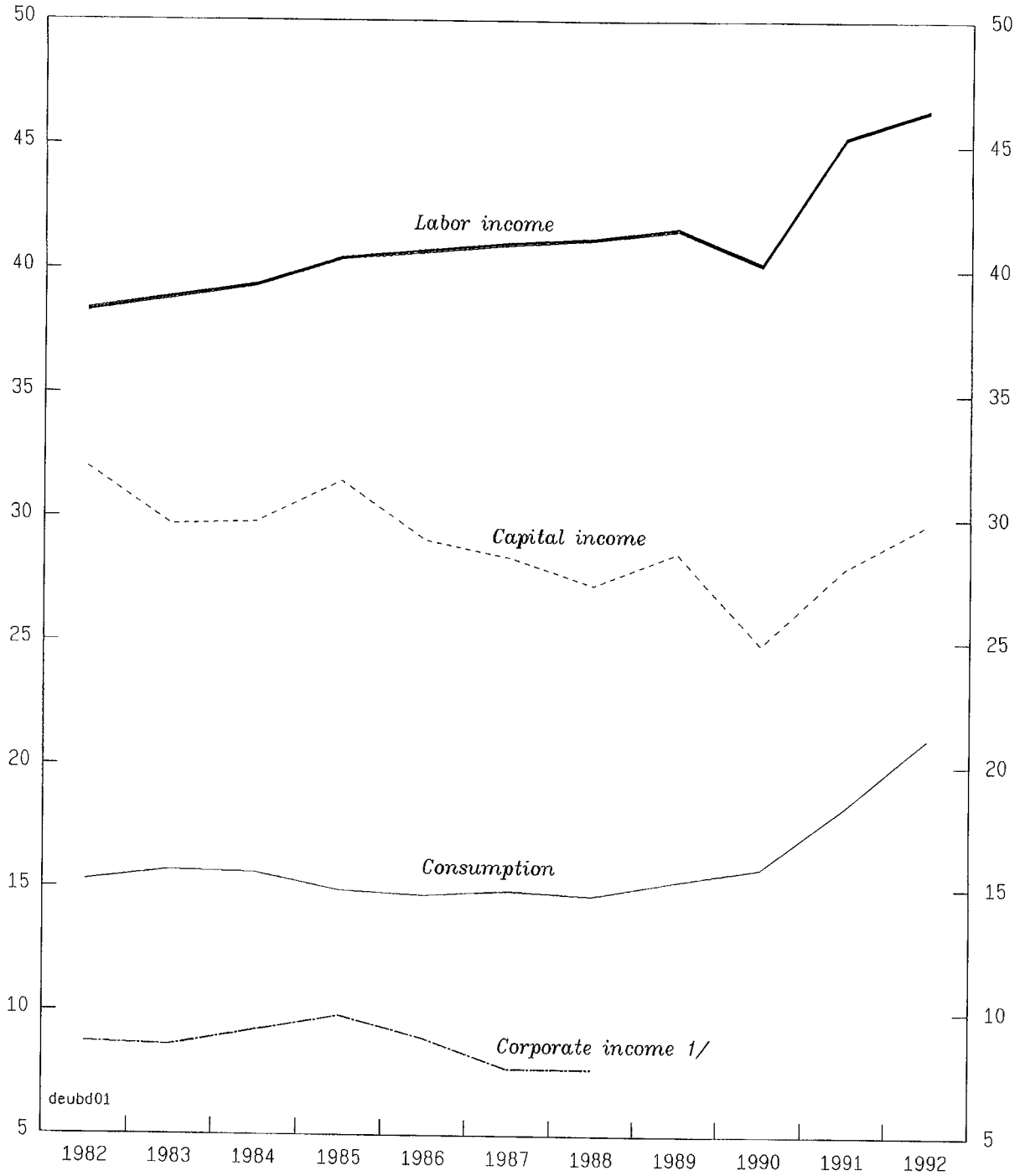
Chart IV-5  
GERMANY  
Statutory and Effective Corporate Tax Rates  
(In percent)



Sources: Price Waterhouse (1996), Deloitte and Touche (1995), Mendoza et al (1994).

1/ Based on calculations by Mendoza et al (1994); average for the period 1984-88.

Chart IV-6  
GERMANY  
Effective Average Tax Rates  
(In percent)



Sources: Mendoza, Razin, and Tesar (1994); Lassen and Nielsen (1996).

1/ Data for 1989 onwards are not available.

20 percent, but was still below the average comparable tax rate for EU countries,<sup>20</sup> suggesting additional scope for Germany to shift taxation toward consumption.

151. As regards the taxation of labor income (including social security contributions), the effective average tax burden has displayed an upward trend in Germany as in most of the G-7 countries. After unification, the tax burden on labor income in Germany surged above 46 percent of gross compensation compared with an effective average tax rate of about 44 percent in other EU countries and less than 30 percent in the United States. In light of the evidence for almost complete tax shifting into product wages in Germany,<sup>21</sup> the high taxation of labor has almost certainly contributed to rising labor costs.

152. The effective average tax rate on capital income presents the mirror image to that on labor income: those countries with high labor taxation, such as Germany, had the lowest effective average tax rates on capital. Throughout the 1980s, taxation on capital income declined steadily in Germany; however, unification pushed the effective average tax rate on capital back to its level of the early 1980s. Nonetheless, the tax burden on capital income in Germany (at 30 percent) remained low by the standards of G-7 countries (40-55 percent).

153. As to the effective corporate tax burden (measured as the ratio of corporate tax to the operating surplus of corporations), Germany has an effective tax rate well below the average for G-7 countries. In Germany, the effective average corporate tax rate was below 10 percent compared with about 30 percent for other G-7 countries (except for the U.K. and Japan with effective tax rates of about 50 percent). The low tax rate in Germany has been attributed in part to greater weight given to large corporations, which have more scope for avoiding taxes (e.g., by transferring tax liabilities across borders).

154. Recent research found that higher taxation, particularly in Europe on labor income, over the past two decades has led to slower growth and less employment.<sup>22</sup> European trade unions have succeeded to a considerable extent, in shifting the burden of labor tax onto producers (unlike in the United States). The resulting higher labor costs prompted firms to substitute labor with capital and contributed to increased unemployment. Economic growth is

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<sup>20</sup>D. D. Lassen and S. B. Nielsen, "Is the Tax Burden in Denmark Higher than in Other European Countries?" *Nationaløkonomisk Tidsskrift*, Vol. 134, 1996, pp. 209-222.

<sup>21</sup>T. Tyrväinen, "Wage Determination in the Long Run, Real Wage Resistance and Unemployment: Multivariate Analysis of Cointegrating Relations in 10 OECD Countries," Discussion Paper, December 1995 (Helsinki: Bank of Finland).

<sup>22</sup>W. Leibfritz, J. Thornton, and A. Bibbee, "Taxation and Economic Performance," Economics Department Working Paper No. 176, (Paris: OECD), 1997, and F. Daveri and G. Tabellini, "Unemployment, Growth and Taxation in Industrial Countries," unpublished, 1997.

adversely affected by reduced investment in human capital and lower marginal productivity of physical capital. Based on econometric estimates, the rise in effective average labor taxes of 8 percentage points experienced by Germany between 1965-75 and 1976-91 would have reduced per-capita GDP growth by 0.4 percentage points per annum and contributed 3-5 percentage points to the unemployment rate. This evidence therefore suggests that even though a higher tax burden on labor income (as the less mobile factor) may be consistent with taxation theory, it might, nonetheless, have adverse effects on the tax yield, real growth, and employment.

155. While effective average tax rates can only approximate marginal tax rates that matter for economic decisions, a methodological technique developed by King and Fullerton<sup>23</sup> estimates the marginal tax burden on income from new investment.<sup>24</sup> This approach seeks to combine corporate and personal income taxation and other features of the tax code, such as depreciation allowances, to estimate the effective tax wedge between the pre-tax return on an investment project and the after-tax return received by the ultimate investor. The results suggest that the marginal tax burden on income from investment is low in Germany relative to G-7 countries.

156. This approach also highlights the tax treatments of various types of investment (primarily machinery versus construction) and of different financing modes (e.g., retained earnings, debt, and equity). The combined effective marginal tax rates on investment (inclusive of corporate and personal income taxes) in Germany declined in the 1980s by about 10 percentage points to 32 percent, which was the lowest tax rate among the countries studied (United States, United Kingdom, and France) (Table IV-1).<sup>25</sup> <sup>26</sup> Notwithstanding the decline in the overall marginal effective tax rate on investment in Germany, the difference between the effective marginal tax rate on debt-financed investments and those financed by retained earnings widened during the 1980s. Leibfritz,<sup>27</sup> however, suggested that this difference narrowed subsequently in the wake of the 1990 tax reform, which reduced marginal

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<sup>23</sup> M. A. King and D. Fullerton, eds., *The Taxation of Income from Capital: A Comparative Study of the United States, United Kingdom, Sweden, and West Germany* (Chicago: University of Chicago Press, 1984).

<sup>24</sup> The King-Fullerton approach is briefly outlined in annex II.

<sup>25</sup> D.W. Jorgenson and R. Landau, eds., *Tax Reform and the Cost of Capital: An International Comparison*, (Washington: The Brookings Institution, 1993).

<sup>26</sup> A similar picture emerges based on corporate tax rates alone.

<sup>27</sup> W. Leibfritz, "Germany" in *Tax Reform and the Cost of Capital: An International Comparison*, ed. by Dale W. Jorgenson and Ralph Landau, (Washington: The Brookings Institution), 1993.

Table IV-1. Germany: Marginal Effective Tax Rates

(In percent)

	1980	1985	1990
<b>Marginal effective corporate tax rates</b>			
Germany	15.2	9.9	4.6
United States	14.4	9.2	24.0
France	-28.0	-33.0	-33.4
United Kingdom	-31.4	21.4	28.0
<b>Marginal effective rates on corporate income (combining corporate and personal income taxes)</b>			
Germany	43.1	38.3	31.9
United States	33.7	26.2	38.5
France	66.6	67.0	53.8
United Kingdom	8.9	34.9	37.9

Source: Jorgenson and Landau (1993).



income tax rates. Nonetheless, investment financed by retained earnings incurred the highest effective marginal tax rates compared with new equity, while debt-financed investment had the lowest tax rates.<sup>28</sup>

#### D. The Government's Tax Reform Proposals

157. The Government's tax reform plan aims to correct many of the above mentioned weaknesses in the tax system and to shore up Germany's global tax position.<sup>29</sup> (It is intended to become effective largely in 1999.) To improve investment incentives and bolster Germany as a location for production (*Standort Deutschland*), marginal personal and corporate income tax rates would be reduced. The top personal marginal rate would be lowered from 53 percent to 39 percent, while the entry marginal rate would be reduced from 25.9 percent to 15 percent (see Chart IV-2). The solidarity surcharge would also be cut in 1998 from 7.5 percent of income taxes to 5.5 percent. The maximum marginal rate on business income would drop in two steps from 47 percent to 40 percent in 1998 and to 35 percent in 1999. The top marginal tax rate on retained profits would be lowered from 45 percent to 40 percent in 1998 and to 35 percent in 1999. The marginal corporate tax rate would be reduced in two steps from 30 percent to 28 percent in 1998 and to 25 percent in 1999.

158. At present, interest paid to German residents is subject to a withholding tax of 30 percent on registered transactions and 35 percent on over-the-counter transactions (*Tafelgeschäfte*).<sup>30</sup> These withholding tax rates would be lowered to 25 percent and 30 percent, respectively. Dividend income on German residents is subject to a withholding tax of 17.5 percent plus a corporate income tax of 30 percent, or 47.5 percent in total. This total tax rate is below the top marginal income tax rate. (Germany applies full imputation for dividend taxation by crediting to the shareholder in full the amount of tax paid by the

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<sup>28</sup>These results could be considered a paradox since more than three-quarters of investment in Germany is typically financed by internally generated funds (J.S.S. Edwards and K. Fischer, "Banks, Finance, and Investment in West Germany since 1970", *Discussion Paper No. 497*, ed. by Center for Economic Policy Research, (London), January 1991). However, the methodology used to estimate effective marginal tax rates does not incorporate the effects of accounting rules (except depreciation allowances). German accounting rules afford relatively wide discretion in valuing assets and are geared toward the protection of creditors. As a result, profits tend to be understated and sizable hidden reserves are routinely built up in corporate balance sheets. The implied tax saving effects for internal financing that stem from hidden reserves are not included in the calculations of effective marginal tax rates.

<sup>29</sup>Press Office of the Federal Government, "Steuerreform", *Aktuelle Beiträge zur Wirtschafts- und Finanzpolitik*, No. 13/1997, 6/26/1997.

<sup>30</sup>Individuals can claim a saver's tax-free allowances of currently DM 6,000 for a single tax payer; this allowance is proposed to be halved in 1999.

corporation.) Under the tax reform proposal, the dividend withholding tax would be reduced to 11.25 percent and the corporate income tax to 25 percent (or to a total marginal rate of 36.25 percent). This lower combined marginal tax rate would be close to the proposed top marginal personal income tax rate of 39 percent.

159. The lower marginal tax rates on personal income would reduce economic distortions and the incentives for tax avoidance. At the lower end of the tax schedule, unemployment traps would be lessened, but they would remain considerable owing to the withdrawal of assistance.<sup>31</sup> Therefore scope remains for closer coordination of taxation with the system of social assistance.<sup>32</sup>

160. The proposals to broaden the personal income tax base are significant steps toward making the tax code fairer and more consistent. The tax base would be broadened by subjecting previously tax-exempt types of income to taxation (see text box).<sup>33</sup> This reduction of tax breaks affects both private households and firms. For private households, tax base broadening would be accomplished by phasing in the full taxation of certain premium time bonus pay such as for work on Sundays, holidays, and at night and for mining work, and of certain fringe benefits such as severance pay and anniversary bonuses. The share of public pension incomes subject to taxation would be raised from an average of 27 percent to 50 percent.<sup>34</sup> The standard deduction for expenses connected with income from dependent

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<sup>31</sup>C. Thimann, "Effective Taxation for Recipients of Social Assistance in Germany and the Consequences of the 1996 Tax Reform", IMF Working Paper 95/120, November 1995 (Washington: International Monetary Fund).

<sup>32</sup>The Commission on Alternative Tax-Transfer Systems recommended, *inter alia*, that the income calculations that determine social benefits be aligned with the income calculations for income taxation purposes, and that the share of wage income that counts toward social assistance benefits be reduced; Commission on Alternative Tax-Transfer Systems, "Integration of Income Taxation with Tax Financed Social Benefits", *Schriftenreihe, Heft 59*, ed. by Ministry of Finance (Bonn), June 1996.

<sup>33</sup>The Government had proposed some measures to broaden the tax base which subsequently were changed during the deliberations in the *Bundestag*. For example, the Government proposed to subject bonus pay for work on Sundays, Holidays and at night to full taxation starting in 1999, whereas the *Bundestag* opted to phase out these exemptions over four years. In addition, the *Bundestag* eliminated the proposal to tax half of unemployment benefits, short-time work compensation and bad weather pay, which are presently completely exempt.

<sup>34</sup>Currently only that part of public pensions that represents a (fictitious) return on investment (*Ertragsanteil*) (about 27 percent on average) is taxed. The taxable income share of 50 percent was apparently chosen since tax-exempt employer-paid pension contributions

(continued...)

## MAIN PROPOSALS ON INCOME TAX REFORM

The Government's proposals on tax reform described below were passed by the *Bundestag* in June 1997. But the legislation was vetoed by the *Bundesrat* in July 1997 and the reconciliation committee failed to reach a compromise in late July.

### Reductions in Tax Rates

- The top marginal rate on personal income would be reduced from 53 percent (for incomes above DM 120,000; single tax payer) to 39 percent (for incomes above DM 90,000), and the entry rate would be lowered from 25.9 percent to 15 percent;
- the flat entry rate of 15 percent for incomes between DM 13,014 and DM 18,035 (single tax payer) would be followed by a linear-progressive (continuous) tax schedule rising from a rate of 22.5 percent to 39 percent;
- the personal income tax rate on business income would be reduced from 47 percent to 35 percent;
- the withholding tax rate on interest income would be cut from 30 percent to 25 percent;
- the corporate tax rate on retained profits would be lowered from 45 percent to 35 percent, and the tax rate on distributed profits (which is fully applied to a shareholder's tax liability on dividend income) would be reduced from 30 percent to 25 percent.

