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August 19, 1998

To:            Members of the Executive Board

From:         The Acting Secretary

Subject:      **Germany—Selected Issues and Statistical Appendix**

This paper provides background information to the staff report on the 1998 Article IV consultation discussions with Germany, which was circulated as SM/98/203 on August 11, 1998.

Mr. W. Lee (ext. 38492) or Mr. Jaeger (ext. 35643) is available to answer technical or factual questions relating to this paper prior to the Board discussion.

Unless the Documents Section (ext. 36760) is otherwise notified, the document will be transmitted, in accordance with the procedures approved by the Executive Board and with the appropriate deletions, to the WTO Secretariat on Thursday, August 27, 1998; and to the European Commission (EC), the Food and Agriculture Organization (FAO), the Organisation for Economic Cooperation and Development (OECD), and the World Food Programme (WFP), following its consideration by the Executive Board.

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INTERNATIONAL MONETARY FUND

GERMANY

**Selected Issues and Statistical Appendix**

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Approved by European I Department

August 17, 1998

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Germany: Basic Data

Area and population

Total area	357,041 square kilometers
Total population (1997)	82.2 million
GDP per capita (US dollar)	25.6 thousand

<u>Germany</u>	1993	1994	1995	1996	1997
<u>(Percentage changes at 1991 prices)</u>					
<u>Demand and supply</u>					
Private consumption	0.1	1.2	1.8	1.4	0.2
Public consumption	-0.5	2.1	2.0	2.6	-0.4
Gross fixed investment	-5.6	3.5	0.8	-1.2	0.2
Construction	1.3	6.5	0.3	-3.1	-2.2
Machinery and equipment	-14.4	-1.0	1.6	1.9	3.9
Inventory accumulation 2/	-0.1	0.8	0.4	-0.3	1.1
Total domestic demand	-1.4	2.7	2.0	0.8	1.2
Exports of goods and nonfactor services	-5.0	7.9	6.6	5.1	10.7
Imports of goods and nonfactor services	-5.9	7.7	7.3	2.8	7.0
Foreign balance 2/	0.3	-0.0	-0.2	0.6	1.0
GDP	-1.2	2.7	1.8	1.4	2.2
Western	-2.0	2.1	1.5	1.3	2.2
Eastern	9.3	9.6	5.2	1.9	1.6
<u>(In millions)</u>					
<u>Employment and unemployment</u>					
Labor force	38.6	38.7	38.4	38.4	38.3
Employment	35.2	35.0	34.8	34.4	33.9
Unemployed	3.4	3.7	3.6	4.0	4.4
In percent of labor force	8.8	9.6	9.4	10.4	11.5
Western	7.4	8.2	8.3	9.1	9.8
Eastern	15.1	15.2	14.0	15.7	18.1
<u>(Percentage change)</u>					
<u>Prices and incomes</u>					
GDP deflator	4.0	2.4	2.1	1.0	0.6
Consumer price index	4.4	2.7	1.8	1.5	1.8
Western	3.6	2.7	1.7	1.4	1.8
Eastern	10.5	3.7	2.1	2.2	2.1
Average hourly earnings (industry)	6.7	2.0	4.1	4.4	1.1
Unit labor costs (total economy)	3.7	0.2	1.6	-0.2	-1.7
Real disposable income 3/	-0.6	0.5	1.5	1.4	-0.3
Personal saving ratio (In percent)	12.2	11.6	11.3	11.4	10.9

1/ Staff projections.

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

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

Germany: Basic Data (concluded)

<u>Germany</u>	1993	1994	1995	1996	1997
<u>(In billions of deutsche marks)</u>					
<u>Public finances</u> 2/					
<u>General government</u>					
Expenditure	1,589	1,660	1,744	1,765	1,773
(In percent of GDP)	50.2	49.9	50.4	49.8	48.7
Revenue	1,488	1,581	1,631	1,645	1,676
(In percent of GDP)	47.0	47.5	47.2	46.4	46.0
Financial balance	-101	-80	-113	-120	-97
(In percent of GDP)	-3.2	-2.4	-3.3	-3.4	-2.7
<u>Deficit of the territorial authorities</u>					
	-138	-116	-109	-120	-97
(In percent of GDP)	-4.4	-3.5	-3.2	-3.4	-2.7
<u>Federal government</u>					
Financial balance	-67	-51	-51	-79	-63
(In percent of GDP)	-2.1	-1.5	-1.5	-2.2	-1.7
<u>General government debt</u>					
	1,514	1,671	2,007	2,139	2,232
(In percent of GDP)	47.9	50.2	58.0	60.4	61.3
<u>Balance of payments</u>					
Trade balance 3/	57.3	70.6	80.6	94.3	115.2
Services balance	-43.8	-52.1	-52.5	-52.5	-56.3
Net private transfers	-15.6	-16.5	-16.6	-17.4	-17.5
Net official transfers	-42.8	-46.3	-42.0	-37.4	-38.9
Current account	-23.2	-32.9	-32.4	-20.7	-1.7
(In percent of GDP)	-0.7	-1.0	-0.9	-0.6	-0.0
Foreign exchange reserves (e.o.p)	120.1	113.6	121.3	119.5	126.9
<u>(Percentage changes, end of period)</u>					
<u>Monetary data</u>					
Money and quasi-money (M3)	10.9	1.6	3.6	8.7	3.6
Domestic bank lending	10.0	8.1	7.2	7.6	6.0
Of which lending to:					
Public authorities	13.7	10.2	15.3	7.6	5.3
Private nonbanks	9.0	7.5	4.9	7.6	6.2
<u>(Period averages in percent)</u>					
<u>Interest rates</u>					
Three-month interbank rate	7.2	5.3	4.5	3.3	3.3
Yield on ten-year government bonds	6.5	6.8	6.8	6.2	5.7
<u>(Levels)</u>					
<u>Exchange rates</u>					
DM per US\$ (end of period)	1.73	1.55	1.43	1.55	1.79
DM per US\$ (annual average)	1.65	1.62	1.43	1.50	1.73
Nominal effective rate (1990=100)	106.1	106.4	111.8	108.9	103.9
Real effective rate (ULC)(1990=100)	109.5	113.7	122.9	122.5	114.3

1/ Staff projections.

2/ 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. Debt data are end-of-year data for the general government in accord with Maastricht definitions.

3/ Including supplementary trade items.

## INTRODUCTION

1. Since unification, weak labor market performance has been the source of Germany's most vexing economic problems and difficult challenges. The advent of European Monetary Union (EMU) and the requirements of the Stability and Growth Pact (SGP) pose still more challenges, notably in the conduct of fiscal policy and in the move toward more flexible labor markets. EMU represents a major regime change where fiscal policy will be expected to play a more prominent role in macroeconomic stabilization as monetary policy is directed toward area-wide rather than German requirements. Moreover, improving labor market flexibility will be crucial for minimizing the deleterious effects of regional shocks, reabsorbing the large number of unemployed, and strengthening Germany's job-creation potential.