### Extensions of the Tax Base

#### Subjecting a Wider Range of Income to Taxation

- full taxation of bonuses for work on Sundays, holidays and at night, and some employer paid fringe benefits would be phased in until 2003;
- half of the retirement income from public pension schemes would be taxable (compared with about 27 percent under current rules);
- instead of taxing extraordinary income at half the regular tax rate, such income would be distributed over up to 7 years;
- capital gains on personal assets would remain exempt from taxation, but the "speculation period" during which they are subject to tax would be extended to one year (from six months) for financial assets and to 5 years (from 2 years) for real estate.

#### Reducing Deductions and Tax Allowances

- the standard allowance for income-related expenses and special deductions for commuting distance would be reduced;
- the savers' tax-free allowance would be halved to DM 3,000 for a single tax payer and DM 6,000 for married couples filing jointly;
- the accelerated depreciation rate for machinery and equipment would be lowered by 5 percentage points;
- the depreciation rate for commercial buildings would be reduced from 4 percent to 3 percent per annum; and the accelerated depreciation on rental housing would be eliminated.

#### Tightening of Corporate Accounting Rules

- accounting rules related to retaining hidden reserves and to risk provisions for pending transactions would be tightened;
- loss carry-forward would be restricted to half of the profits in any given year;
- some (but not all) tax concessions for agriculture and shipping would be eliminated.

### Measures to be Implemented in 1998 Ahead of the 1999 Reform

- the solidarity surcharge would be cut from 7.5 percent to 5.5 percent of the income tax liability;
- the top personal tax rate on business income would be reduced from 47 percent to 40 percent;
- the corporate tax rate on retained profits would be cut from 45 percent to 40 percent and on distributed profits from 30 percent to 28 percent;
- corporate accounting rules would be tightened to make the above measures broadly revenue neutral;
- the local trading tax on capital would be abolished.

work would be reduced from DM 2,000 to DM 1,300 and the deduction for commuting distance would be scaled back. The savers' tax-free allowance for interest income would be halved to DM 3,000 for a single tax payer and DM 6,000 for a married couple.

161. For enterprises, under German tax law commercial and tax accounting go hand in hand—the so called linkage principle. Although this principle would not be abolished, it has been proposed that tax accounting should differ from commercial accounting to improve the assessment of profits by preventing the creation of substantial hidden reserves in the balance sheet. For example, under existing accounting rules, a business that has made an extraordinary write-down can maintain its lower book value even after the reason for the write-down no longer pertains. The tax savings are thus preserved indefinitely. It has been proposed to introduce a mandatory write-up, or appreciation, to the higher of fair market value or production costs, if the reason for the extraordinary depreciation no longer applies. The rules for setting-aside provisions for risks from pending business transactions would also be tightened.

162. The accelerated (declining balance) depreciation allowance on equipment investment would be reduced from 30 percent to 25 percent of the residual value. The linear depreciation on commercial buildings would be lowered from 4 percent to 3 percent per annum, and the accelerated depreciation on rental housing and the special depreciation for buildings in urban development areas would be abolished. In addition, capital gains rules would be made more restrictive: the rollover or reinvestment of capital gains would be limited to land and buildings; the tax-free allowance (maximum of DM 60,000) in case of the sale of a business would be abolished; and the special startup depreciation and tax-free reserves for small and medium-sized enterprises would be abolished even though they had just been extended by the 1997 Tax Act. These changes would make many existing tax shelters unattractive.

163. The tax reform proposals constitute an important step toward moving to a comprehensive income tax base and eliminating some big tax shelters. The proposals represent progress toward the reduction of distortions of tax-favored activities, as a number of preferential tax rules (though not all) for agriculture and shipping would be eliminated, while depreciation rates for buildings and land would be scaled back. They would thus restrict the opportunities for tax arbitrage and minimize the distortions of investment. The proposed reduction in corporate tax rates in combination with fewer investment incentives and a more transparent determination of profits would likely have positive effects on the allocation of capital because investment decisions would thus be based more on economic fundamentals than tax considerations. The broader tax base would also alleviate concerns about horizontal equity and—in combination with lower marginal tax rates—would help to simplify the income tax code both directly and through smaller incentives for complicated tax avoidance schemes. This would make the effects of the tax rules more transparent.

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<sup>34</sup>(...continued)

constitute half of the total pension contributions.

164. The tax reform proposals would be a step toward rebalancing the tax structure. The shift from direct to indirect taxes, which tend to be less distortionary, would strengthen incentives for investment, work, and eventually growth. Increasing VAT would also align Germany's tax structure with that of other European countries. The Government has also proposed to abolish the local trading tax on capital—one of the key taxes for municipalities with a tax yield of about DM 5 billion.<sup>35</sup> This tax is levied on a company's equity and long-term debt. Since the tax liability is independent of profitability, it can diminish the financial capacity and liquidity of a firm. At the margin, the elimination of the capital tax would benefit firms in western Germany, since the tax has so far not been imposed on firms in eastern Germany. But the EU has formally approved this exception only until temporarily. Thus, if the tax were not be eliminated, it would have to be extended to the new Länder in 1998.

165. The proposed tax reform plan is, however, less ambitious than other proposals for tax reform, such as the Bareis Commission,<sup>36</sup> which was appointed by Finance Minister Waigel in 1993, and the plan proposed in 1995 by Mr. Uldall, a leading member of the business group of the CDU's parliamentary group.<sup>37</sup> The Bareis Commission envisaged raising DM 35 billion from a broadening of the personal income tax base alone. By contrast, only about DM 14 billion would be raised under the current reform plan from a broadening of the personal income tax base. Most of the base broadening would take place with respect to the corporate income tax base with about half derived from revised accounting rules.

166. The new proposals leave unaddressed some weaknesses in the tax code. While some proposals of the Bareis Commission, such as the abolition of various tax breaks and in principle the adherence to a linear progressive income tax schedule, have been incorporated in the proposed tax reform, this reform does not fully correct some systematic abnormalities and does not eliminate all tax breaks. It maintains, for example, tax advantages for shipbuilding, merchant shipping, and agriculture. Similarly, it does not systematically revise tax allowances for expenses that are determined by the tax payer (e.g., for offices at home, company cars, and a second household), as suggested by the Bareis Commission. The reform plan merely envisages a cut and modest revision in the commuter tax allowance.

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<sup>35</sup>This proposal was accepted by both the *Bundestag* and *Bundesrat* in July. Municipalities would be compensated for the revenue foregone by receiving a larger share of VAT revenues.

<sup>36</sup>Bareis Commission, "Report of the Income Tax Commission on the Tax Exemption of Subsistence Income and on Income Tax Reform", *Schriftenreihe, Heft 55*, ed. by Ministry of Finance (Bonn), August 1995.

<sup>37</sup>Mr. Uldall advocated in January 1995, a personal income tax code with a top marginal tax rate of 28 percent on personal and corporate income. The revenue loss of DM 120 billion would be financed partially by eliminating nearly all tax breaks (about DM 80 billion). G. Uldall, *Proposal for a Reform of Income and Corporate Taxation*, (Bonn), January 1995.

167. The proposals do not completely adopt the principle of equal treatment of all forms of income. Even after the reform, various types of income would be taxed differently and some tax allowances for specific income sources would be retained. A faster phasing in of the taxation of bonuses for work on Sundays, holidays, and at night would be preferable. Similarly, the partial taxation of unemployment benefits and other income replacement payments, which was struck out by the *Bundestag*, would be a reasonable measure to promote more uniform taxation of income. Moreover, the differential tax treatment of personal and business incomes (and of capital gains) would leave in place the incentive for income shifting to lessen the tax burden.

168. A more systematic tax treatment of pension income is also absent. Instead of raising the share of pension income subject to taxation rather arbitrarily to 50 percent, a more systematic approach would make all pension contributions tax-exempt and, in turn, tax pension income as ordinary income (in line with the so-called correspondence principle). The correspondence principle should also be applied to the private provisioning for pension income, which will gain importance in the future (see chapter V on pension reform), by making contributions tax-exempt but future income taxable.

169. The tax reform proposals are not explicitly set in an international, and in particular a European context. The proposed reform would lower the tax on profits paid to foreign parent companies. For German parent companies of foreign subsidiaries, the tax reform does not consider introducing a credit for foreign-paid corporate income tax to avoid double taxation (which applies for example in the United States and the United Kingdom). Moreover, while the tax reform lowers the withholding tax rate on interest income, it is silent on a broader "European" approach that would reduce the problem of tax evasion on interest income.

170. One key element of a more far-reaching reform—but which also would be most controversial—is the taxation of capital gains on personal assets.<sup>38</sup> There are valid considerations that would argue against introducing such a capital gains tax. It would likely be administratively cumbersome (e.g., for the valuation of real estate), might have to allow the deduction of capital losses and, according to Ministry of Finance calculations, would yield relatively little from limited private financial assets. Some observers are concerned that a tax on capital gains may undermine the promotion of Germany as a financial center. However a capital gains tax would be desirable not only from a tax system point of view, but also because the absence of a tax on capital gains still leaves open one of the biggest tax loopholes. The sheltering of taxable income by shifting it toward eligible capital gains is highly regressive and would continue, albeit to a lesser extent as lower marginal tax rates would reduce the incentive for such shifting. As a result of the special depreciation rules in the new Länder, tax-free capital gains have been a particular boon for high-income real estate investors and have been one of the key factors behind the shrinking tax base on personal nonwage income.

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<sup>38</sup>Some experts consider a tax on capital gains on stocks a double taxation of retained earnings.

### E. The Effects of the Tax Reform Proposals

171. The proposed cut in tax rates on personal and corporate income would reduce gross revenues by DM 87.5 billion (Table IV-2).<sup>39</sup> This reduction would be partly offset by additional revenues from a broader tax base, amounting to DM 42.6 billion. The resulting financing gap of some DM 44.9 billion would be partially closed by as yet unspecified increases in indirect taxes of DM 14 billion. (This amount could be raised, for example, by a 1 percentage point increase in the VAT rate.) The proposed net tax relief, which includes the 2 percentage point reduction in the solidarity surcharge planned for 1998, would amount to about DM 30.9 billion or  $\frac{3}{4}$  percent of GDP by 1999.

172. Official calculations of the distribution of the tax relief indicate that the business sector (including agriculture and forestry) would obtain 34.2 percent of the benefits from the reduction in tax rates, while contributing 45.6 percent to the broadening of the tax base (Table IV-3).<sup>40</sup> Correspondingly, the personal sector would reap 65.8 percent of the benefits from lower tax rates and account for 54.4 percent of the tax base broadening. Total net tax relief for the business sector in 1999 has been officially estimated at about DM 6 billion (or one sixth of the total tax relief). Lower tax rates would yield a tax relief of DM 6 billion, which would be more than offset by measures to broaden the tax base of DM 12 billion. The higher tax on business would largely finance the proposed reduction in the solidarity surcharge (DM 7 billion).

173. Estimates by the Deutsches Institut für Wirtschaftsforschung (DIW) paint a somewhat different picture of the distribution of tax relief. According to DIW calculations, 57 percent of the net tax relief would accrue to profit taxation, while 43 percent would reduce wage taxation (Table IV-4).<sup>41</sup> Thus, DIW contends that the decline in the taxation of profits (entrepreneurial and property income), which has proceeded steadily since the early 1980s, would continue.<sup>42</sup> Based on these estimates, wage taxes would fall by  $1\frac{1}{4}$  percent of gross wages and salaries, and the effective average tax burden on labor income would decline by

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<sup>39</sup>The reduction in corporation tax rates in 1998 would be broadly revenue-neutral due to a planned reduction in some depreciation allowances in the corporate sector (see table).

<sup>40</sup>Ministry of Finance, *Finanzielle Auswirkungen der Steuerreform 1998/1999*, June 1997.

<sup>41</sup>See DIW, "Tax Reform 1998/99: No Success in Tackling Unemployment", *Wochenbericht* 15/97 (Berlin: Deutsches Institut für Wirtschaftsforschung) April 1997.

<sup>42</sup>According to DIW, the effective tax burden on enterprises declined from 37 percent in 1980 to 22 percent in 1997. The tax burden was measured by the ratio of the assessed income tax, the relevant part of the solidarity surcharge, withholding tax on interest income, corporate income tax, the wealth tax, and the local trading tax relative to gross entrepreneurial and property income.

Table IV-2. Germany: Revenue Effects of the Tax Reform Acts Passed by the Bundestag

(In billions of deutsche mark)

	1998	1999
<b>Lower income tax rates</b>	<b>-13.0</b>	<b>-87.5</b>
Lower personal income tax rates	-1.9	-69.3
Lower solidarity surcharge	-7.1	-7.7
Lower corporate tax rates	-3.9	-8.8
Lower tax rate on interest and dividend income	0.0	-1.4
Other	-0.2	-0.3
<b>Broadening the tax base</b>	<b>11.8</b>	<b>42.6</b>
Revenue from previously tax-exempt income	0.0	1.4
Corporate accounting changes and depreciation rates	10.5	22.9
Risk provisions for pending transactions	1.6	4.4
Provisions for purchase and production costs	2.0	3.1
Write-up requirement	1.7	4.8
Valuation of damage provisions in insurance industry	2.4	2.2
Lower accelerated depreciation for machinery and equipment	2.2	6.4
Other	0.6	2.0
Income specific measures		
Income from agriculture	0.0	0.2
Dependent employment	0.0	8.0
Lower standard deduction	0.0	4.1
Lower tax allowance for commuters	0.0	3.1
Other	0.0	0.8
Investment income	0.0	5.0
Halving of savers' tax-free allowance	0.0	2.1
Tax on life insurance premia	0.0	2.9
Other income	0.0	1.5
Tax on pensions	0.0	1.5
Other measures	1.2	3.1
<i>Of which</i>		
Taxation of extraordinary income	0.0	1.1
Restrictions on loss carry-over	1.2	1.6
<b>Net income tax relief</b>	<b>-1.2</b>	<b>-44.9</b>
In percent of GDP	0.0	1.1
Higher indirect taxes 1/	0.0	14.0
<b>Net tax relief</b>	<b>-1.2</b>	<b>-30.9</b>
In percent of GDP	0.0	0.8

Source: *Aktuelle Beiträge zur Wirtschafts- und Finanzpolitik* (June 26, 1997), Press Office of the Federal Government.

1/ Not yet proposed to the Bundestag.



Table IV-3. Germany: Distribution of Tax Relief of the Proposed Tax Reform 1/

(In billions of deutsche mark)

	Income and corporate tax rate reductions	Broadening of the tax base	Net tax relief
Personal sector (In percent)	51.9 (65.8)	-25.8 (54.6)	26.1 (83.1)
Business sector 2/ (In percent)	26.9 (34.2)	-21.6 (45.6)	5.3 (16.9)
Total (In percent)	78.8 (100.0)	-47.4 (100.0)	31.4 (100.0)

Source: Ministry of Finance.

1/ Based on the Waigel Commission proposals.

2/ Including agriculture and forestry.

Table IV-4. Germany: Revenue Effects of the Proposed Tax Reform 1/

(In millions of deutsche mark)

	Wage taxes	Profit taxes	Total
Personal income tax schedule	-30,100	-39,000	-69,100
Corporate income tax		-9,800	-9,800
Capital yield tax		-500	-500
Withholding tax on interest income		-500	-500
Solidarity surcharge	-1,000	-1,000	-2,000
Gross income tax relief	-31,100	-50,800	-81,900
In percent	38.0	62.0	100.0
Broadening of the tax base	12,350	25,658	38,008
In percent	32.5	67.5	100.0
<i>Of which</i>			
Tax on bonuses for work on Sundays, holidays, and at night	1,650		
Extension of speculation period on private real estate		900	
Mandatory write up		3,750	
Risk provisioning for pending transactions		3,750	
Lower accelerated depreciation on machinery and equipment		3,225	
Lower straight-line depreciation on commercial structures		1,350	
Reduced deductibility of commuting expenditures	3,150		
Lower flat-rate allowance for income-related expenditures	2,925		
Halving of personal exemption for pension payments	825		
Taxation of interest income from life insurance	751	1,725	
Halving of saver exemption	525	1,050	
Elimination of accelerated depreciation on private residential buildings		1,800	
Taxation of pensions	755		
Net income tax relief	-18,751	-25,142	-43,892
In percent	42.7	57.3	100

Source: *DIW Wochenbericht* 15/1997.

1/ Based on the Waigel Commission proposals.

1 percentage point. But the personal income tax reduction as a function of income levels is u-shaped; i.e., tax reductions (in percentage terms) are larger in the upper and lower income brackets than for upper-middle income earners.<sup>43</sup> Overall, DIW's wage tax model indicates for west Germany that the top 10 percent of wage earners would receive about 35 percent of the total tax relief. Half of the tax relief would accrue to the top 20 percent of wage earners. This analysis, however, takes only limited account of the planned abolition of, or reductions in, tax allowances. It may thus overstate the tax reductions particularly for upper income tax payers.

174. To judge the impact on investment decisions and to assess the net effect on the tax burden stemming from the simultaneous cut in corporate (and personal) tax rates and the diminished depreciation allowances, marginal effective tax rates on investment were calculated by the staff along the lines described in OECD.<sup>44 45</sup> These effective tax rates are designed to capture the wedge created by taxation between the pre-tax rate of return required from the corporation's point of view to implement an investment project and the post-tax return received by the ultimate saver/investor. They are also intended to take into account—in addition to statutory corporate and personal tax rates—other aspects of the tax code that affect investment decisions, foremost among them being the depreciation rules (Table IV-5).<sup>46</sup> Effective tax rates in general also require consideration of personal tax rates and whether these are integrated with corporate taxation (e.g. through full imputation of dividend taxation such as in Germany).

175. The results indicate that the proposed tax measures would lower the overall effective marginal tax burden on corporate investment. The marginal tax reductions (in percentage

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<sup>43</sup>For example, single tax payers without children and gross incomes of DM 30,000 would benefit from a 27.7 percent reduction in their tax liability; at a salary of DM 100,000 the tax cut would amount to 11.7 percent before rising again and reaching 25 percent for higher incomes. At an annual income of DM 200,000, taxes would be cut by 20 percent.

<sup>44</sup>OECD, *Taxing Profits in a Global Economy: Domestic and International Issues*, (Paris: OECD), 1991.

<sup>45</sup>The approach applied in OECD (1991) is based on the King and Fullerton (1984) methodology. But in contrast to the above mentioned analysis in Jorgenson and Landau (1993), which employs the "constant p approach" (fixing the pre-tax required rate of return of investment projects), following the OECD (1991) the "constant r approach" is utilized in this study. In the "constant r approach", the return on alternative investments (before personal income tax) is used to anchor the calculations. The calculated effective tax rates on investment should, however, be interpreted as merely illustrative since they cannot capture all relevant features of the tax system.

<sup>46</sup>The results reported here are predicated on the top personal income tax rate (see Table IV-5).

Table IV-5. Germany: Parameters for the Calculation of  
Effective Marginal Corporate Tax Rates

(In percent)

	1997	1999
Corporate tax rate		
on retained earnings	45.0	35.0
on distributed profits	30.0	25.0
Capital gains tax rate	45.0	35.0
Personal income tax rates		
Interest income	30.0	25.0
Dividends (full imputation)	53.0	39.0
Tax depreciation rates		
Machinery	30.0	25.0
Buildings	4.0	3.0
Real interest rate	5.0	5.0
Inflation rate	2.0	2.0
Economic depreciation rates		
Machinery	12.5	12.5
Buildings	3.0	3.0
Depreciation method		
Machinery	accelerated depreciation	
Building	linear depreciation	
Inventory valuation method	LIFO	
Asset weights		
Machinery	35.0	35.0
Buildings	38.0	38.0
Inventories	29.0	29.0
Financing weights		
Retentions	49.0	49.0
Equity	8.0	8.0
Debt	43.0	43.0

terms) would be slightly smaller for investment in machinery and equipment (8.5 percentage points) than for investment in buildings (10.2 percentage points) (Tables IV-6 and IV-7). With personal taxes included, the difference in the effective tax rate on buildings and on machinery would remain broadly unchanged, although the scaling back of depreciation allowances would tend to have a larger adverse effect on corporate building investment. The overall effective tax rate drops by 9.8 percentage points inclusive of personal taxes and by 10.7 percentage points based exclusively on corporate taxation.

176. The proposed tax reform would lessen the tax-induced distortions related to the modes of financing, as it would substantially narrow the differences in effective marginal tax rates across forms of financing. The taxation of equity and internally financed investments would be lowered, while the tax advantage of debt financing would decline markedly owing to the reduction in corporate and personal income tax rates. Retained earnings are the most heavily taxed (at the margin) mode of financing, followed by new equity issues. These relative rankings would not be changed by the proposed tax measures, but equity financing would become more attractive relative to the other modes of financing.

177. Because accounting provisions that facilitate the build-up of hidden reserves would be tightened as part of the tax reform (e.g., through a write-up requirement if the earlier special depreciations have become obsolete), the costs of internal financing would increase slightly. The clear tax advantage of debt-financing (based on these calculations) would remain—though it would be markedly reduced. The improved relative standing of new equity financing could help broaden the traditionally narrow German equity markets.

178. For an average firm in manufacturing, the Center for European Economic Research (ZEW) arrived at a similar assessment.<sup>47</sup> It calculated that under the proposed tax reform the effective tax burden of an average manufacturing enterprise would decline from about 40.2 percent to 34.7 percent.<sup>48</sup> However, even at the proposed lower tax rate, the effective tax burden in Germany would still exceed the effective tax burdens in the United Kingdom (23.1 percent), Netherlands (26.1 percent), and the United States (31.2 percent), but would fall below the effective tax rate in France (38.7 percent). The ZEW data indicate that further reductions in the tax burden in the manufacturing sector could be needed.

179. The overall macroeconomic effects of the proposed tax reforms depend on the extent the net income tax relief would translate—*ceteris paribus*—into lower labor costs and how the financing gap of  $\frac{3}{4}$  percent of GDP would be financed. Any estimates of the impact would

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<sup>47</sup>ZEW (Zentrum für Europäische Wirtschaftsforschung), “Testimony in the Bundestag Finance Committee Hearing on Tax Reform”, May 14-16, 1997.

<sup>48</sup>This calculation includes the reduction in the corporate tax rate, the solidarity surcharge and local trading tax on capital, and new depreciation rules. The new accounting rules, such as the write-up requirement, are not taken into account.

Table IV-6. Germany: Effective Marginal Tax on Investment Under the Current Tax Code

(Tax wedge 1/; tax rate 2/)

Type of Investment	Mode of Financing			Average
	Retained earnings	Equity issues	Debt	
I. Without Personal Income Tax				
Machinery	7.47 (59.9)	-0.03 (-0.6)	-2.18 (-77.6)	2.72 (35.2)
Buildings	10.35 (67.4)	0.54 (9.8)	-1.76 (-54.4)	4.36 (46.6)
Inventories	11.53 (69.7)	0.88 (15.0)	-1.60 (-47.2)	5.03 (50.2)
<b>Average</b>	9.66 (65.9)	0.43 (8.0)	-1.87 (-59.6)	3.96 (44.2)
II. With Personal Income Tax				
Machinery	5.17 (63.9)	4.90 (62.7)	-0.10 (-3.42)	2.88 (49.7)
Buildings	6.37 (68.6)	5.91 (67.0)	0.33 (10.1)	3.73 (56.2)
Inventories	6.71 (69.7)	6.42 (68.8)	0.48 (14.2)	4.01 (57.9)
<b>Average</b>	6.04 (67.5)	5.69 (66.1)	0.22 (7.1)	3.51 (54.7)

Source: Staff calculations.

1/ Difference (in percentage points) between required pre-tax rate of return and after-tax rate of return received by investor.

2/ Tax wedge as a percent of required pre-tax rate of return (shown in parantheses).

Table IV-7. Germany: Effective Marginal Tax On Investment  
Under the Government's Tax Reform Proposal

(Tax wedge 1/; tax rate 2/)

Type of Investment	Mode of Financing			Average
	Retained earnings	Equity issues	Debt	
I. Without Personal Income Tax				
Machinery	5.00 (50.0)	0.17 (3.3)	-1.49 (-42.4)	1.82 (26.7)
Buildings	6.61 (56.9)	0.69 (12.2)	-1.02 (-25.6)	2.86 (36.4)
Inventories	6.83 (57.7)	0.75 (13.1)	-1.06 (-26.8)	2.95 (37.2)
<b>Average</b>	6.11 (55.0)	0.53 (9.5)	-1.19 (-31.3)	2.52 (33.5)
II. With Personal Income Tax				
Machinery	3.75 (53.5)	3.26 (50.0)	0.25 (7.2)	2.21 (40.4)
Buildings	4.75 (59.3)	3.94 (54.7)	0.72 (18.1)	2.95 (47.5)
Inventories	4.46 (57.8)	4.04 (55.3)	0.68 (17.3)	2.80 (46.2)
<b>Average</b>	4.32 (57.0)	3.73 (53.3)	0.55 (14.4)	2.65 (44.9)

Source: Staff calculations.

1/ Difference (in percentage points) between required pre-tax rate of return and after-tax rate of return received by investor.

2/ Tax wedge as a percent of required pre-tax rate of return (shown in parantheses).

thus be tentative. Moreover, the positive effect of tax reform could be strengthened if it were complemented by structural measures aimed at more flexibility in the labor market. Two economic institutes, DIW and the Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI), have undertaken various scenarios of the macroeconomic effects of tax reform. These scenarios differ according to whether the tax reform is financed by a higher deficit or by lower expenditures.<sup>49 50</sup> The DIW estimates ranged from a 1¼ percent higher GDP after four years (and an employment increase of ½ percent) based on deficit financing to ¾ percent lower GDP (and an employment decrease of ½ percent) assuming an uncharged fiscal deficit. In contrast, calculation using estimates by Leibfritz, et al. indicate that tax cuts, particularly on labor and capital income, can boost economic activity and employment markedly, even if they are fully offset by spending cuts.<sup>51</sup> Since consumption taxes typically are less distortionary, a shift from labor taxation to consumption taxation is also estimated to raise both output and employment. Applied to the proposed tax reform, these calculations would suggest that over the long term, GDP would rise by 2½ percent while employment would grow by 1¼ percent.<sup>52</sup> As lower wage taxes would reduce labor costs and support the shift toward lowering the capital labor ratio, the higher marginal productivity of capital would stimulate the accumulation of capital and economic growth.<sup>53</sup>

180. The implied decline in the marginal tax rates on investment suggests that the impact on total investment of the proposed tax reform is likely positive. The expansionary effect on business investment should, however, not be overstated. The proposed measures would imply a relative shift of the tax burden to new investment: while all (profitable) enterprises would benefit from the rate cuts, the less generous depreciation allowances apply only for new investment. Some sectors, where investment is particularly sensitive to tax considerations (such as the housing sector), would in fact be adversely affected by the proposed tax changes.

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<sup>49</sup>DIW, *Tax Reform 1998/99*.

<sup>50</sup>RWI, "Testimony in the Bundestag Finance Committee Hearing on Tax Reform", May 14-16, 1997.

<sup>51</sup>See Leibfritz et al, (1997), "Taxation and Economic Performance."

<sup>52</sup>For these calculations, the total income tax relief of the proposed reform (1.1 percent of GDP) is assumed to be almost evenly split between relief on wage taxes and other (i.e. profit taxes) (Table IV-4); in addition, consumption taxes (VAT) would be raised by ½ percent of GDP.

<sup>53</sup>Daveri and Tabellini (1997) show how endogenous growth features in an economy (such as a production externality where firms are more productive the larger the per-capita capital stock in the economy is) can create positive effects from tax reform on the real GDP *growth rate*.



181. The effects of the reform proposals are thus unevenly distributed across sectors and depend on the composition of the firms' capital stock and cyclical sensitivity. Investment-intensive enterprises that invest heavily in machinery and equipment and thus have relatively short-lived capital stocks would be particularly adversely affected by the broadening of the corporate tax base. Enterprises in the service sector would, by contrast, benefit primarily from the reduction in corporate tax rates without marked effects from tighter depreciation rules. Moreover, the introduction of mandatory write-up rules would adversely effect companies that have large reserves on their balance sheets, which tend to be capital-intensive firms. The curtailment of loss carry forward provisions would adversely affect cyclical sensitive industries, such as steel and automobiles. Moreover, firms would benefit from the reduction in tax rates proportionately to their profitability, implying significant differential effects across sectors.

182. One of the hardest hit sectors would be new rental housing, since tax breaks are most concentrated in that sector.<sup>54</sup> Rental units held as personal property would be adversely affected by the impact of lower income tax rates, which reduces the investment incentive for high-income earners, and the broadening of the tax base eliminates favored treatments such as accelerated depreciation and short holding periods to qualify for tax exempt capital gains. The elimination of the accelerated depreciation could lead to liquidity problems in the early years of a typical new rental housing project. Rental housing is expected to become a less attractive investment opportunity for private investors, while institutional investors (such as insurance companies) and residential real estate companies would be affected less by some of the proposed tax changes.<sup>55</sup> Overall, the withdrawal of tax breaks for rental housing could boost owner-occupied housing. Moreover, since tax-induced investments would diminish, economic fundamentals would gain in importance for investment decisions. Consequently, the housing market might become more efficient and the volatility in residential housing—in part created by tax-induced pro-cyclical decisions by private investors—might decline to the extent that commercial and institutional investors would come to dominate.<sup>56</sup>

183. The overall impact of the tax reform (and the proposed elimination of the local trading capital tax in western Germany) would be a diminution of the present tax advantages enjoyed by east over west Germany. The impact on investment in eastern Germany could be adverse

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<sup>54</sup>For a review of the effects on the housing sector, see M. Kelle and R. May, "The Effects of the Tax Reform on the Housing Sector", *Bundesbaublatt*, May 1997.

<sup>55</sup>In 1996, an estimated two-thirds of all rental units financed at market rates were financed by private investors; M. Kelle and R. May, "The Effects of the Tax Reform on the Housing Sector", *Bundesbaublatt*, May 1997.

<sup>56</sup>*Ibid.*

and larger than the impact on investment in west Germany.<sup>57</sup> Despite chronically low profitability, the scaling back of tax breaks and lowering of marginal tax rates would affect economic activity in east Germany relatively more than in west Germany. This differential impact occurs because investment comprises a larger share of economic activity in east Germany than in west Germany and because tax concessions are relatively more heavily utilized to support investment in east Germany. In addition, lower corporate tax rates would improve the financial position of firms in west Germany more than in east Germany, because on average firms are less profitable in east Germany.

184. As to the attractiveness of Germany as a location for foreign direct investment, the proposed tax reform—though lowering the tax on distributed profits to foreign parent companies—would not markedly correct the tax disadvantage compared with other European countries. The reduction of the corporate tax rate on distributed profits would reduce the total tax rate on profits paid to a foreign parent company from 47.7 percent to 42.7 percent in 1999.

185. (Table IV-8).<sup>58</sup> But even at that level, Germany would only move down one place in its European ranking (Chart IV-7). Nonetheless the headline statutory tax rate on retained profits, which draws much attention in international comparisons, would be reduced by 10 percentage points. However, given the opportunities of multinational corporations to shift tax liabilities abroad, the role of corporate taxation in decisions on production locations might be losing its significance.

186. The impact on private consumption of the proposed net tax relief could be substantial. Abstracting from increases in consumption taxes, low income households with higher marginal propensities to consume could benefit from tax reform. They would gain from the lower entry marginal income tax rates and less progressive linear tax schedule, while they are relatively unaffected by the closing of tax loopholes. The net tax relief accruing to high-income earners would have less impact on consumption owing to their higher marginal propensity to save. A full assessment on consumption behavior is hampered, however, by the uncertainty about the long-term financing of the net tax relief.

187. The impact on employment depends on the flexibility of the labor market (in particular on the relative response of consumption wages and production wages) and on the elasticities of the labor supply and demand. The smaller income tax wedge could lead to diminished demands for gross wages and thus lower firms' wage costs (production wages). Alternatively, trade unions may bargain to retain the net tax relief for workers. Thus net wages would

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<sup>57</sup>See Deutsches Institut für Wirtschaftsforschung (DIW); Institut für Weltwirtschaft (IfW); and Institut für Wirtschaftsforschung Halle (IWH); Micro- and Macroeconomic Adjustment Processes in East Germany—Fifteenth Report," 1997.

<sup>58</sup>American Chamber of Commerce in Germany, "Testimony in the Bundestag Finance Committee Hearing on Tax Reform", May 14-16, 1997.