2. Real growth and employment performance in Germany kept pace with its future EMU partners during the 1980s. Since then, employment trends have diverged markedly—with massive layoffs and record-high unemployment rates continuing in Germany even as employment recovered in the rest of the European Union. This decline in employment also worsened the fiscal situation by increasing the general government deficit, as spending on social benefits grew and the tax base narrowed. Moreover, labor costs ballooned as social contribution rates were raised to pay for unification-related expenditures. Hence a vicious circle was created, which exacerbated the employment problem even further.

3. The macroeconomic stabilization requirements for fiscal policy and the interaction between fiscal policy and the labor market are the themes of the following chapters: these studies analyze the conduct of fiscal policy under the strictures of the SGP; present a diagnosis of the labor market situation from a disaggregated perspective, which has implications for policy options; and illustrate the dynamics between fiscal policy and the labor market. These chapters build on earlier staff studies of the labor market that have investigated, inter alia, aggregate labor market developments, employment trends in eastern Germany, and the implications for inflation of asymmetries in the wage-setting process (Phillips curve).

4. Chapter I analyzes Germany's past fiscal policy behavior and assesses the likely adjustments that would be necessary to bring future fiscal policy behavior in line with EMU and SGP requirements. Using estimated fiscal policy reaction functions that take account of Germany's decentralized fiscal decision-making structure, the statistical results suggest that discretionary fiscal policy at the general government level has maintained a procyclical stance since the end of the 1970s, almost completely offsetting the operation of automatic fiscal stabilizers. EMU constitutes a new environment that may allow more scope for the operation of automatic fiscal stabilizers in Germany. Depending on how the automatic stabilizers will operate in the future, the analysis suggests that the general government's core deficit (essentially the structural deficit, excluding discretionary fiscal policy responses to the business cycle) could range from zero to 2 percent of GDP without breaching the SGP deficit limits. As estimates of the core deficit in 1997 were found to be close to the actual general government deficit of 2¾ percent of GDP, providing more scope for the operation of the

automatic stabilizers in the future will likely require substantial further fiscal adjustments to achieve an EMU-consistent setting for fiscal policy.

5. A diagnosis of disaggregated labor market developments and their deleterious interaction with Germany's social insurance system, and implications for structural reforms and policy options are the focus of the analysis in Chapter II. Most of the unfavorable developments in labor market trends (sharply higher unemployment rates, jobless growth, and productivity-lagging real wage growth) have fallen on the low end of the skill and earnings distribution. With aggregate demand growth in Germany broadly similar to its EMU partners, demand considerations cannot explain Germany's relatively adverse labor market trends. A supply-side model is developed to demonstrate that the mismatch of labor productivity and labor costs (primarily stemming from skill-biased technological progress and the wage bargaining process) causes labor shedding at the low end. This can trigger a vicious circle of higher social spending, increased social contribution rates, and further labor shedding at the low end. Beyond the implications from the model, the slow sectoral reallocation of labor (from manufacturing to services) and the increased duration of the business cycle can also explain part of the rising trend in aggregate unemployment. The policy options suggested by this analysis include the following: (1) focus education, training, and active labor market programs on raising worker productivity at the low end; (2) increase flexibility in wage bargaining to promote more wage differentiation; (3) reshape incentives at the low end toward finding work by limiting the duration of non-work benefits and increasing the enforcement of search requirements; (4) lower non-wage labor costs at the low end (e.g., taper social contribution rates); and (5) revise regulatory requirements to promote growth and employment in the service sectors.

6. As a complementary exercise to the analysis in Chapter II, an aggregate macroeconomic growth model is calibrated for Germany in Chapter III to numerically illustrate the dynamic interplay among wage bargaining behavior and fiscal policies (especially social contribution rates, unemployment benefits, and pensions). The model's baseline converges to full employment over time with GDP growth (per worker) of around 2 percent. Fiscal policy is set to achieve budget balance in the long run. The simulations show that structural reforms and policies aimed at slowing autonomous wage growth, increasing the responsiveness of real wages to labor market conditions, and reducing the pass-through of taxes to net real wages can mitigate employment and output losses from shocks to the economy. Moreover, it is shown that asymmetric responses that allow more downward wage flexibility and partial pass-through of tax increases (but not decreases) to real wages can reduce the adverse employment and output effects of negative shocks while preserving the beneficial effects from positive shocks. Over time, demographic pressures inherent in pension system will place upward pressures on contribution rates and thus labor costs, which could trigger successive rounds of layoffs and further rate increases. Structural changes that increase the downward flexibility of real wages and reduce the pass-through of social contribution rates can improve employment performance in the medium term, but a vicious circle of contribution rate increases and layoffs may remain in the long run unless the pension system is reformed further.

## I. FISCAL STABILIZATION POLICY UNDER EMU<sup>1</sup>

### A. Introduction and Summary

7. European Monetary Union (EMU) involves a **major regime change** in the conduct of macroeconomic policies by member countries. In this context, a key issue will be the role of fiscal policy as a stabilization tool under EMU. The views on the costs and benefits of adapting fiscal institutions and policy behavior to the new EMU environment differ widely. Some observers fear that member countries' fiscal policy will be hamstrung by the strictures of the Stability and Growth Pact (SGP), aggravating macroeconomic instability at a time when monetary policy levers are centralized at the European Central Bank (ECB). Other commentators have flagged the difficult transition issues involved in moving to an EMU-consistent fiscal policy regime, noting in particular the front-loaded macroeconomic cost of fiscal adjustment. Still other observers have reckoned that the SGP will provide a much-needed device for precommitting policies, imposing discipline on countries with checkered fiscal histories, and helping to gird the European welfare states for a difficult uphill battle to contain fiscal deficits and public debt.

8. The extent of the fiscal policy regime change necessitated by a country's membership in EMU will depend on the characteristics of its fiscal institutions and policy behavior prior to EMU. In particular, did discretionary fiscal policy seek to offset or reinforce the operation of automatic fiscal stabilizers? Were there significant transitory variations in the fiscal position unrelated to business cycle fluctuations? And what was the behavior of the underlying (core) fiscal position over time? This chapter examines the implications of EMU for Germany's fiscal policy behavior in two steps. First, the chapter describes the main characteristics of Germany's fiscal institutions and policy behavior during 1960–97. Second, it assesses the likely policy adjustments that would be necessary to bring Germany's future fiscal policy behavior in line with EMU requirements. The scope of this chapter is limited to the fiscal stabilization dimension of Germany's move to an EMU-consistent fiscal policy regime. In particular, the chapter does not address issues related to fiscal stabilization at an EMU-wide level.