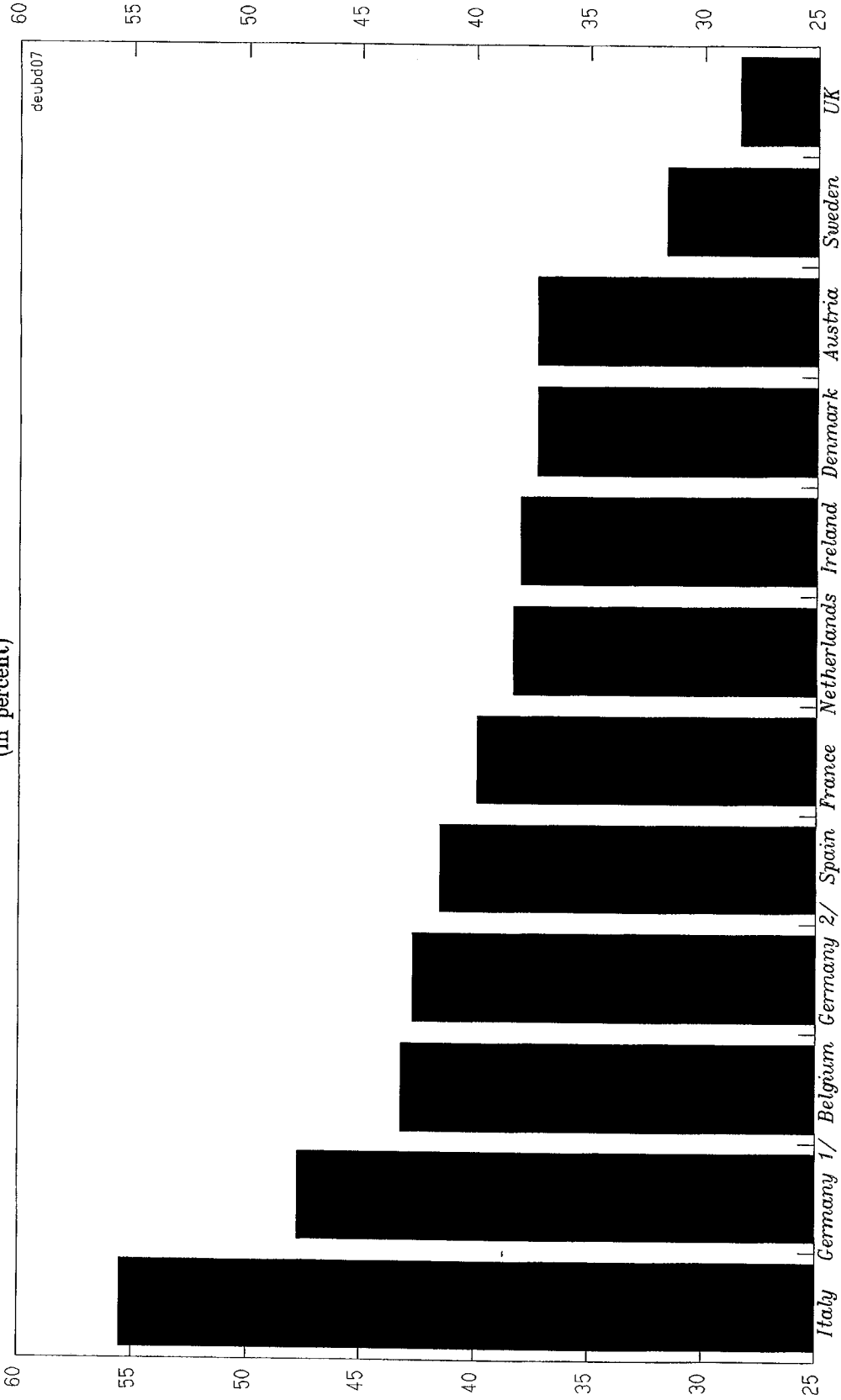
Table IV-8. Germany: Taxation of Distributed Profits to Foreign Parent Companies  
Under the Government's Tax Reform Proposal

(In percent)

	1997	1998	1999
Before-tax profit	100.00	100.00	100.00
Trading tax on profits	18.00	18.00	18.00
Profit before corporate income tax	82.00	82.00	82.00
Corporate income tax	25.11	23.21	20.60
Solidarity surcharge	1.88	1.28	1.13
After-tax profit	55.01	57.51	60.27
Capital income tax (5 percent)	2.75	2.87	3.01
Net dividend	52.26	54.64	57.26
Total tax burden	47.74	45.36	42.74

Source: American Chamber of Commerce in Germany, 1997.

Chart IV-7  
GERMANY  
Tax Rates on Distributed Profits to U.S. Parent Company  
(In percent)



Source: American Chamber of Commerce in Germany (1997).

1/ Under current tax law.

2/ After proposed tax reform.

increase one-for-one with the tax cut with no reduction in labor costs. The effect on gross wages (and labor costs) may also be limited by the relatively small elasticity of the labor supply typically estimated in Germany.<sup>59</sup> Studies suggest that the only group that would increase its labor supply in response to lower marginal tax rates would be married women. As the tax reform would reverse some—albeit a relatively small part—of the increased tax burden on labor income that occurred during the past decade, the positive effects would be bolstered by structural measures aimed at more flexible wage setting and open labor markets.

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<sup>59</sup>See e.g. H. Kaiser, U. van Essen, and P. B. Spahn, "Income Taxation and the Supply of Labor in West Germany: a Microeconomic Analysis with Special Reference to the West German Income Tax Reforms, 1986-1990", in *Empirical Approaches to Fiscal Policy Modeling*, ed. by Alberto Yeimler and Daniele Meulders, (London), 1993.

### Effective Average Tax Rates Based on Macroeconomic Data

188. Mendoza, Razin, and Tesar compute effective average tax rates using national accounts and actual tax revenue data.<sup>60 61</sup> These effective tax rates are consistent with the tax rates faced by a representative agent in a general equilibrium setup. The numerators measure the difference between the before-tax and after-tax values of consumption, labor income, and capital income, approximated by the tax revenue collected from each tax. The tax bases in the denominators measure consumption, labor income, and capital income at before-tax prices.

#### Effective average tax rate on consumption

189. The effective average tax rate on consumption,  $\tau_c$ , is calculated as the ratio of revenues from indirect taxation (general taxes on goods and services,  $t_g$ , and excise taxes,  $t_e$ ) relative to the before-tax value of consumption as the tax base,

$$\tau_c = [(t_g + t_e) / (C + G - G_w - t_g - t_e)]$$

where the part of public consumption that is typically subject to indirect taxes excludes compensation of government employees,  $G_w$ .

#### Effective average tax rate on labor income

190. The effective tax rate on labor income,  $\tau_l$ , is derived in two steps, under the assumption that all sources of household income are taxed at the same rate. First, the average tax rate on total household income,  $\tau_h$ , is calculated as the ratio of household income tax revenue,  $t_h$ , as a percent of the sum of wage income,  $W$ , households' property and entrepreneurial income,  $P_h$ , and the operating surplus of unincorporated businesses,  $OS_u$ .

$$\tau_h = t_h / [W + P_h + OS_u]$$

191. Second, the effective average tax rate on labor income combines the estimated tax on wages and salaries,  $\tau_h W$ , with social security contributions,  $t_s$ , and other payroll taxes,  $t_p$ , and expresses it as a ratio to gross income from dependent employment (i.e.; the sum of wages and salaries,  $W$ , plus employer-paid social security contributions,  $S_E$ ).

$$\tau_l = [\tau_h W + t_s + t_p] / [W + S_E]$$

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<sup>60</sup>Mendoza, Razin, and Tesar, "Effective Tax Rates".

<sup>61</sup>The calculations are based on data from the *OECD Revenue Statistics*.

**Effective average tax rate on capital income**

192. The effective average tax rate on capital income,  $\tau_k$ , is defined as the ratio of capital income taxes to the total operating surplus in the economy, OS.

$$\tau_k = [\tau_h(OS_u + P_h) + t_{corp} + t_{prop} + t_{fin}] / OS$$

Capital income taxes in the numerator are the sum of the estimated capital income tax paid by households,  $\tau_h(OS_u + P_h)$ , the corporate income tax,  $t_{corp}$ , property taxes,  $t_{prop}$ , and taxes on financial transactions,  $t_{fin}$ .

### Marginal Effective Tax Rates on Investment

193. The calculations of marginal effective tax rates on investment closely followed accepted methodology.<sup>62</sup> Corporate and personal income taxes drive a wedge between the before-corporate tax rate of return,  $p$ , on an investment project and the after-tax return,  $s$ , that an individual investor receives. Consider an investment project with a depreciation rate of  $\delta$  and a perpetual rate of return,  $r$ . The before-tax net rate of return is therefore  $p=r-\delta$ . Denote the present value of depreciation allowances and other tax incentives by  $A$ . For a marginal investment project, in equilibrium the net cost of the project  $(1-A)$  is equal to the present value of the discounted future after-tax cash flow,

$$(1-A) = [(1-\tau)(p+\delta)] / (\rho+\delta-\pi)$$

where  $\tau$  is the corporate income tax rate,  $\rho$  is the discount factor, and  $\pi$  is the rate of inflation. Solving for the before-tax rate of return,  $p$ , yields

$$p = [(1-A)/(1-\tau)] (\rho+\delta-\pi) - \delta.$$

194. Suppose an investor can earn a nominal interest rate,  $i$ , on an alternative investment, subject to a personal income tax rate,  $m$ . Then the real after-tax return,  $s$ , on the alternative investment is

$$s = (1-m)i - \pi.$$

195. The marginal effective tax rate,  $t$ , on income from the investment project is defined as the ratio of the tax wedge (between the before-tax return on the investment,  $p$ , and the after-tax return for the investor,  $s$ ) and the before-tax return,  $p$ ,

$$t = (p-s) / p.$$

196. In the absence of any taxes (and assuming investors are risk neutral), the factor used to discount the project's cash flow would be equal to the rate of return in the capital market,  $i$ . However, if corporate and personal income taxation differentiates between interest payments, capital gains, and distributed profits, the effective discount rate depends on how the investment project is financed. For debt financing, the appropriate discount rate is  $\rho=(1-\tau)i$ , because interest payments are tax deductible for the corporation. For new equity issues, the discount rate is  $\rho=i/\theta$ , where  $\theta$  captures the different tax rates on retained earnings and distributed profits. In the German case, with full imputation  $\theta=1/(1-\tau)$ , and thus  $\rho=(1-\tau)i$ . For retained earnings, the discount rate is  $\rho=(1-m)i$ .

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<sup>62</sup>See OECD, *Taxing Profits in a Global Economy*, and King and Fullerton, *The Taxation of Income from Capital*.



## V. ALTERNATIVE APPROACHES TO PENSION SECURITY IN AN AGING SOCIETY <sup>1</sup>

### Introduction and Summary

197. This chapter discusses three approaches to public pension reform in the context of recent proposals to overhaul Germany's pay-as-you-go (PAYG) scheme. First, the "piecemeal approach" to pension reform focusses on adjusting the basic parameters affecting public pension revenue and expenditure, such as the contribution rate, budget transfers, pension replacement rates, or retirement ages. Second, partial prefunding of the public pension pillar, an approach that allows to smooth contribution rates across contributing generations. And third, shifting a significant portion of retirement income provision to a funded private pension scheme, thus diversifying pension provision between the public and private sector.

198. The pension reform proposals by a commission chaired by Labor Minister Blüm—which were broadly incorporated in a draft pension law submitted to the *Bundestag* in June 1997—followed the piecemeal approach of earlier German reform efforts, and proposed to cut net pension replacement rates, to increase budget transfers, and to tighten the generosity of early retirement and disability pensions. These proposals would preserve the dominant role of the public PAYG pillar. Indeed, in its report, the Blüm Commission strongly advised against considering alternative approaches to pension reform that would lead to fundamental or systemic changes to Germany's present pension system—including partial prefunding and shifting a significant portion of retirement income provision to a funded private pension scheme—arguing that the PAYG system has proven sturdy and adaptable under difficult historical circumstances and that the transition cost of systemic reforms would not be manageable.

199. The chapter concludes that regarding pension reforms, policy makers can not eschew difficult trade-offs involving risk, equity, and efficiency considerations. However, a prudent pension reform strategy seeking to adapt a pension system dominated by a large PAYG pillar to the challenges of an aging society would seek to combine elements of all three approaches to pension reform:

- Piecemeal adjustments in existing public pension arrangements, in particular of benefit structures, are often needed as a first step to improve the short-run fiscal position of public pension funds and to prepare the grounds for systemic reform. The piecemeal adjustments proposed by the Blüm Commission are sensible both on equity and efficiency grounds. However, a pension reform strategy exclusively based on piecemeal adjustments of PAYG parameters—while perhaps politically expedient—would continue to subject pensioners and contributors to considerable long-run risks by not addressing most of the problems associated with a pension system dominated by a PAYG pillar, in particular in the context of a rapidly aging population.

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<sup>1</sup>Prepared by Albert Jaeger.

- Partial prefunding of the public pension scheme could mitigate intergenerational inequities by smoothing contribution rates across contribution generations and enhance financial discipline. At the same time, partial prefunding as an isolated strategy can not address the various problems plaguing a pension system dominated by a large PAYG pillar. Moreover, partial prefunding of the first pension pillar could raise difficult financial management issues given the need to accumulate a large pension reserve fund within the confines of the public sector.
- Shifting a significant portion of retirement income provision to a funded private pension pillar could address most of the risk and efficiency concerns raised by Germany's present system. However, these gains would likely come at the cost of incurring a sizeable explicit fiscal burden during the transition period. This burden would need to be distributed equitably across generations. Moreover, government insurance of private pension funds would raise complex regulatory issues.

200. Thus, the range of choices and trade-offs for pension reforms is considerable. At the same time, the time available for designing and implementing more systemic reforms is fast running out. While the full impact of the aging problem is not likely to be felt for another 10-15 years, the lead time for systemic changes in pension arrangements are long and to avoid sizeable costs, early reforms are needed. As regards the eventual structure of Germany's pension system after adopting the multi-pronged reforms outlined above, it would likely bear close resemblance to Switzerland's present pension system featuring a sizeable first-pillar social insurance scheme that would pay a basic pension benefits, a funded private second-pillar scheme that would pay complementary pensions aiming to achieve a satisfactory pension replacement rate, and a third-pillar scheme consisting of voluntary savings.

201. Section A provides institutional background information on the German pension system and lays out the mechanics of PAYG financing. Section B considers the piecemeal approach to pension reform, focussing on the Blüm Commission's reform proposals. Finally, Section C discusses systemic approaches to pension reform.

### **A. Institutional Background and the Mechanics of PAYG Financing<sup>2</sup>**

202. Since the pension reform of 1957, the provision of retirement income in Germany has been dominated by a mandatory publicly-managed PAYG pension scheme.<sup>3</sup> Under the present PAYG scheme, an average wage earner with a full contribution record of 45 years is promised a pension benefit equivalent to about 70 percent of average net earnings. Reflecting the wide

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<sup>2</sup>A survey of the institutional structure of Germany's pension system is provided by Monika Queisser, *Pensions in Germany*, Policy Research Working Paper No. 1664 (Washington: The World Bank, 1996).

<sup>3</sup>The roots of Germany's public pension scheme stretch back to the invalidity and old-age insurance law of 1889, which established the first modern public pension scheme in industrial countries.

coverage and high income replacement rates of this first pension pillar, retirement income provision through voluntary private pension schemes, or the second pension pillar, has traditionally played a relatively minor role. Indeed, the intergenerational contract underpinning the PAYG scheme has often been hailed as one of the cornerstones of Germany's social market economy (*Soziale Marktwirtschaft*): a market economy restrained by social policies that include among their main instruments comprehensive and publicly-managed pension, health, and unemployment insurance systems.

203. Total spending by the first pillar of the German pension system in 1994 amounted to about 13 percent of GDP, one of the highest public pension spending ratios among industrial countries (Chart V-1). Spending by the wage and salary earners' fund (WSEF), at about 10 percent of GDP in 1994, and the civil service pension scheme, at about 2 percent of GDP in 1994, accounted for almost all of public spending on pensions. The WSEF covers about 98 percent of wage and salary earners. As the civil service pension scheme is subject to different demographic and financial influences, the WSEF will be assumed to coincide with the first-pillar system.<sup>4</sup>

204. The key parameters of the WSEF can be brought out by considering the basic budget constraint of a PAYG system:

$$(1) \quad N(\alpha W) = M(\beta W),$$

where  $N$  denotes the number of contributors to the system,  $\alpha$  is the contribution rate,  $W$  denotes average gross earnings,  $M$  is the number of retirees (pensioners), and  $\beta$  denotes the gross pension replacement rate. Equation (1) says that revenue and expenditure of PAYG system have to match in each period.<sup>5</sup> To model Germany's public pension system, two important institutional characteristics need to be incorporated in equation (1):

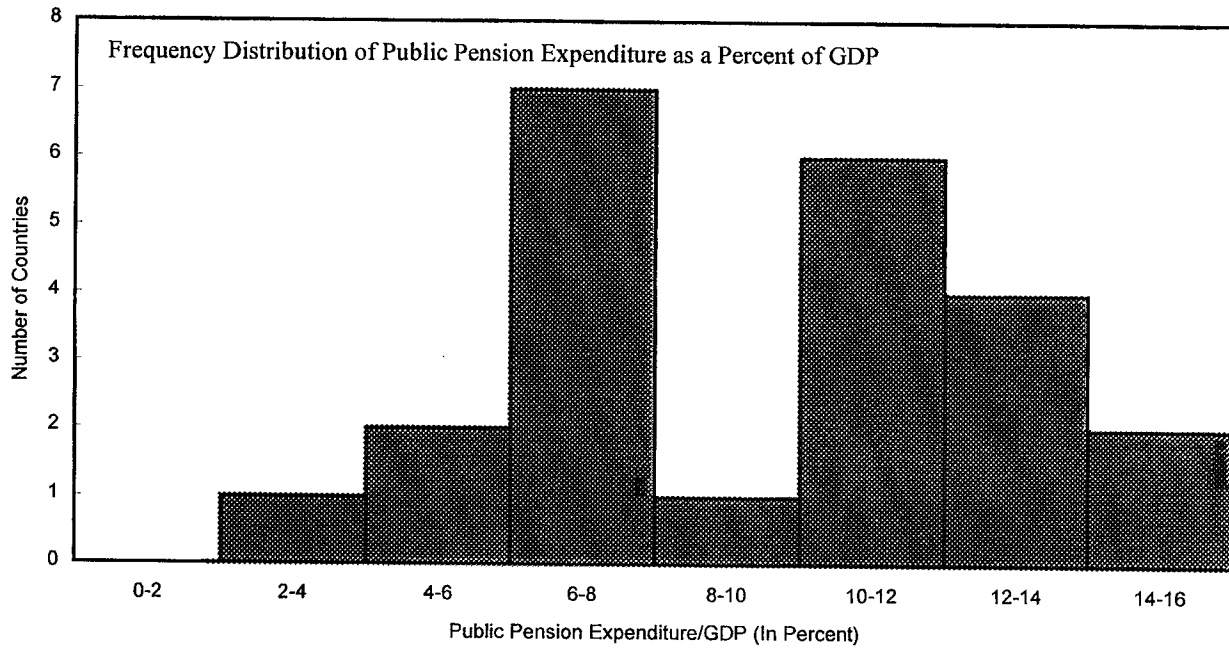
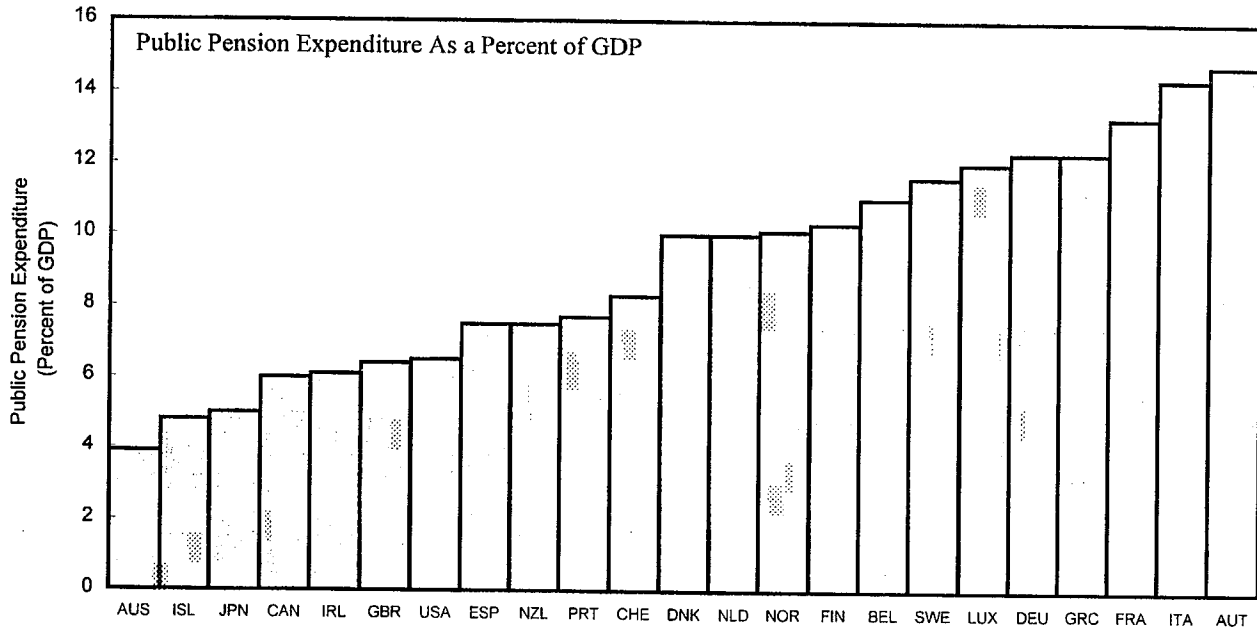
- First, pensions are indexed to net wages; this feature may be handled by re-defining  $\beta$  as the net pension replacement rate, here defined by the pension expressed as a ratio to net wages,  $W(1-\alpha)$ . However, this definition of the net pension replacement rate represents only an

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<sup>4</sup>Pensions for civil servants are financed from the territorial authorities' budgets. A recent government report on the future development of the cost of civil service pensions (*Versorgungsbericht 1996*) suggested that total spending on civil service pensions would rise from 1.9 percent of GDP in 1996 to 2.1 percent of GDP in 2008, but then remain around the 2 percent of GDP until about 2030, and decline afterwards to 1.6 percent of GDP by 2040. The authorities' projections for civil service pension cost are below the staff's previous projection (by about ½ percent of GDP in 2010 and afterwards) reported in SM/96/227, mainly on account of different assumptions regarding the effect of changes in early retirement rules for civil servants after 2002.

<sup>5</sup>Equation (1) ignores the WSEF's small fluctuation reserve—which is required to amount to at least one month of pension expenditure.

Chart V-1  
Industrial Countries  
Public Pension Expenditure As a Percent of GDP



Source: World Bank (1994).

approximation. In practice, the average net wage is defined as average gross wage minus the employee's social security contributions, which also include contributions to health care, unemployment, and long-term care insurance and minus wage income tax. By taking account of both the employee's and the employer's share of the social security contribution, savings from net wage indexation are overstated. On the other hand, the built-in progressivity of the income tax schedule—rather than the implicitly assumed flat tax schedule—would lower pension costs under the assumption of rising wage incomes. On balance, the approximation appears to be reasonable.

• Second, the revenue of the PAYG system consists of contributions by workers plus a budget transfer component. Budget transfers are supposed to broadly cover the share of WSEF spending unrelated to previous pension contributions. However, calculations recently reported by the Association of German Pension Insurance Funds (1997) estimated WSEF spending unrelated to previous contributions in 1995 at 30 percent of total WSEF spending, significantly higher than the about 18 percent of WSEF spending actually covered by budget transfers.<sup>6</sup> The main categories of spending unrelated to previous contributions in 1995 were: (i) pension payments based on imputed World War II contribution periods, which accounted for 23 percent of total unrelated spending; (ii) cost of early retirement pensions not covered by actuarial pension reductions (18 percent); (iii) imputed contribution periods for times spent unemployed or sick (15 percent); (iv) imputed contribution periods for times spent in education (8 percent); and (v) the cost of imputed contribution periods due to raising children (6 percent).

205. Taking account of net wage indexation and expressing the budget transfer component as a ratio to pension expenditure ( $\tau$ ), the PAYG system's equilibrium contribution rate can be written as:

$$(2) \quad \alpha = \beta(M/N)(1-\alpha)(1-\tau).$$

206. The 1994 data for the WSEF can be used to calibrate values of parameters in equation (2) (Table V-1, column "1994"). The system dependency ratio ( $M/N$ ) of the WSEF in 1994 was about 41 retirees per hundred contributors. The net replacement rate ( $\beta$ ) for a "standard pension" was about 70 percent. Given the budget transfer rate ( $\tau$ ) of 18 percent in 1994, the implied PAYG system contribution rate is 19.2 percent, which, by construction, is equal to the statutory contribution rate of the WSEF in 1994.

207. First-pillar pension benefits are in principle subject to income tax, a feature that could also be incorporated in equation (2) to determine the net cost of public pension provision. However, Germany's present income tax code assumes that only about 25 percent of pension benefits represent previously untaxed income, which, in practice, amounts to a full income tax exemption. The assumption that only about 25 percent of public pension benefits represent

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<sup>6</sup>See Association of German Pension Insurance Funds (*Verband Deutscher Rentenversicherungsträger (VDR)*), *Versicherungsfremde Leistungen—Sachgerecht Finanzieren!* (Frankfurt: VDR, 1997).

Table V-1. Germany: Public Pension Projections and Blüm Commission Reform Proposals, 1994-2030  
(in percent)

	1994	2000	2005	2010	2015	2020	2025	2030
<b>Baseline projection Blüm Commission 1/</b>								
System dependency ratio (M/N) 2/	41.4	44.6	...	46.0	...	51.7	...	60.9
Net pension replacement rate ( $\beta$ ) 3/	69.9	69.6	...	68.8	...	68.9	...	69.0
Budget transfer rate ( $\tau$ ) 4/	18.0	18.0	...	18.0	...	18.0	...	18.0
Contribution rate ( $\alpha$ ) 5/	19.2	20.4	...	20.9	...	22.9	...	25.9
<b>Baseline projection staff 1/</b>								
System dependency ratio (M/N)	41.4	46.6	47.0	48.0	51.7	58.1	67.5	79.2
Net pension replacement rate ( $\beta$ )	69.9	69.6	69.2	68.8	68.8	68.9	68.9	69.0
Budget transfer rate ( $\tau$ )	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Contribution rate ( $\alpha$ )	19.2	21.0	21.1	21.3	22.6	24.7	27.6	30.9
<b>Blüm Commission main proposals</b>								
A. Lower $\beta$ (by taking account of increasing longevity)	69.9	69.4	...	65.4	...	64.6	...	64.0
Change of $\beta$ relative to baseline $\beta$		-5	...	-3.4	...	-4.2	...	-5.0
Effect on baseline contribution rate $\alpha$		-1	...	-9	...	-1.2	...	-1.6
B. Decrease (M/N) (reform of disability pensions)	41.4	44.3	...	45.4	...	51.2	...	60.3
Change of (M/N) relative to baseline (M/N)		-4	...	-1.4	...	-1.4	...	-1.5
Effect on baseline contribution rate $\alpha$		-1	...	-5	...	-5	...	-5
C. Increase $\tau$ (accruals for time spent raising children)	18.0	22.5	...	22.1	...	22.0	...	21.5
Change of $\tau$ relative to baseline $\tau$		4.5	...	4.1	...	4.0	...	3.5
Effect on baseline contribution rate $\alpha$		-9	...	-8	...	-9	...	-9
Total effect of main proposals on contribution rate $\alpha$		-1.2	...	-2.2	...	-2.6	...	-3.0
Memorandum item:								
Elderly dependency ratio 6/	22.3	23.8	27.6	30.3	31.9	35.4	40.8	49.2

Sources: Blüm Commission Proposals (1997); *Verband Deutscher Rentenversicherungsträger* (VDR); and staff estimates.

1/ Wage and salary earners' pension fund (WSEF) only. Projections incorporate late-1996 (WFG) changes to pension law..

2/ Defined as ratio of number of pensioners to number of contributors.

3/ Defined as ratio of standard pension as a percent of average net wage.

4/ Defined as budget contribution to pension fund as a percent of pension expenditure.

5/ Statutory contribution rate.

6/ Defined as population aged 65 and over as a percent of population aged 15-64.

previously untaxed income is based on two presumptions: (i) that all pension contributions were previously subject to income tax; and (ii) that pension benefits include a tax-free interest income component equivalent to about 25 percent of benefits. However, in fact only the employee's pension contribution is subject to income tax, and, as illustrated below, the rate of return on pension contributions is significantly below market interest rates on long term government bonds. The draft law on income tax reform proposed to increase the taxable share of pension benefits to 50 percent. However, this change in the income tax law would leave most public pension benefits exempted from income tax, therefore obviating the need to incorporate income taxation in equation (2).

208. At unification, former west Germany's first-pillar system was also introduced in the new Länder. Pension benefits in the new Länder at the beginning of 1996 were 81 percent of the level in the old Länder and are indexed to wage developments in the new Länder. The first-pillar pension insurance schemes are supplemented by means-tested social assistance and housing benefits, which, in the case of a single-person household, cumulatively replace about 40 percent of the average net wage in the economy. Take up of re-current social assistance by elderly persons is, however, modest; at the beginning of the 1990s, only about 1 percent of all persons aged 65 or more received re-current social assistance transfers.<sup>7</sup>

209. The second or occupational pension pillar of the German pension system comprises voluntary company pension plans, which are either funded by book reserves on companies' balance sheets, by separate pension funds (*Pensionskassen*), by support funds (*Unterstützungskassen*), or by insurance policies taken out by companies on the employee's behalf. A *Deutsche Bank* study (1996) reported that assets of occupational pension schemes in 1993 amounted to DM 461 billion or 14.6 percent of GDP, of which about 55 percent were kept as book reserves on companies' balance sheets. Pension funds accounted for about 23 percent of occupational pension assets. The dominance of book reserve funding for occupational pensions in Germany reflects partly the more favorable income tax provisions for accumulating book reserves—employers' contributions channeled into book reserves are not taxable whereas employers' contributions to pension funds are taxable—but may also be due to Germany's distinct "stakeholder culture."

210. Insolvency insurance for occupational pensions is provided by a mutual insurance corporation that has the powers of an institution of public administration. The liabilities of the mutual insurance corporation are backed up by a state guarantee, and it is financed on a PAYG basis by compulsory contribution rates. The coverage of employees by occupational pension schemes has declined since the mid-1980s, in particular in the industrial sector, reflecting inter alia a steady worsening of tax preferences and the cost impact of judicial decisions requiring the indexation of pension payments.<sup>8</sup> Available, but sketchy, data on the

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<sup>7</sup>See Deutsche Bundesbank, "Expenditure on Social Assistance Since the Mid-Eighties," *Monthly Report April 1996*, Vol. 45, No 5, pp. 33-50.

<sup>8</sup>E.g., the flat tax rate on contributions to the separate pension funds and insurance companies  
(continued...)

size of private funded pension schemes in selected industrial countries suggest that Germany's second-pillar system is comparatively small, mirroring the overarching importance of the first-pillar system.<sup>9</sup>

211. The third pension pillar, individual provisions for retirement, plays a substantial role, as indicated by a comparatively high private household savings rate of about 13 percent during 1991-96 and net asset holdings of about 470 percent of disposable household income in 1992.<sup>10</sup> Fiscal incentives to promote individual retirement savings directly or indirectly include income tax exemptions for private household life insurance savings, a tax allowance for income from capital assets, and income tax incentives for the acquisition of owner-occupied housing.

### **B. The Piecemeal Approach to Pension Reform**

212. The traditional approach to pension reform in Germany—as in most other industrial countries—has consisted in piecemeal adaptations of the basic parameters determining revenues and expenditures of the public pension system. As the most recent occurrence of substantial piecemeal pension reforms in Germany, the *1992 Pension Reform Act* introduced: (i) a gradual unification of statutory retirement ages for regular pensions at age 65; (ii) the linking of pensions (new and pre-existing pensions) to net instead of gross wages, thereby stabilizing the average pension benefit at a net replacement rate of about 70 percent; and (iii) introduction of flexible early retirement of up to three years before the statutory retirement age with a reduction of benefits of 3.6 percent per year of early retirement. According to projections, in the absence of these measures the pension contribution rate could have risen to about 36½ percent in 2030, up by more than 18 percentage points from a level of about 18 percent in the early 1990s; taking account of the 1992 pension reform, the calculations

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<sup>8</sup>(...continued)

was increased from 15 percent to 20 percent at the beginning of 1996. For further details on Germany's second-pillar system see Peter Ahrend, "Pension Financial Security in Germany", in: *Securing Employer-Based Pensions: An International Perspective*, edited by Bodie, Zvi, Mitchell, S. Olivia, and John A. Turner (Philadelphia: University of Pennsylvania Press, 1996), pp. 73-104.

<sup>9</sup>See E. Philip Davis, "The Structure, Regulation and Performance of Pension Funds in Nine Industrial Countries," World Bank Working Paper No. 1229 (Washington: World Bank, 1993). According to this source, second-pillar pension fund assets in Switzerland, the United Kingdom, and the United States exceeded 50 percent of GDP at the end of 1991.

<sup>10</sup>The net asset holding data include financial and residential assets and cover west Germany only. See Deutsche Bundesbank, "Households' Asset Situation in Germany," *Monthly Report October 1993*, Vol. 45, No. 10, pp. 19-31.



predicted an equilibrium contribution rate in the range of 26-28 percent in 2030.<sup>11</sup> At the time of the 1992 reform, the projected long-run increase of the contribution rate was widely characterized as a necessary element of a “fair burden sharing” compromise between contributors and pensioners.