9. A number of recent studies have examined the challenges involved in moving to an EMU-consistent fiscal policy regime.<sup>2</sup> To shed additional light on this issue, this chapter uses estimates of fiscal policy reaction functions to gauge the scope of the likely adjustments needed to conform to EMU's fiscal policy strictures. Moreover, this chapter follows Bayoumi and Eichengreen (1995) in tracing fiscal policy behavior at the general government level to the

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

<sup>2</sup>See, e.g., Buti, Franco, and Ongena (1997), Eichengreen and Wyplosz (1998), and Annex I on the medium-term framework for fiscal policy in the Background Annexes to the Board paper *Economic Policy Challenges Facing the Euro Area and the External Implications of the Euro* (EBS/98/134).

behavior of the underlying decision makers at the central government level (including the social insurance sector) and the lower government levels (states and communes), thus taking account of Germany's decentralized fiscal decision-making structure.<sup>3</sup> The estimates of the fiscal policy reaction functions are based on an analytical framework that tracks fiscal policy behavior over time by decomposing the observed budget balance (as a percent of GDP) into four unobserved components: (i) an underlying permanent component, termed here the **core budget balance**; (ii) an automatic fiscal stabilizer component; (iii) a component reflecting discretionary fiscal policy responses to the business cycle; and (iv) a component reflecting all other transitory shocks to the fiscal position.

10. The conventional approach to the analysis of fiscal stabilization policy relies on a decomposition of the budget balance (as a percent of GDP) into only two components: the **structural budget balance** and the automatic fiscal stabilizer component. This conventional approach lacks the specificity of the analytical framework adopted in this chapter in that the structural budget balance lumps together three components that capture different dimensions of fiscal policy behavior: the core budget balance describes the underlying fiscal position; the component reflecting discretionary fiscal policy responses to the business cycle can move pro- or counter-cyclically with the output gap; and the component capturing all remaining shocks to the fiscal position reflects transitory changes in the fiscal position due to discretionary policy and/or macroeconomic shocks. As a consequence, structural budget balance estimates in many countries vary substantially during the cycle—with their variability sometimes even exceeding the variability of the actual budget balance—and provide unreliable benchmarks for assessing the underlying fiscal position.<sup>4</sup>

11. Based on the comparison of Germany's estimated fiscal policy reaction functions prior to EMU with a menu of fiscal policy reaction functions that would be consistent with EMU strictures, the chapter draws five main conclusions.

- Estimates of Germany's fiscal policy reaction function at the general government level suggest that discretionary fiscal policy has maintained a procyclical stance since the end of the 1970s, almost completely offsetting the operation of automatic fiscal stabilizers. Against this background, EMU may provide a new institutional environment that allows more scope for the operation of automatic fiscal stabilizers in Germany (and in other EMU member countries). A revitalization of automatic fiscal stabilizers could at least partly compensate for the loss of monetary policy autonomy, and, in view of Germany's relative size, also improve EMU's overall capacity to absorb macroeconomic shocks.

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<sup>3</sup>Gavin and Perroti (1997) use a similar approach to study fiscal policy behavior in Latin American countries.

<sup>4</sup>For this reason, Tanzi (1982) also advocated analytical decompositions of fiscal balances that go beyond the conventional approach.

- Owing to Germany's decentralized fiscal structure, the behavior of the general government reflects the aggregated outcome of fiscal policy decisions at different government levels. The parameter estimates for disaggregated fiscal policy reaction functions at the central and lower government levels indicate that a switch to a procyclical policy stance at the central government level at the end of the 1970s largely accounts for the overall procyclical behavior of the general government balance. By contrast, lower government levels appear to have followed consistently a procyclical stance during the whole period 1962–97.

- Germany's strongly procyclical fiscal policy stance during the past 20 years implies that estimates of the general government's structural balance may provide a misleading (i.e., too optimistic) benchmark for assessing the country's present underlying fiscal position. In particular, budgetary improvements due to procyclical discretionary savings measures during a cyclical downswing may be dissipated again as the cyclical upswing takes place. The estimate of the general government core deficit, i.e., the fiscal deficit adjusted for all transitory movements in the budget balance, was found to be close to the actual general government deficit of 2¾ percent of GDP in 1997. By contrast, the estimated general government structural deficit was ¾ percent of GDP in 1997 (assuming the size of the cyclical output gap was some 3½ percent). Thus, to avoid "backsliding" of the structural deficit during the cyclical upswing, efforts to "lock in" the procyclical consolidation gains of the past few years would be needed.

- Depending on the scope allowed for the operation of automatic fiscal stabilizers under an EMU-consistent fiscal policy, the estimates of the general government core deficit required to respect the SGP under normal circumstances can range from zero to 2 percent of GDP. However, practical (and perhaps theoretical) considerations would suggest that allowing full operation of automatic fiscal stabilizers may only be feasible at the central government level. Under this assumption, a required core balance of ¾ percent of GDP would suffice to keep Germany within the constraints of the SGP under normal circumstances. The implied long-run path for the general government's primary balance would clearly be sustainable, although long-run projections of social expenditure under unchanged policies suggest that making an EMU-consistent fiscal policy rule stick in the long run will require repeated primary discretionary expenditure and/or revenue adjustments. On the other hand, allowing the full operation of automatic fiscal stabilizers at all government levels would call for a balanced core budget position. While clearly an ambitious undertaking, restoring the full operation of automatic fiscal stabilizers at all government levels would strengthen the overall shock absorption capacity of the economy and, correspondingly, reduce output fluctuations.

- Given Germany's decentralized fiscal structure, EMU will also require increased coordination of fiscal policy at the central and lower government levels. Current proposals on a National Stability Pact (NSP) that envisage Maastricht-type deficit limits of 1.5 percent of GDP for the central and lower government levels, respectively, would call for a balanced core fiscal position at the central government level. Moreover, under the proposed outlines of the NSP, most of the burden of closing the general government's present overall core balance gap would fall on the central government.

12. The remainder of the chapter is organized as follows. Section B provides some background on German fiscal institutions and policy behavior during 1960–97. Section C outlines a framework to analyze fiscal stabilization policy behavior over time. Section D presents the parameter estimates for Germany’s fiscal policy reaction function during 1960–97. Section E uses these parameter estimates to calibrate EMU-consistent fiscal policy rules and discusses the need for increased coordination of fiscal policy at the central and lower government levels.

## B. Background

13. Fiscal performance—as proxied by the behavior of fiscal deficits and debt—is taken to reflect the interplay among fiscal institutions (the “rules of the game”), the behavior of fiscal policy makers (the “players”) within the constraints of these institutions, and the macroeconomic and political environment. Germany’s fiscal performance during 1960–97 underwent substantial variations, ostensibly marked by a shift to high fiscal deficits and rising public debt after the oil price shock of 1973–74, the onset of a prolonged fiscal consolidation phase at the beginning of the 1980s, and German unification at the beginning of the 1990s (Figure I-1).<sup>5</sup> Until the end of the 1970s, fiscal performance in the other EU countries (as an aggregate) paralleled closely the fiscal performance in Germany, but their aggregated deficit level deteriorated markedly relative to Germany in the 1980s and the early 1990s. In the run up to stage 3 of EMU, the aggregate fiscal deficit in the other EU countries reverted back to the benchmark set by German fiscal performance.