213. In the event, only a few years after the adoption of the *1992 Pension Reform Act* and with hardly any change in the long-term outlook for the pension finances, the government decided to put pension reform back on the public policy agenda in early 1996. In particular, the *Action Program for Jobs and Investment* (“50-point program”) called, inter alia, for a major overhaul of social spending, including spending on public pensions, to curb rising non-wage labor costs. The *Action Program* referred to increasing global competition and deteriorating labor market conditions as the main rationales for reconsidering the 1992 “burden sharing compromise.” Given this shift in priorities, a fresh round of reforms was needed to address the immediate problem of reducing (or at least limiting further increases) in the pension contribution rate during 1997-2000<sup>12</sup> as well as the long-term problem of limiting increases in the pension contribution rate below the levels projected under the 1992 reforms.

214. A first package of piecemeal pension reform measures was enacted as part of the *Law on Promotion of Growth and Employment* (WFG) in September 1996. These measures included: (i) an accelerated increase of the statutory retirement age for women and long-term unemployed persons from 60 to 65 years; (ii) an accelerated increase of the statutory retirement age for long-term insured persons from 63 to 65 years; (iii) recognition of only 3 years (before 7 years) of education as non-contributory periods; and (iv) cash limits on rehabilitation spending for pensioners. Estimates suggest that—relative to a baseline based on the 1992 pension reform—these measures would lower the need for increases in the contribution rate by 0.4 percentage points in 2000 and by almost 1 percentage point by the year 2010.<sup>13</sup>

215. In June 1996, the Government appointed a commission on “Further Developing the Pension System” chaired by Labor Minister Blüm.<sup>14</sup> The Commission’s baseline projection of

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<sup>11</sup>Based on the “upper” and “lower variant” of the *Prognos-Gutachten 1995*. See Association of German Pension Fund Insurers (VDR), *Prognos-Gutachten 1995* (Frankfurt: VDR, 1995). Further details of the *1992 Pension Reform Act* are surveyed in SM/96/11 (pp. 12-16).

<sup>12</sup>The *Action Program* established the specific target of reducing the overall social security contribution rate from 40.6 percent in 1996 to below 40 percent by the year 2000. In 1997, the overall social security contribution rate increased to 42.1 percent, and, without further reform measures, it was projected to increase to about 42.5 percent in the year 2000.

<sup>13</sup> See Horst-Wolf Müller, “Änderungen der Finanzierung und finanzielle Auswirkungen des WFG,” *Deutsche Rentenversicherung* 1-2/1997, pp. 78-93.

<sup>14</sup>The commission comprised 16 members, in the main pension experts from public pension  
(continued...)

the WSEF finances suggested that projected increases in the system dependency ratio would eventually raise the pension contribution rate to about 26 percent in 2030, some 7 percentage points above its 1996 level, with most of the increases in the contribution rate occurring after 2010 when the “baby boom” generation begins to retire (Table V-1). This projection assumes that the pension for a worker with average earnings and 45 contribution years would continue to replace about 70 percent of net wage earnings and that budget transfers would continue to finance about 18 percent of total pension expenditure, but rising from presently about 1¾ percent of GDP to 2¼ percent of GDP in 2030.

216. The Blüm Commission’s report addressed the concerns raised by the government’s *Action Program* through three main piecemeal reform proposals, which were broadly incorporated in the draft pension law (*Rentenreformgesetz 1999*) submitted to the *Bundestag* in June 1997 (see Table V-1 for the effects of the proposals on the Commission’s baseline projection of pension contribution rates during the period 2000-30):<sup>15</sup>

- A phased-in cut in the net pension replacement rate ( $\beta$ ) to reflect increases in longevity of 65-year old persons (averaged for men and women) since the 1992 pension reform.<sup>16</sup> In particular, from about the year 2000 onwards, pension benefits would be lowered by one half of the percentage point increase of life expectancy of 65-year old persons. As the average life expectancy of a 65-year old person in Germany is presently estimated at about 17 years and is projected to increase until 2030 by about 2 years, this measure is estimated to amount to a cumulative cut in net pension benefits of about 5 percent relative to baseline by 2030. Accordingly, this measure would eventually reduce the standard net pension replacement rate by about 5 percentage points to 64 percent and reduce the 2030 contribution rate by 1½ percentage points.
- An increase in budget transfers of about ½ percentage point of GDP starting in 1999. The Blüm Commission had proposed this measure as an explicit compensation for the accrual of new non-contributory pension rights related to raising children. However, the draft pension law submitted to the *Bundestag* does not tie the increase in budget transfers to this specific

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<sup>14</sup>(...continued)  
funds, universities, and research institutes.

<sup>15</sup>In July 1997 the Association of German Pension Insurance Funds (VDR) submitted estimates of the effects of the draft pension law proposals to the Committee for Labor and Social Affairs of the *Bundestag* that were broadly in line with the Commission’s estimates reported in Table V-1.

<sup>16</sup>This proposal follows the pioneering example of earlier Swedish reform efforts to stabilize pension spending by taking account of changes in life expectancies in pension benefit adjustments (see SM/96/11 for a description of Sweden’s recent pension efforts).

purpose.<sup>17</sup> This measure is projected to increase the budget transfer rate from 18 percent at present to 22½ percent of pension expenditure by 2000, and it would contribute 1 percentage point to the lowering of the 2030 contribution rate.

- And a tightening of the current generosity of early retirement pensions due to prolonged unemployment and of disability pensions for severely handicapped persons. The Blüm Commission estimated this measure to contribute about ½ percentage point to the lowering of the 2030 contribution rate. However, more recent estimates by the Association of German Pension Funds gauged the reduction in the 2030 contribution rate at about 1 percentage point.

217. Overall, the proposed three measures were projected to lower the 2030 contribution rate by a total of 3 percentage points; in the “short-run”, i.e. by the year 2000, the three measures would lower the projected contribution rate by some 1¼ percentage points, but this contribution rate reduction would mainly reflect the substitution of budget transfers for revenue from social security contributions.<sup>18</sup>

218. The Blüm Commission’s report strongly supports the preservation of the four main structural characteristics of the German pension system:

- The dominance of the PAYG pension pillar would remain largely intact, leaving residual roles to retirement income provision through funded occupational schemes or individual saving.
- The financing of first-pillar pension benefits according to PAYG principles, as opposed to partial or full funding.
- The relatively close link between worker contributions and pension benefits, which limits the redistributive role of the public pension system.
- And the indexation of pension benefits to net wages, as opposed, to indexing pension benefits to consumer prices or gross wages.

219. Besides achieving the key goal of reducing the need to increase social security contribution rates, the piecemeal proposals would further strengthen the already close link between contributions and benefits under Germany’s first-pillar system. In particular, these proposals would establish a link between changes in life expectancies and pension benefits,

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<sup>17</sup>Moreover, and also deviating from the Blüm Commission proposals, the draft pension law proposed to increase the generosity of non-contributory pension rights related to raising children. The cost of this measure would mainly come due toward the end of the projection period and would amount to about ¼ percent of GDP by 2030.

<sup>18</sup>The Blüm Commission also proposed to overhaul provisions for survivor pensions once data from a major survey on the income situation of women become available and to strengthen incentives for occupational pension schemes and individual retirement income provision.

increase the share of non-insurance related pension financed by budget transfers, and reduce the generosity of early retirement and disability pensions. Nevertheless, the Commission's overall recommendation to maintain the dominance of the present PAYG pillar raises issues of risk, equity, and efficiency of long-run retirement income provision in Germany:

220. **Risks:** Long-term projections of pension finances are always subject to large margins of uncertainty. Nevertheless, the Commission's baseline projection for the system dependency ratio appears to be based on a fairly optimistic scenario. In particular, the Commission's projections broadly follow the "upper (i.e. optimistic) variant" of the *Prognos-Gutachten 1995* (1995) study of Germany's long-term public pension finances adjusted for the 1996 WFG-changes to the pension laws.<sup>19</sup> The upper Prognos variant assumes that population aging will partly be kept in check by higher net immigration (about 200,000 persons per year during 2010-30, an assumption that would increase the share of foreigners as a percent of the total population in Germany from 8 percent in 1992 to 23 percent in 2030). Moreover, the upper Prognos variant projects further significant increases in the labor force participation rate of women in the old Länder and a long-term decline of the unemployment rate to an average level of 4½ percent from an average of 9¼ percent during 1992-96.

221. As an alternative benchmark, staff projections based on the World Bank's population projections for Germany, which assume zero net immigration after 2005, suggest that the system dependency ratio would about double by 2030 (Table V-1 and Chart V-2).<sup>20</sup> The staff projections also reflect the assumptions of broadly unchanged labor force participation and unemployment rates, the latter fixed at about 8 percent, corresponding broadly to a "consensus estimate" of the natural rate of unemployment for Germany. Moreover, pension eligibility rates are assumed to be constant during the projection period except for adjustments reflecting the phasing-in of retirement age increases scheduled by the WFG passed in 1996.<sup>21</sup> The staff's projection of the system dependency ratio essentially reflects the trend increase in the elderly dependency ratio during the period 2010-30. Under the additional assumptions of unchanged net replacement and budget transfer rates, the staff's projections would necessitate an increase in the contribution rate of the WSEF to about 31 percent by 2030, some

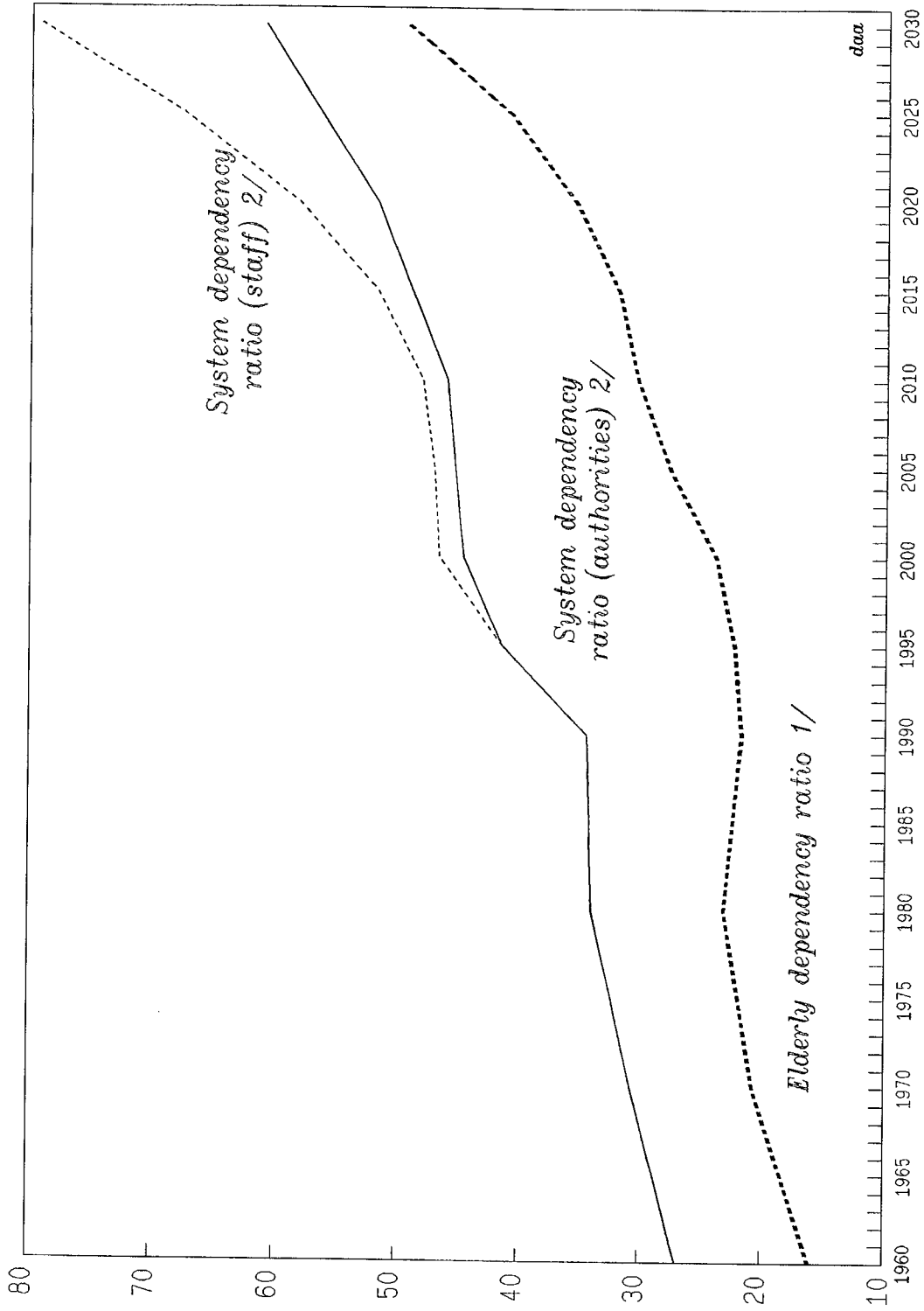
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<sup>19</sup>The *Prognos-Gutachten 1995* was commissioned by the Association of German Pension Insurance Funds, an association of the different first-pillar pension schemes. In its publications, this association has always been strongly in favor of maintaining the basic characteristics of the present pension system. Baseline projections prepared by more independent institutions—perhaps along the lines of the regular actuary reports published by the *Board of Trustees* in the United States and the *Government Actuary's Department* in the United Kingdom—could accordingly provide a more neutral foundation for reform proposals.

<sup>20</sup>The World Bank's population projections for Germany are close to the "lower variant" (i.e., pessimistic variant) of the population projection in the *Prognos-Gutachten 1995*.

<sup>21</sup>The model and macroeconomic assumptions underlying the staff projection are detailed in Sheetal K. Chand and Albert Jaeger, *Aging Populations and Public Pension Schemes*, Occasional Paper No. 147 (Washington: International Monetary Fund, 1996).

CHART V-2  
Germany  
Demographic and System Dependency Ratios  
(In Percent)



Sources: Verband Deutscher Rentenversicherungsträger (VDR); Blum Commission proposals (1997); and staff estimates.

1/ Defined as population aged 65 and over as a percent of population aged 15-64.

2/ Defined as number of "standard pensioners" as a percent of number of contributors.

5 percentage points more than in the Blüm Commission's baseline. At the same time, over the next 15 years or so, the projected contribution rate under the two baselines are similar, deviating from each other only by about ½ percentage point in 2010.