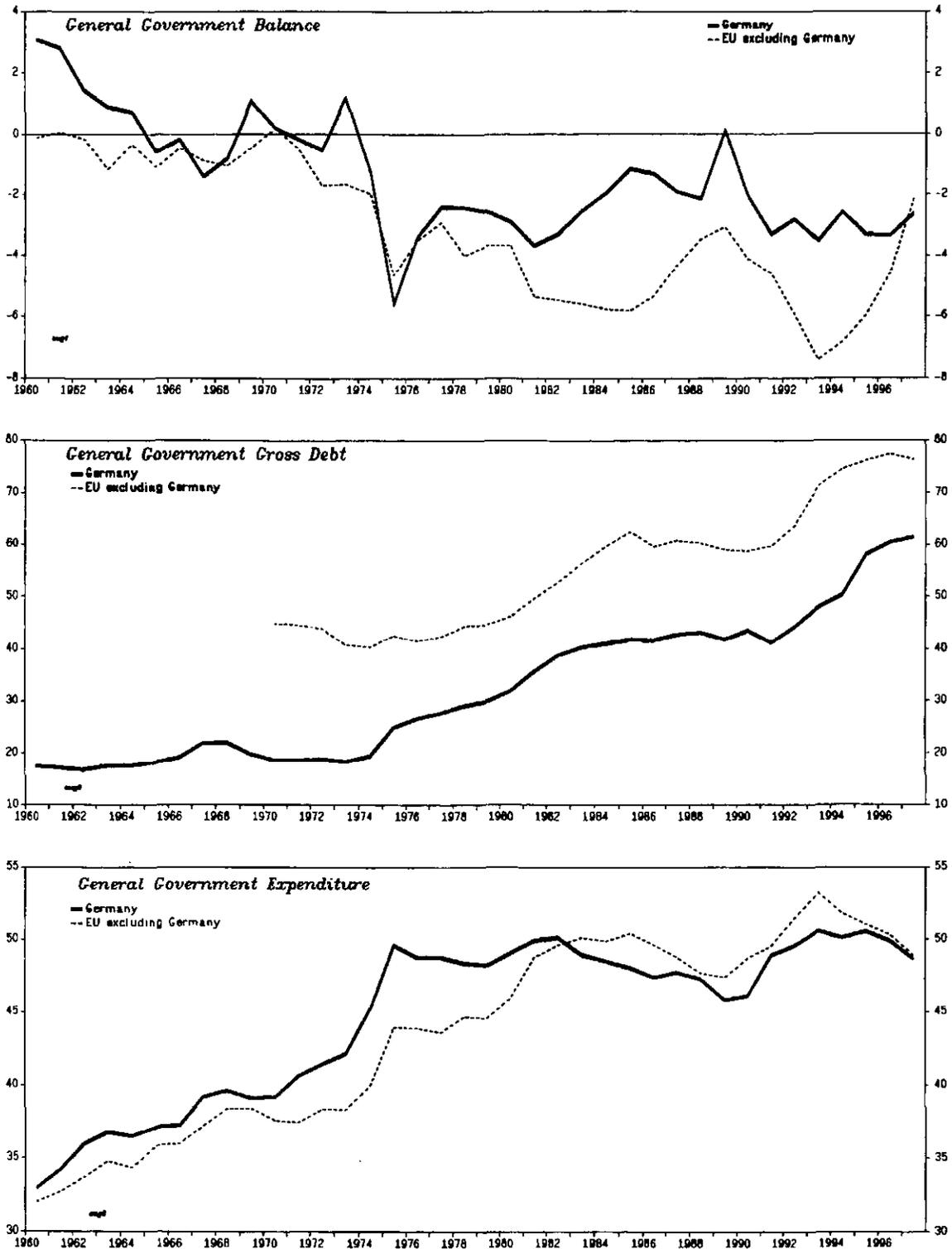
14. Germany’s decentralized federal structure assigns governmental functions and responsibilities to three broad levels of government (the central government, the states, and the communes).<sup>6</sup> Thus, fiscal policy at the general government level reflects the underlying behavior of a multitude of fiscal decision makers. Based on data for 1995, about 60 percent of total general government spending was assigned to the central government (including the social insurance sector), while the remaining 40 percent were split about equally between the states and the communes. During 1960–97, indicators of fiscal performance behaved markedly different across government levels (Figure I-2). In particular, fiscal deficits accrued largely at the levels of the federal government and the states. By contrast, the fiscal position of the communes was broadly balanced and stable over time. Similarly, the finances of the social insurance sector were also usually in balance or were even in surplus.

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<sup>5</sup>The data in Figure I-1 do not fully reflect the impact of unification on fiscal deficits and debt during 1990–94 owing to the exclusion of the financial operations of the *Treuhandanstalt* and of the post/telecom and railway companies. The average fiscal deficit of the “extended public sector” exceeded the average general government deficit by 1½ percentage points of GDP during 1990–94.

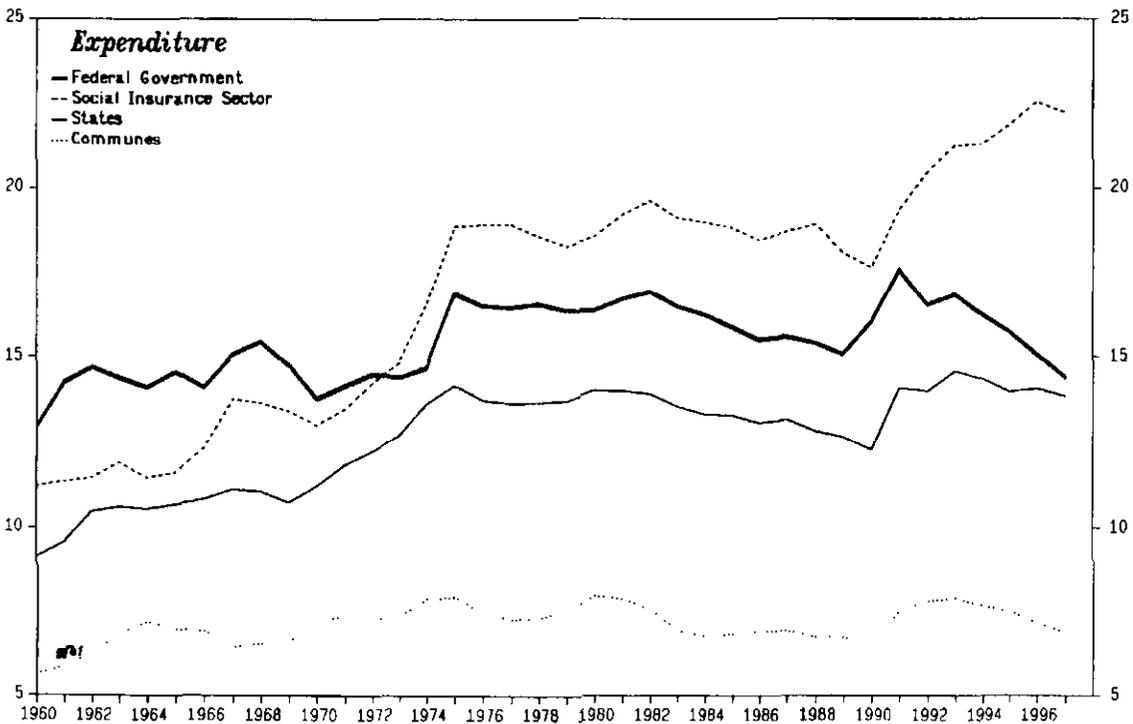
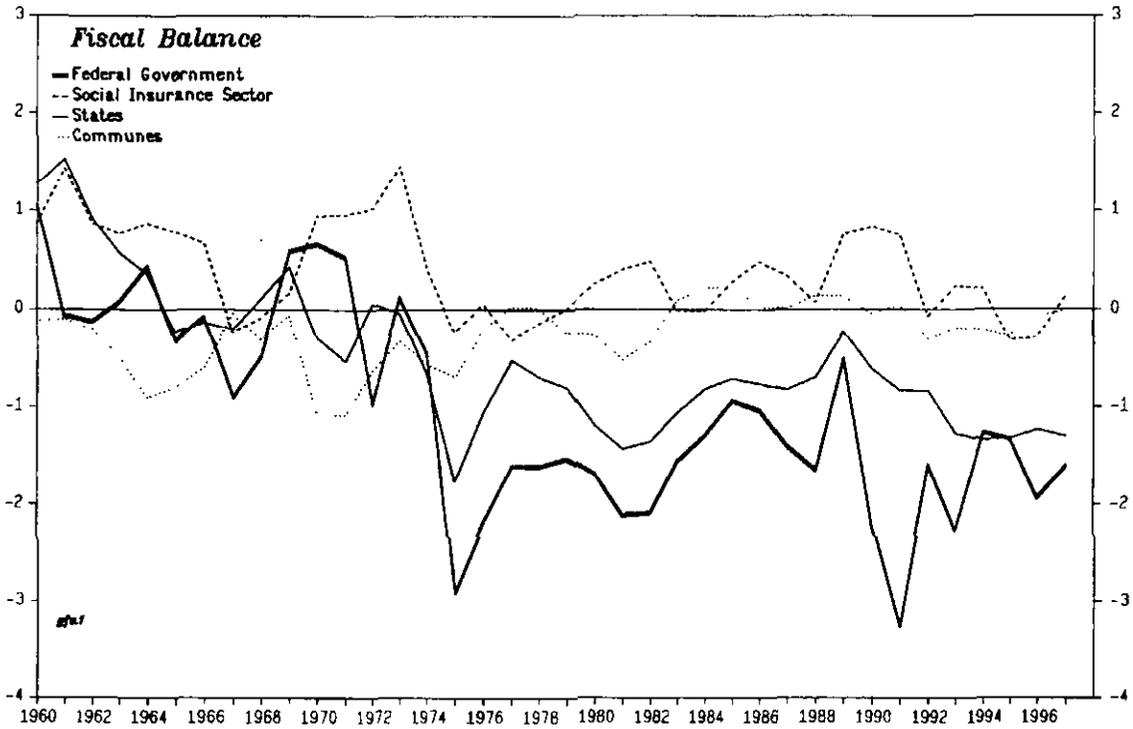
<sup>6</sup>See Spahn and Föttinger (1997) and OECD (1998) for reviews of the key features of Germany’s intergovernmental fiscal structure.

Figure I-1. Germany: General Government Finances, 1960-97  
(In percent of GDP)



Source: IMF, World Economic Outlook database.

Figure I-2. Germany: Government Finances  
at Different Government Levels, 1960-97  
(In percent of GDP)



Source: IMF, World Economic Outlook database.

15. A second important characteristic of Germany's fiscal system has been the overriding role of social spending in shaping fiscal developments. The build up of a comprehensive social insurance/protection system in the rapid growth-phase after World War II led to a sharp increase in the share of social expenditure in overall general government spending (Figure I-3). In fact, practically all of the increase in the general government's primary spending from 31 percent of GDP in 1960 to 45 percent of GDP in 1997 is accounted for by higher social spending, in particular on labor markets (unemployment benefits, active labor market measures), health care (including disability pensions and accident insurance), and old-age and survivor pensions. The increase in social spending is mirrored on the revenue side by the upward trend in social insurance contributions, which rose from 10¼ percent of GDP in 1960 to 20 percent of GDP in 1997. Meanwhile, the tax-GDP ratio declined slightly from 23 percent of GDP in 1960 to 22½ percent of GDP in 1997. Reflecting pay-as-you-go (PAYG) financing of social insurance spending, this increasingly dominant portion of the fiscal system is particularly vulnerable to adverse shifts in the system dependency ratio (beneficiaries per contributor) and therefore to adverse shocks to employment growth and/or the impact of an aging population.

16. At the federal government level, the "golden rule" provision of the German Constitution restricts budgeted federal government borrowing to no more than projected outlays for investment purposes except under circumstances that are considered to represent "disturbances of general economic equilibrium." Similar golden rule provisions apply to the state budgets in line with their state constitutions, while the communes' borrowing is subject to state control.<sup>7</sup> Although the definition of "outlays for investment purposes" in the golden rule is considerably broader than the definition of spending on investment as defined in the national income accounts, the federal government's borrowing requirements breached ex post the golden rule requirements on ten occasions during 1970–97 (Figure I-4).<sup>8</sup> At the same time, the general government's borrowing requirement—as measured by the general government deficit—respected the limit set by the golden rule's definition of public investment outlays throughout this period, with a considerable margin to spare.