222. The long-run projection risk built into the Commission's baseline projection exposes contributors to the risk of significantly higher-than-projected contribution rate increases, or, alternatively, pensioners to the risk of significantly lower-than-projected pension replacement rates.<sup>22</sup> The issue of projection risk also highlights the small margin of manoeuvre inherent in the Commission's decision to adopt a piecemeal reform approach. In particular, at least for low and average income earners, it would probably be difficult to reduce pension replacement rates much further without recourse to systemic reform that would include the build-up of a significant second-pillar system. Indeed, analysis suggests that first-pillar systems broadly fall into the two categories "large" and "small" systems, corresponding roughly to average replacement rates of around 60-70 percent and around 30-40 percent, respectively. This discontinuity in the size of first-pillar systems across industrial countries may reflect the need for a "critical mass" in order to build up a significant funded private pension scheme, perhaps related to the relatively high administrative cost of funded schemes or to decreasing welfare gains from social insurance at higher pension replacement rates.<sup>23</sup>

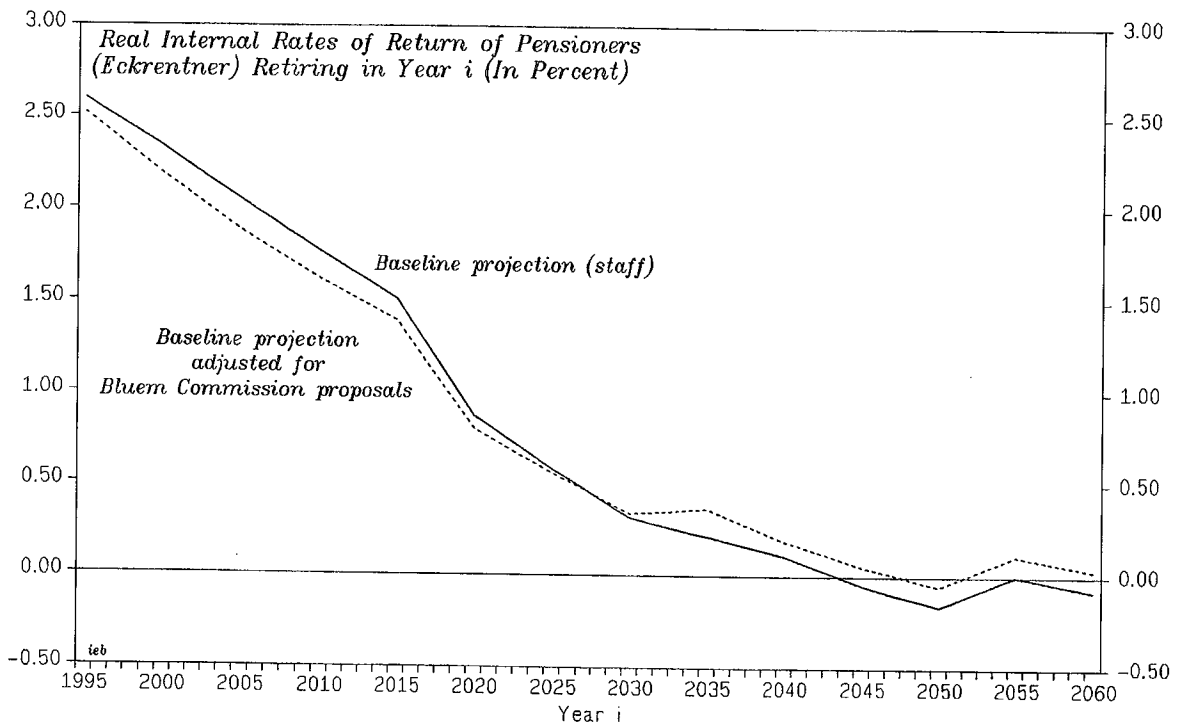
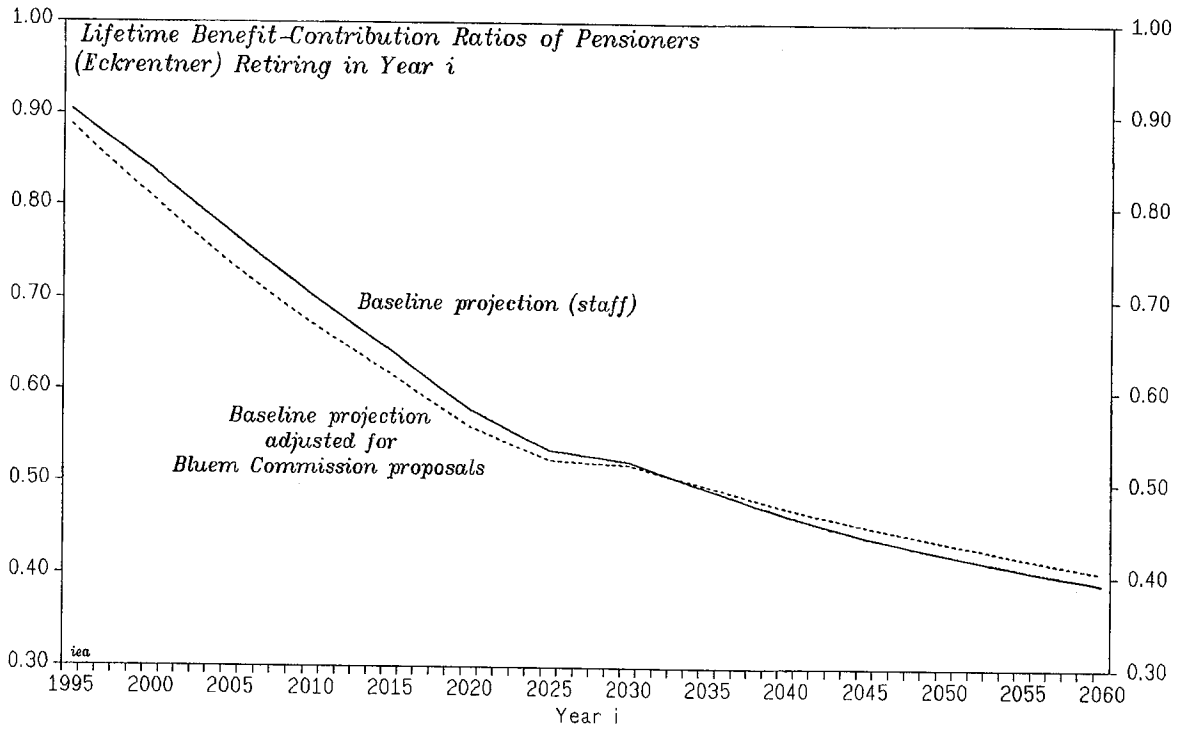
223. **Equity:** The acceptability of a PAYG system to workers and pensioners depends, inter alia, on the system's net benefit payments to different generations taking account of lifetime contributions and benefits (intergenerational equity) and the system's rate-of-return characteristics for contributors within a given cohort (intragenerational equity). An increase in the system dependency ratio will, in general, lower the net benefits of cohorts that retire later; these cohorts pay into the system at a time of rising contribution rates, while their net replacement rates may decline. This prediction regarding intergenerational equity is clearly borne out by calculations for the WSEF fund. Based on the staff's projection of the system dependency ratio, net pension benefits of a representative pensioner—measured by lifetime benefit-contribution ("money worth") ratios or, alternatively, by the real internal rate of return—of cohorts retiring after 1995 decline sharply over time (Chart V-3). For example, staff calculations indicate that the real internal rate of return of a pensioner retiring in 1995 amounted to about 2½ percent, but it would decline to below ½ percent for a pensioner retiring in 2030. For comparison, the real rate of return on long-term government bonds during 1970-96 amounted to about 4½ percent (CPI adjusted). The Blüm Commission's

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<sup>22</sup>The distribution of these risks between contributing and retired generations may change over time because of population aging. In particular, persons in the age group 55 years-and-above are projected to gain an absolute majority of votes in Germany after 2025, implying a significant shift in political power from the contributing population to the retired population.

<sup>23</sup>For example, simulations of life-cycle general equilibrium models suggest that the welfare gains from public pension insurance against living longer than expected decrease significantly at pension replacement rates above 40 percent. See Victor H. Validvia, "The Insurance Role of Social Security: Theory and Lessons for Policy Reform," IMF Working Paper No. 97/1, April 1997.

# Intergenerational Equity Implications of Public Pension System 1/



Source: Staff estimates.

1/ Wage and salary earners' fund; average wage earner with average life expectancy (both sexes) at age 65 and 45 contribution years; real wage growth of 2 percent; and real interest rate of 3 percent.

proposals would have only a marginal (equalizing) effect on the lopsided intergenerational distribution of net benefits (Chart V-3).

224. The relatively low and declining internal rate-of-return characteristics of a PAYG pension system in the face of an aging population also raise an intragenerational equity issue. Pension contributions on wage earnings are subject to a ceiling of about twice average wage earnings (DM 98,400 per annum in 1997). High-income wage earners with incomes exceeding the ceiling (and the same applies a fortiori to self-employed persons not participating in the system) have the option to invest a proportional share of their income in excess of the contribution ceiling in assets with significantly better rate-of-return characteristics than offered by the PAYG pension system. As a consequence, the rate of return on the same percentage share of income set aside for retirement income provision could be significantly tilted in favor of high-income earners.<sup>24</sup>

225. **Efficiency:** The efficiency implications of large first-pillar systems for savings, investment, and work effort have been at the focus of a large recent literature on pension reform.<sup>25</sup> While the savings implications of PAYG versus funded pension systems remain controversial,<sup>26</sup> a substantial body of evidence indicates that large first-pillar pension systems are often associated with significant labor market distortions and/or narrower equity markets. As regards potential labor market distortions, recent studies have highlighted: (i) the role of high pension contribution rates in raising effective marginal tax-benefit rates at lower income levels; (ii) the distortions due to a loose link between contributions and benefits; and (iii) the adverse effects on labor force participation rates of elderly cohorts.<sup>27</sup>

226. Pension contributions, in combination with other social security contributions, account for a significant portion of high effective marginal tax-benefit rates at lower income levels in Germany. As mentioned above, the Commission's reform proposal were largely motivated by concerns that further sizeable increases in pension contribution rates could impair the competitiveness of the German economy and increase distortions in the labor market. However, the Commission's proposals would probably not have a significant impact on

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<sup>24</sup>This intragenerational inequity bias is probably re-enforced by the comparatively lower life expectancies of lower-income earners.

<sup>25</sup>See, e.g., the World Bank's study (1994), *Averting the Old Age Crisis* (Oxford: Oxford University Press), and Laurence J. Kotlikoff (1996), "Privatizing Social Security at Home and Abroad." *American Economic Review, Papers and Proceedings*, Vol. 86, No.2 pp. 368-72.

<sup>26</sup>On the effects of pension systems of savings, see the survey paper by G.A. Mackenzie, Philip Gerson, and Alfredo Cuevas, *Pension Regimes and Saving*, Occasional Paper No. 151 (Washington: International Monetary Fund, 1997).

<sup>27</sup>See, e.g., chapters 6 and 9 in Organization for Economic Co-Operation and Development (OECD), *The OECD Jobs Study, Evidence and Explanations, Part II—The Adjustment Potential of the Labour Market* (Paris: OECD, 1994).



effective marginal tax-benefit rates in the short run, in particular if indirect taxes are incorporated in the tax-benefit wedge measures. In the long run, the proposals would—under the Commission optimistic baseline projection—allow for a further long-term increase in the pension contribution rate by 3 percentage points.

227. In view of the already relatively tight link between pension contributions and benefits, Germany's first-pillar system is likely to be subject to fewer distortions from the tax-benefit wedge caused by the pension contribution rate. As already mentioned, the Commission's three main proposals would further strengthen the link between contributions and benefits. As regards the impact of the public pension system on labor force participation of elderly cohorts, large first-pillar systems are generally associated with lower labor force participation rates for persons aged 55-64 years (Chart V-4). This could reflect formal early retirement provisions,<sup>28</sup> but may also reflect political pressures to use the public pension pillar to reduce measured unemployment among older workers. The reforms announced in the 1996-WFG pension reforms and the Commission's proposals on disability pensions would tighten formal early retirement provisions. At the same time, the Blüm Commission—citing the insurance purpose of the public pension system—advised against introducing actuarially fair pension benefit reductions for early retirement.

228. Lack of venture capital is often cited as a key financial bottleneck for the growth of businesses in Germany.<sup>29</sup> Indeed, cross-country data on the size of first-pillar systems and stock market capitalization suggest that large first-pillar systems are usually associated with relatively narrow equity markets (Chart V-5). While the lack of an "equity culture" in countries with large first-pillar systems could reflect a host of other influences including tax, investment, and accounting rules, risk-averse investment attitudes, and financial market regulations, there appears to be evidence that these other influences usually "fall in place" once a significant funded private pension pillar is built up.

### C. Systemic Pension Reform Approaches

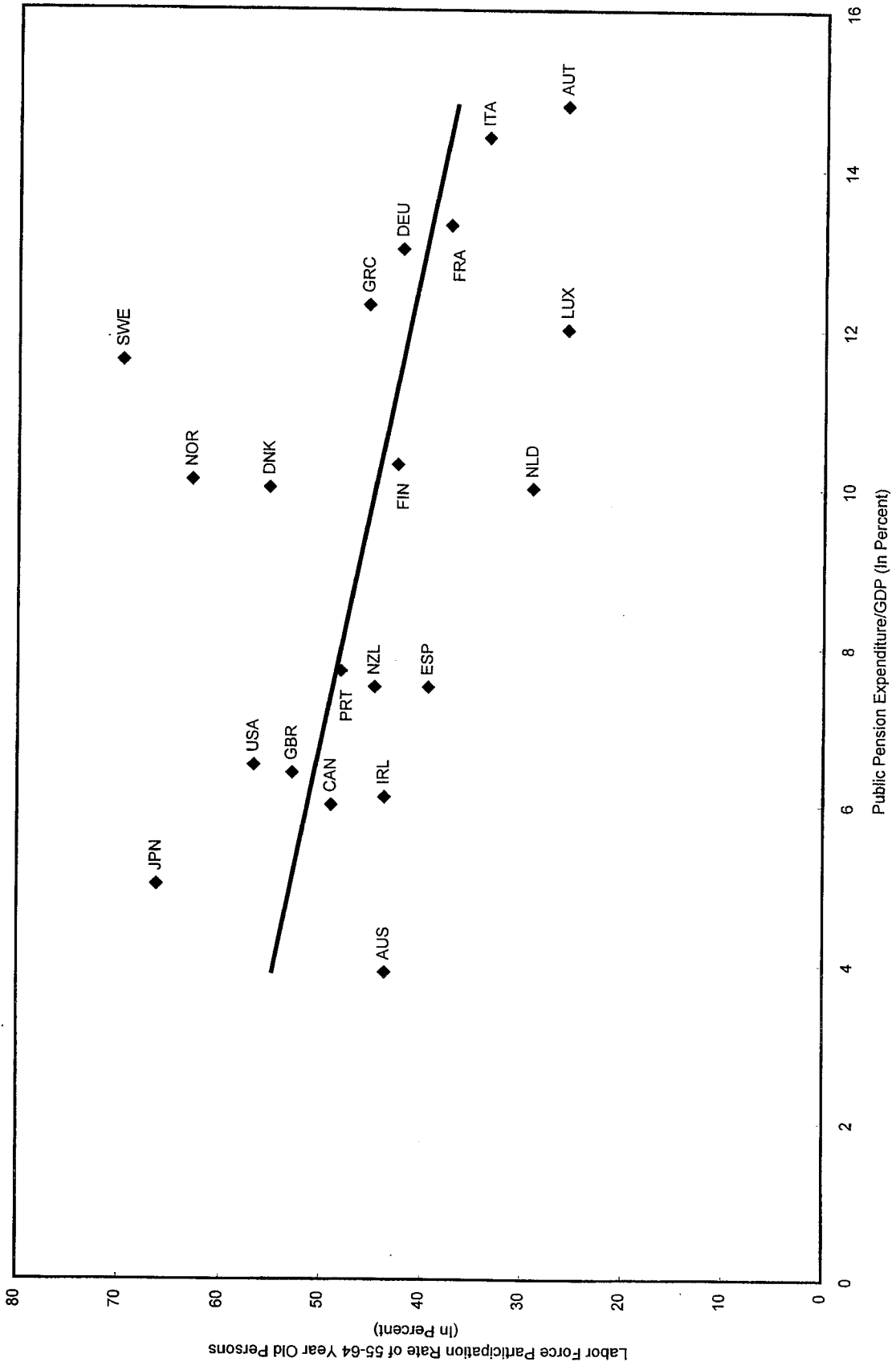
229. The Blüm Commission's report argued strongly in favor of maintaining the basic structure of the present pension system. Nevertheless, pressures for adopting more systemic

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<sup>28</sup>It has been estimated that the pension benefit reductions for early retirement introduced by the 1992 *Pension Act* would leave average effective retirement ages by about 3/4 of a year above average retirement ages under an actuarially fair benefit reduction system, necessitating to keep the contribution rate about 3/4 percentage points higher than under an actuarially fair system. See Axel Börsch-Supan (1992), "Population Aging, Social Security Design, and Early Retirement," *Journal of Institutional and Theoretical Economics*, 148, pp. 533-57.