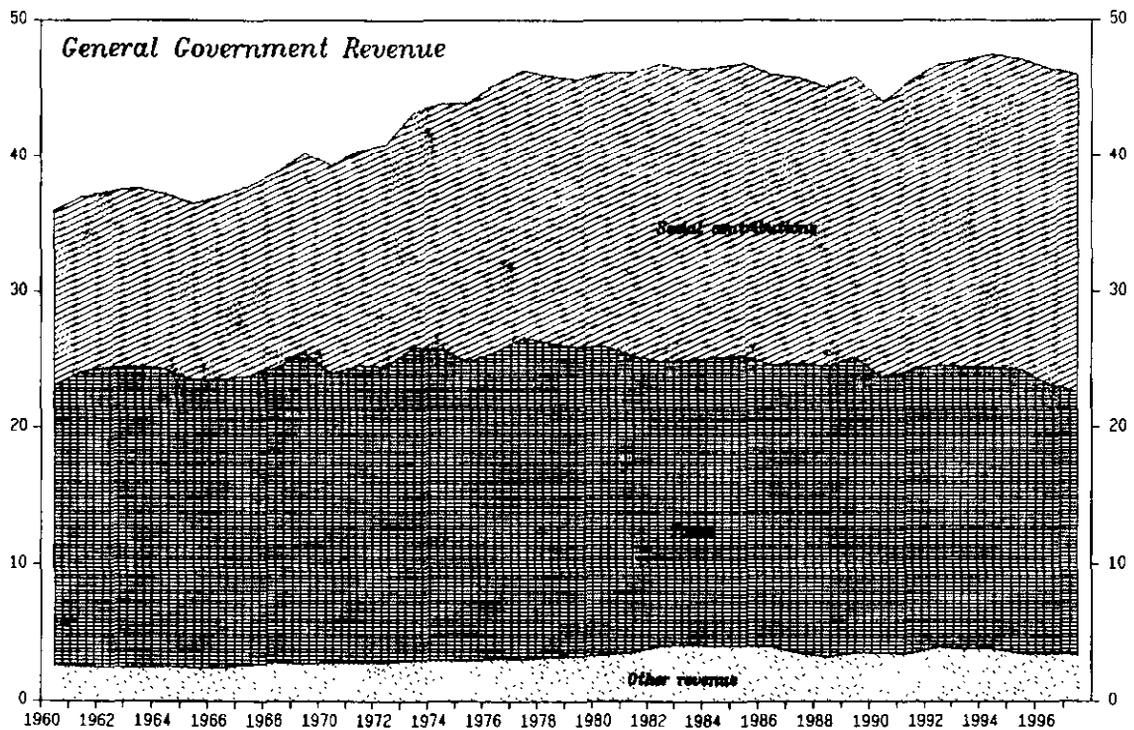
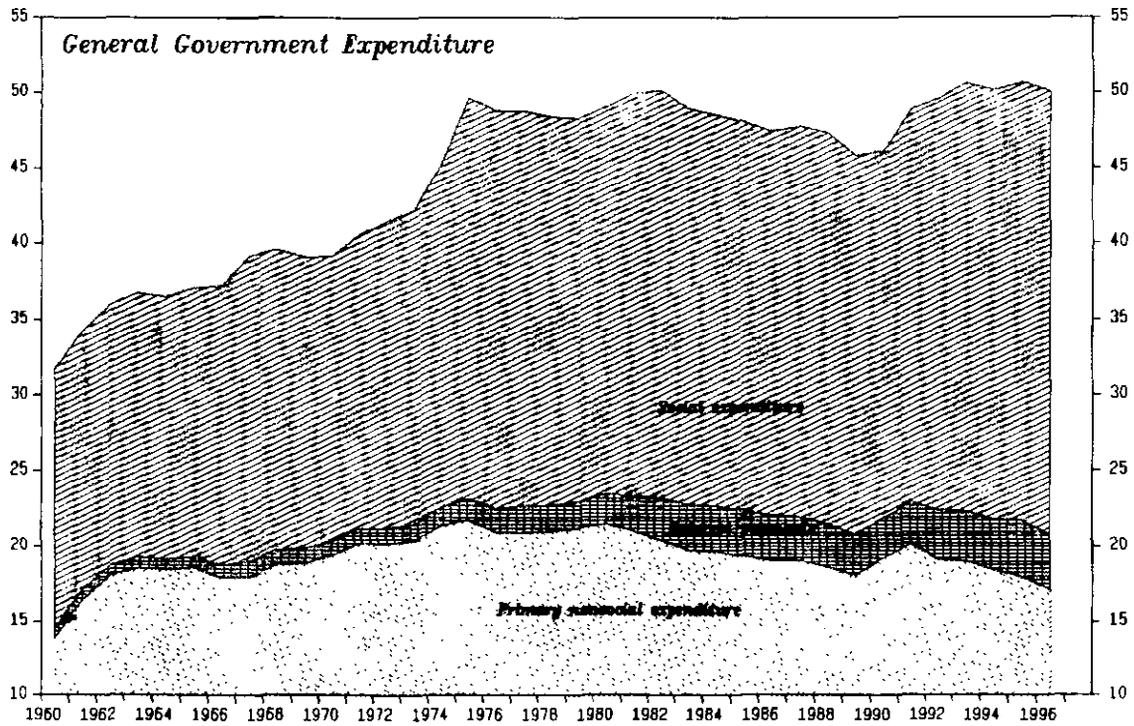
17. The conduct of fiscal stabilization policy in Germany was also importantly affected by changing perceptions regarding the effectiveness of aggregate demand management. During the 1960s, substantial efforts were devoted to designing fiscal institutions suitable for an activist approach to aggregate demand management. In particular, this period saw the enactment of the *Stability and Growth Law* (1967), which called on the federal government

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<sup>7</sup>Moreover, the Bundesbank Act constrains the composition of government borrowing by restricting central bank lending to the federal and state governments to negligible amounts of short-term loans.

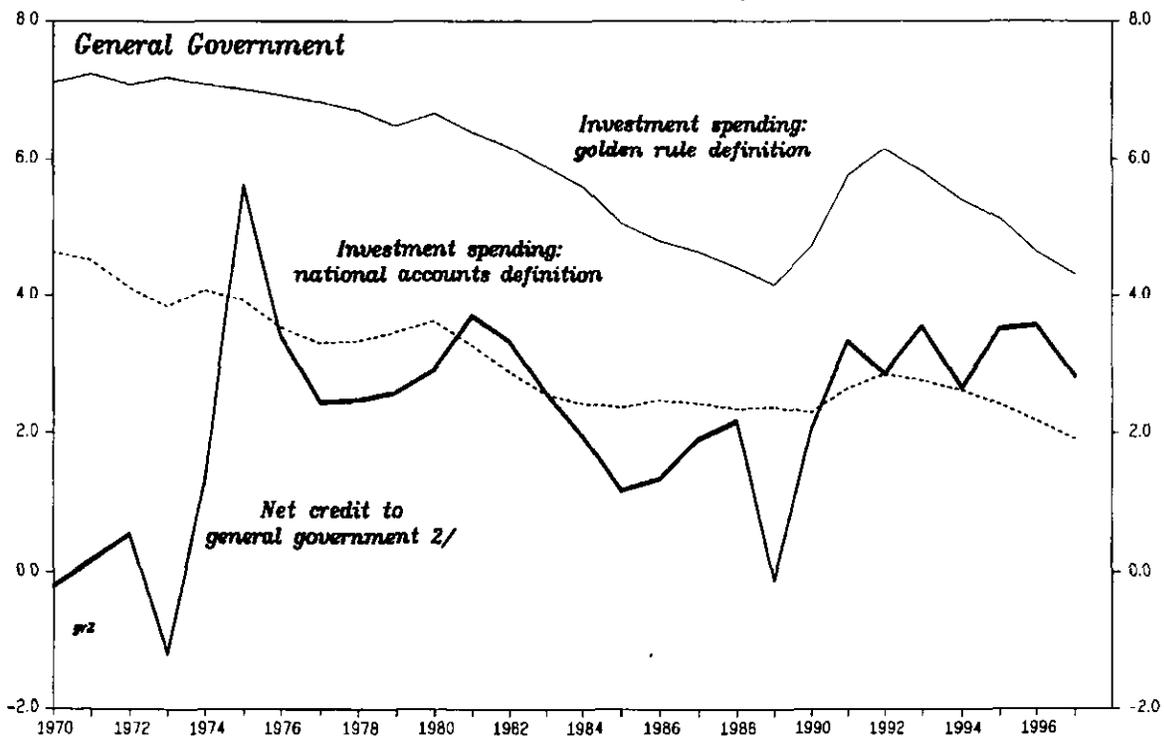
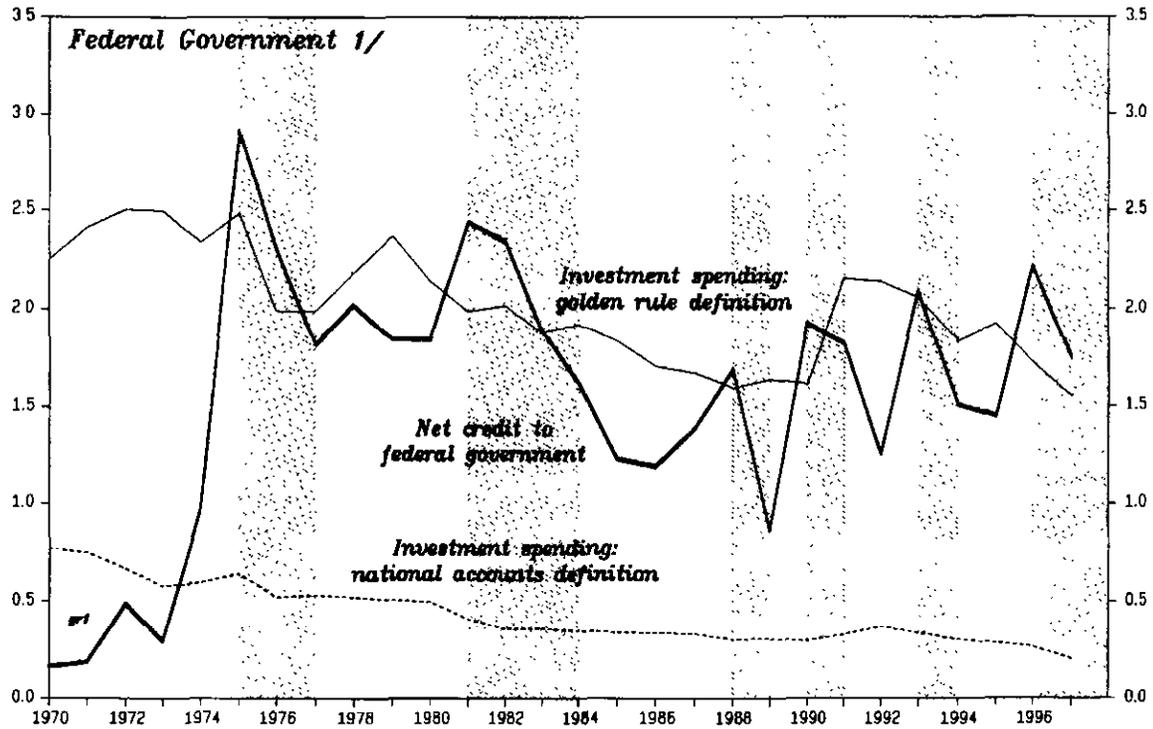
<sup>8</sup>Besides gross fixed capital formation as defined in the national accounts, investment outlays according to the golden rule include *inter alia* loans to the private sector, budget disbursements due to guarantees, and purchases of military hardware.

Figure I-3. Germany: General Government Expenditure and Revenue, 1960-97  
(In percent of GDP)



Source: IMF, World Economic Outlook database.

Figure I-4. Germany: Golden Rule Limits on Fiscal Deficit Financing, 1970-97  
(In percent of GDP)



Source: Ministry of Finance.

1/ Shaded areas denote years when golden rule limit on deficit financing was breached *ex post*.

2/ As measured by the general government deficit.

and the states to orient their short-run fiscal policies toward maintaining "macroeconomic equilibrium." To facilitate the coordination of countercyclical fiscal policies among different levels of government, two new intergovernmental bodies were created (*Business Cycle Council, Financial Planning Council*). However, following the significant deterioration in the macroeconomic environment after the first oil shock and the persistence of high fiscal deficits and rising public debt levels, disenchantment with activist aggregate demand management set in. Moreover, according to what came to be dubbed the "German view of fiscal policy," excessively high fiscal deficits and public debt were thought to have a direct adverse effect on economic activity through expectations-induced crowding out, which would overpower the direct expansionary demand effect of fiscal impulses.

### C. Tracking Fiscal Policy Behavior Over Time: An Analytical Framework

18. The conventional approach to the cyclical adjustment of budget balances decomposes the observed budget balance ( $b_t$ ) into two unobserved components: the structural balance ( $bs_t$ ) and the automatic fiscal stabilizers ( $ba_t$ ):

$$b_t = bs_t + ba_t \quad (1)$$

where the observed balance is expressed as a ratio to nominal GDP, and the structural and automatic fiscal stabilizer components are both expressed as ratios to nominal potential GDP. The automatic fiscal stabilizer component captures the built-in response of the budget to cyclical output fluctuations:

$$ba_t = \alpha \text{GAP}_t \quad \alpha > 0. \quad (2)$$

where the parameter  $\alpha$  measures the automatic response of the fiscal balance-GDP ratio to a 1 percentage point change in the cyclical output gap ( $\text{GAP}_t$ ). For expositional simplicity, the response of the automatic fiscal stabilizer component is assumed to occur without lags.

19. The structural budget balance is conventionally considered to measure the hypothetical budgetary position that would be observed if the output gap were zero. This view suggests that the structural budget balance should represent a smoothed version of the actual budget balance. Thus, the relation between the structural and the actual budget balance would be analogous to the relation between private consumption and disposable income under the permanent income hypothesis (PIH), and the structural budget balance would provide a useful measure of the "medium-term" or "underlying" fiscal position that is independent of the ups and downs of the business cycle. In this setting, the design of an EMU-consistent fiscal policy reaction function would essentially be reduced to the task of determining a "safe level" for the structural budget balance that would allow automatic fiscal stabilizers to operate fully without breaching the 3 percent deficit limit, at least under "normal circumstances."

20. This conventional interpretation of the structural budget balance notwithstanding, estimates of structural budget balances are in practice often more variable than actual budget

balances. For example, in Germany over the last 20 years, the structural balance at the general government level has been markedly more variable than the actual balance (Figure I-5). The striking variability of Germany's structural general government balance over the last 20 years contrasts with the relatively smooth path of the structural balance in the 1960s and the first half of the 1970s. More broadly, "excess variability" of structural general government balances was a characteristic of fiscal policy behavior during 1979-97 in many EU countries, and it also obtained for an aggregate of the eleven countries slated to participate in EMU (Figure I-6).