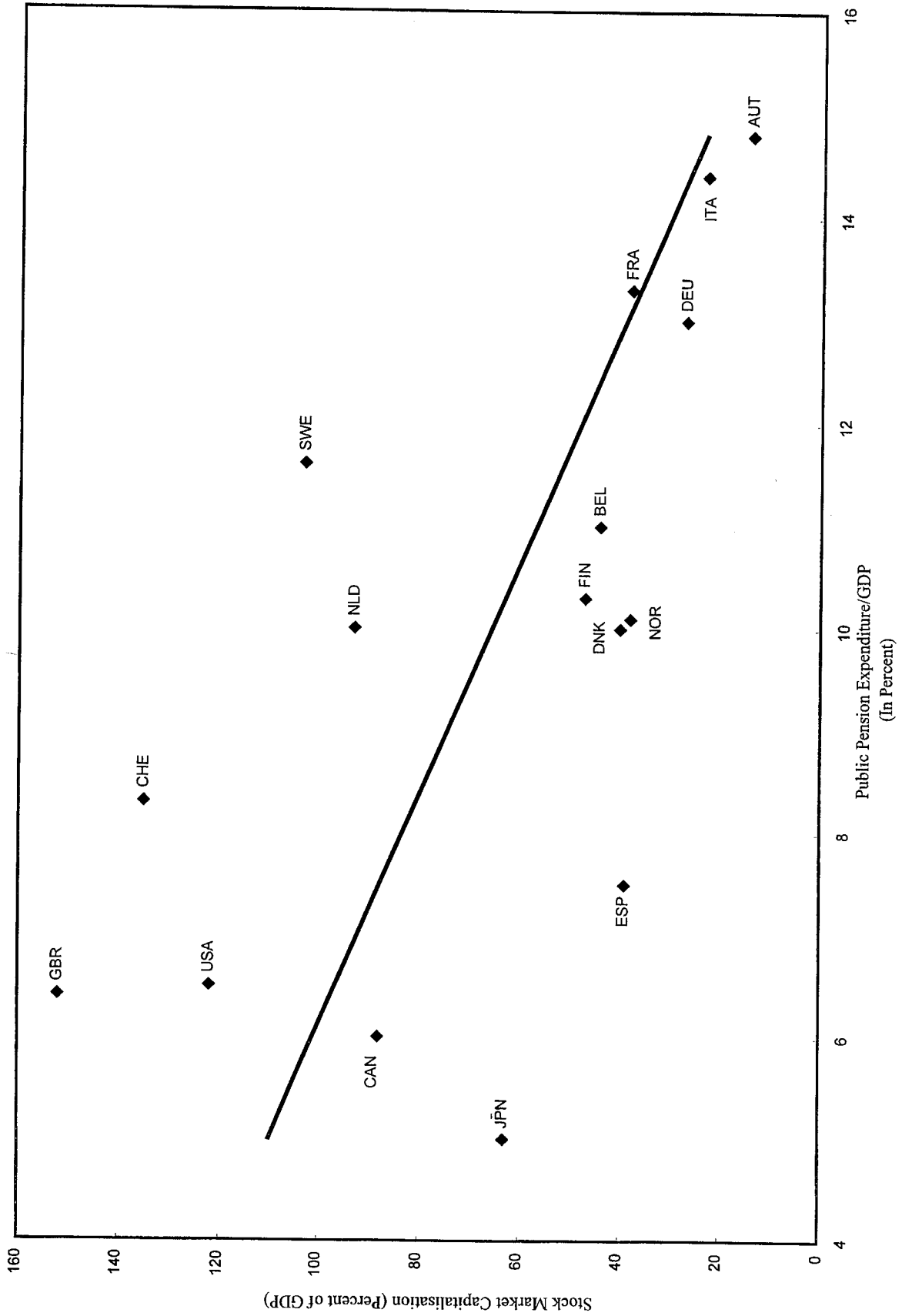
<sup>29</sup>See, e.g., the Government's *Jahreswirtschaftsbericht 1997* (1997, pp. 45-47).

Chart V-4  
Industrial Countries  
Public Pension Expenditure and Labor Force Participation Rates of 55-64 Year Old Persons



Sources: World Bank (1994) and International Labor Statistics (1993).

Chart V-5  
Industrial Countries  
Public Pension Expenditure and Stock Market Capitalisation As a Percent of GDP



Sources: World Bank (1994) and Deutsche Bundesbank (1997).

approaches to pension reform in Germany have been mounting.<sup>30</sup> As indicated above, four considerations appear to underpin the case for more systemic pension reform in Germany:

- The scope for further piecemeal reforms is limited by the likely need to preserve net replacement rates for the mass of retirees in the range of 60-65 percent and the constraints on increases in the contribution rate. Options for further piecemeal reforms include reductions in pension spending not related to previous contributions, in particular by moving to actuarially fair pension benefit reductions for early retirement (as indicated this measure could allow a reduction in the contribution rate of some  $\frac{3}{4}$  of a percentage point) and by further cutting imputed pension contribution periods for time spent in education. Indexing pensions to the CPI, rather than to net wages as at present, could lower spending on pensions in the likely case that future CPI inflation is lower than net wage increases. The average retiree under this indexation system would receive a fixed initial replacement rate at retirement. Thereafter, real benefits would be held constant. However, retirees would not benefit from real wage increases and the net replacement rate based on post-retirement wages would decline over the retiree's remaining lifetime.<sup>31</sup> Other piecemeal reform options include a reform of survivor pensions aiming at reducing the cumulation of own and survivor pension rights and further increases in statutory retirement ages that lower the system dependency ratio. However, the Blüm Commission proposed to postpone the reform of survivor pensions.
- Concentrating most of retirement income provision in a large mandatory PAYG pension pillar exposes pensioners and contributors to risks. There is in particular the "political risk" that piecemeal reforms will not last, even without unanticipated changes in the demographic and/or economic environment.<sup>32</sup> However, preserving a large mandatory PAYG pension pillar is likely to put most of the adjustment risk in the long run on contributors, because pensioners are likely to resist a further discontinuous downward adjustment of first-pillar average pension replacement rates from a level around 60 percent of average net wages.
- There are considerable inter- and intragenerational inequities associated with a large PAYG pension pillar. However, as indicated below, even far-reaching systemic reforms are likely to provide less than full relief with respect to these equity problems.

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<sup>30</sup>E.g., in its 1996/97 annual report, the German Council of Economic Experts (*Sachverständigenrat*) has argued in favor of shifting a significant part of retirement income provision to a funded system.

<sup>31</sup>For example, assuming a remaining life span of 20 years and labor productivity growth of 1½ percent, the net replacement rate would decline by about 25 percentage points even though real benefits were constant.

<sup>32</sup>For a discussion of political risks in the context of pension systems, see Peter Diamond, "Insulation of Pensions from Political Risk," NBER Working Paper No. 4895 (Cambridge, Massachusetts: National Bureau of Economic Research, October 1994).

- Finally, a large PAYG pillar may entail significant distortions in labor and capital markets, and systemic reforms could accordingly reap substantial efficiency gains. On the other hand, the likely need to mobilize additional fiscal resources for systemic reforms and, in the German context, the likely need to loosen the link between contributions and pension benefits in a downsized first-pillar system would at least partly off set these efficiency gains.

230. In the following paragraphs, two broad approaches to systemic pension reform are considered: (i) partial prefunding of the first-pillar system to mitigate the adverse effects of the PAYG financing mechanism; and (ii) shifting all, or part of, retirement income provision to funded private pension schemes (“privatization of social security”).

231. Partial prefunding of the first-pillar system (as practiced, e.g., in the United States) would convert the period-by-period PAYG budget constraint (1) into an intertemporal budget constraint. Under this approach, given long-term pension spending projections, contribution and budget transfer rates would be set at a level that would ensure long-term intertemporal balance of the public pension system. In view of the pattern of projected population aging, this approach would first lead to the build up of a reserve fund, which could later be drawn down as pension spending exceeds revenues under constant contribution and budget transfer rates.

232. Using the baseline staff projections of pension expenditure reported in Table V-1 (but extended to the time period 1995-2050), partial prefunding of the WSEF fund would require the “sustainable contribution rate” to be set at 25¼ percent (Chart V-6), i.e. about 5 percentage points above the current rate.<sup>33</sup> The sustainable contribution rate can be lowered by combining partial prefunding with piecemeal reductions in pension benefits. The main advantage of partial prefunding lies in some reduction of political risk and the smoothing of contribution rates over time, the latter providing some scope to mitigate the incidence of intergenerational inequity.<sup>34</sup> In addition, partial prefunding may have the advantage of strengthening financial discipline if coupled with the publication of regular reports on the actuarial status of the reserve fund. These reports could increase awareness of the future cost implications of current pension benefit promises, and the increased transparency could lead to more informed decisions by voters.

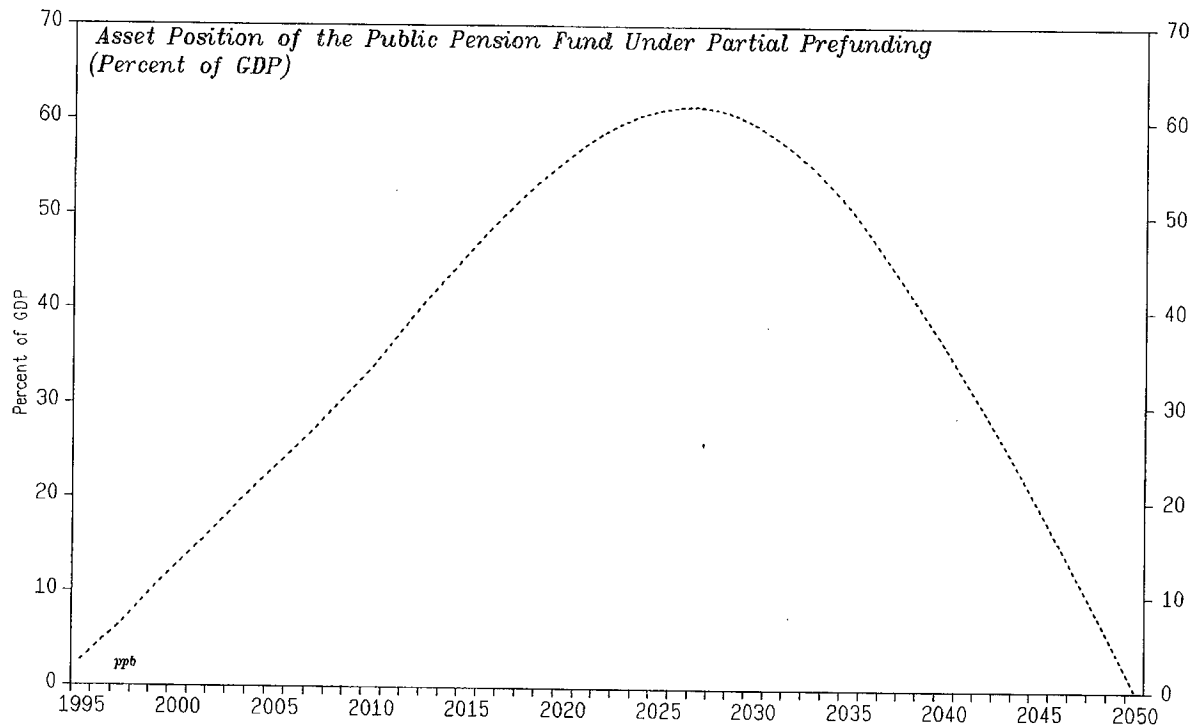
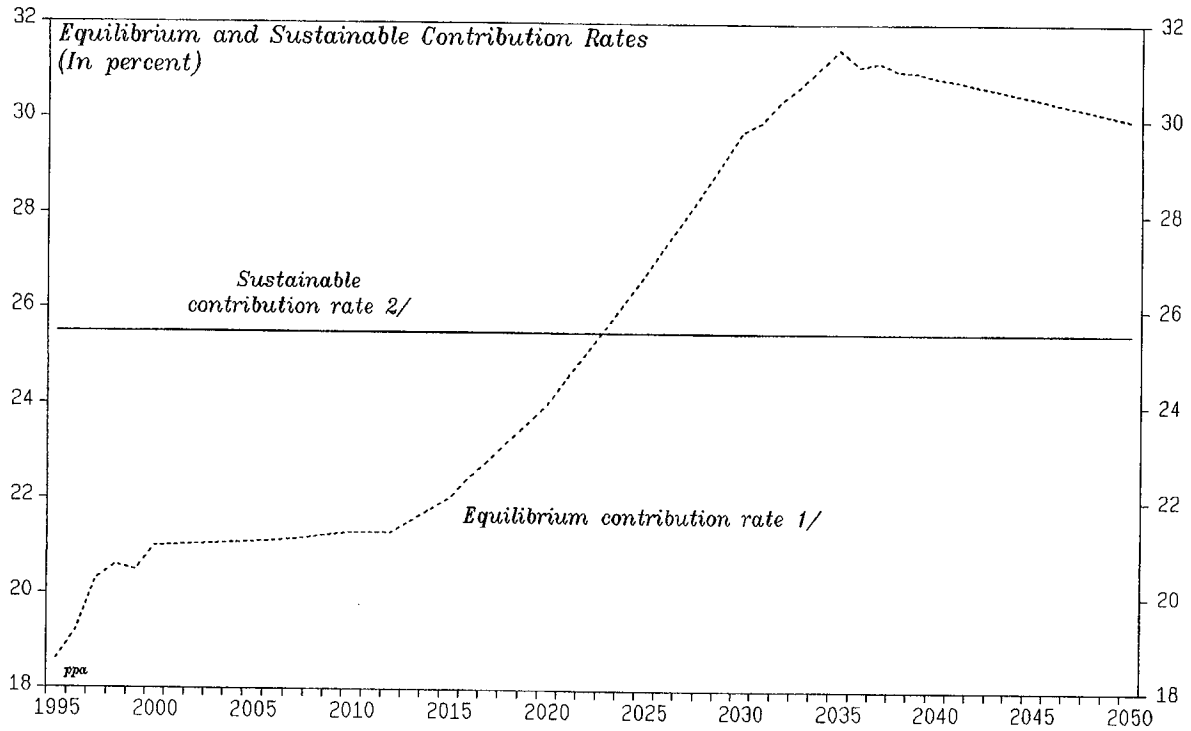
233. However, in the context of a pension system dominated by a PAYG scheme, partial prefunding is unlikely to resolve all the problems outlined above. At the same time, the accumulation of a large publicly-managed pension fund necessitated by the size of the PAYG

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<sup>33</sup>The sustainable contribution rate is calculated as the constant contribution rate over 1995-2050 that equalizes the net asset position of the WSEF in 1995 (assumed to be zero) with the net asset position in 2050.

<sup>34</sup>Calculations of internal real rates of return for the U.S. social security system covering cohorts retiring during 1995-2030 suggest that partial prefunding can mitigate intergenerational inequities. See Eugene C. Steuerle and Jon M. Bakija, *Retooling Social Security for the 21st Century: Right and Wrong Approaches to Reform* (Washington: Urban Institute Press, 1994).

### Partial Prefunding of Public Pension System



Source: Staff estimates.

1/ The equilibrium contribution rate is the contribution rate that maintains year-by-year balance of the pension system.

2/ The sustainable contribution rate is defined as the constant contribution rate that equalizes the net asset position in 2050 with initial net assets.

scheme raises new difficult issues. One such issue concerns the proper financial management of the accumulated assets by public sector agencies including the choice between investment in government securities and equities—both domestic and foreign—and the role of pension fund managers in corporate governance. In the German context, and again using the staff baseline projection of the equilibrium contribution rate, the accumulated reserve fund would peak at close to 60 percent of GDP around 2025 (Chart V-6). While these results are sensitive to the assumed rate of return—higher rates of return would lower the reserve accumulation requirements—and to the equilibrium contribution rate, a reserve funding would involve a sizeable accumulation of assets in the public sector. The size of the reserve fund needed to smooth contribution rates across cohorts could, however, be scaled back by additional piecemeal reform measures and/or a partial shift of retirement income provision to a funded private pension scheme.

234. Shifting a significant portion of retirement income provision to a private funded pension scheme could mitigate considerably the risk, intragenerational equity, and labor and financial market distortion problems outlined above.<sup>35</sup> At the same time, such a shift—depending on the details of the transition—could aggravate intergenerational equity problems, induce new labor market distortions as the link between benefits and contribution in a downsized PAYG pillar is likely to be loosened, and, finally, impose a large fiscal burden. Intergenerational equity problems could be aggravated if most of the fiscal burden of the transition is imposed on the cohorts that work during the transition period as these cohorts would bear the double burden of financing pension payments to the already retired cohorts and the build-up of their own funded pension pillar. Calculations for Germany under the extreme assumptions of a complete shift to a fully funded system and no use of public debt to finance the transition indicate that non-pension expenditure would need to be cut and/or revenue would need to be increased by a total of some 3 percentage points of GDP during the transition period 1995-2050.<sup>36</sup> Although the fiscal transition cost would be lower if only part of retirement income is shifted to a funded scheme, the fiscal transition cost would remain sizeable. Also, if public debt is used to spread part of the transition financing burden across different generations, difficulties could arise in the context of limits based on fiscal deficits and public debt. A downsized PAYG pillar is also likely to be more redistributive because it would need to fulfill the function of basic retirement provision. Indeed, in countries with smaller PAYG pillar scheme, the public pension pillar generally has a significant redistributive component. Finally, private funded pension schemes raise difficult regulatory issues regarding the government's role in insuring pension provision including the range of powers granted to oversight agencies and the levying of insurance premia commensurate with risk.<sup>37</sup>

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<sup>35</sup>For a discussion of the issues involved in moving from a PAYG pension system to a private funded scheme, see Robert Holzmann, *On the Economic Benefits and Fiscal Requirements of Moving from Unfunded to Funded Pensions*, AICGS Research Report No. 4 (Washington: American Institute for Contemporary German Studies, 1997).

<sup>36</sup>See Chand and Jaeger, "Aging Populations and Public Pension Schemes"

<sup>37</sup>For a discussion of the experience of selected industrial countries with public insurance of private funded pension schemes, see James E. Pesando, "The Government's Role in Insuring Pensions", in: *Securing Employer-Based Pensions: An International Perspective*, edited by Bodie, Zvi, Mitchell, S. Olivia, and John A. Turner (Philadelphia: University of Pennsylvania Press, 1996), pp. 73-104.