21. What could explain the widespread occurrence of highly volatile structural budget balances? At a statistical level, the variance of the actual budget balance can be written as:

$$\text{Var}(b_t) = \text{Var}(bs_t) + \alpha^2 \text{Var}(\text{GAP}_t) + 2\alpha \text{Cov}(bs_t, \text{GAP}_t), \quad (3)$$

where  $\text{Var}(\cdot)$  and  $\text{Cov}(\cdot, \cdot)$  denote unconditional variances and covariances, respectively. Equation (3) has two immediate implications. First, negative (positive) covariation between the structural balance and the output gap implies procyclical (countercyclical) movements in the structural budget balance. And second, "excess variability" of the structural budget balance, defined as  $\text{Var}(bs_t) > \text{Var}(b_t)$ , will arise if the procyclical changes in the structural balance offset at least half of the automatic cyclical response.<sup>9</sup>

22. At a more substantive level, procyclical fiscal policy behavior is likely to occur under fiscal systems that have any of the following three characteristics: (i) decentralized fiscal systems, where at least some of the units of the lower government follow balanced budget rules and therefore offset the automatic fiscal stabilizers at that level; (ii) fiscal systems with large PAYG social insurance systems, where the PAYG principle may enforce approximate budget balance in the social spending portions of the budget; and (iii) fiscal systems struggling with containing relatively high deficits and debt, where the free operation of automatic fiscal stabilizers may be considered an unaffordable "stabilization luxury."<sup>10</sup> Ascertaining the relative empirical importance of these three characteristics in explaining past procyclical fiscal stabilization policy in Germany (or in other EU countries) is, however, outside the scope of this chapter.

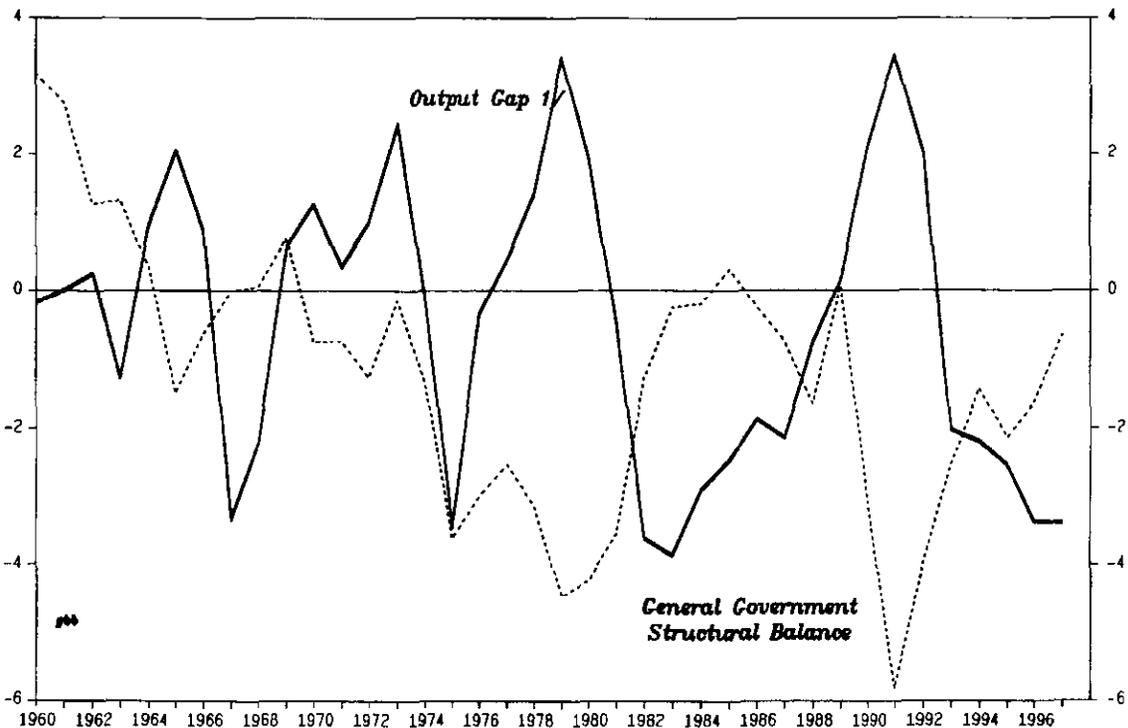
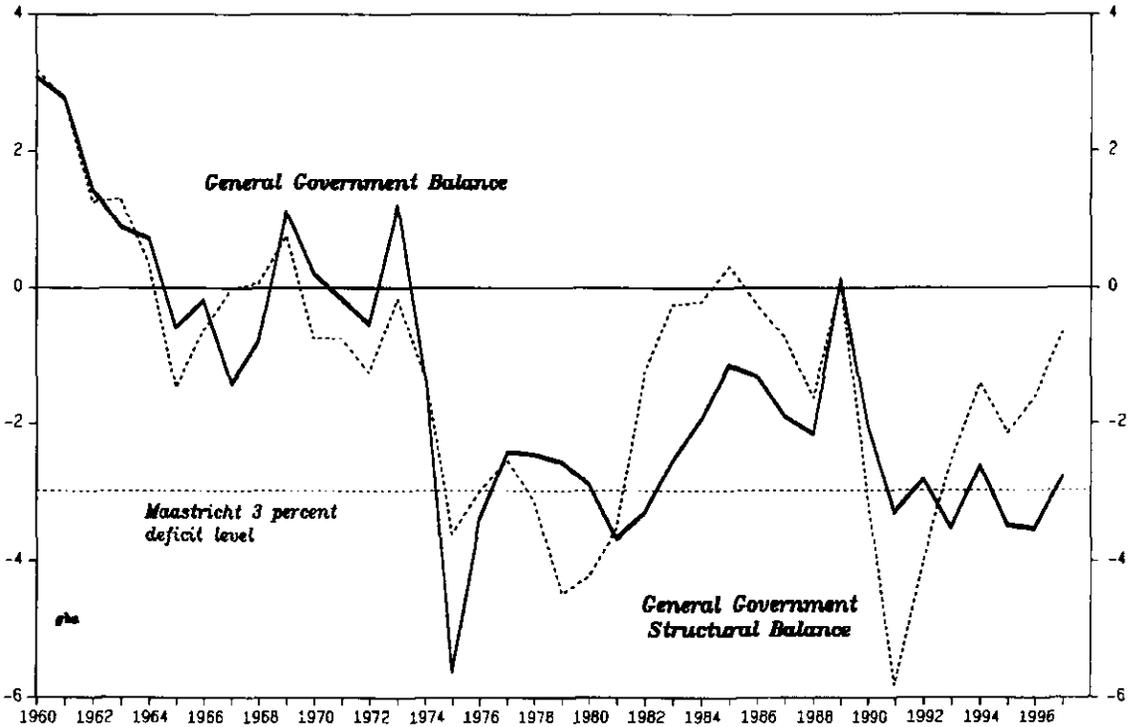
23. In view of the previous discussion, a statistical model for tracking fiscal policy behavior over time would need to decompose the movements of the structural balance into three components: (i) an underlying permanent component, termed here the core budget

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<sup>9</sup>This follows from:  $\text{Var}(bs_t) > \text{Var}(b_t)$  if and only if  $-\text{Cov}((bs_t, \text{GAP}_t)/\text{Var}(\text{GAP}_t)) > (\alpha/2)$ .

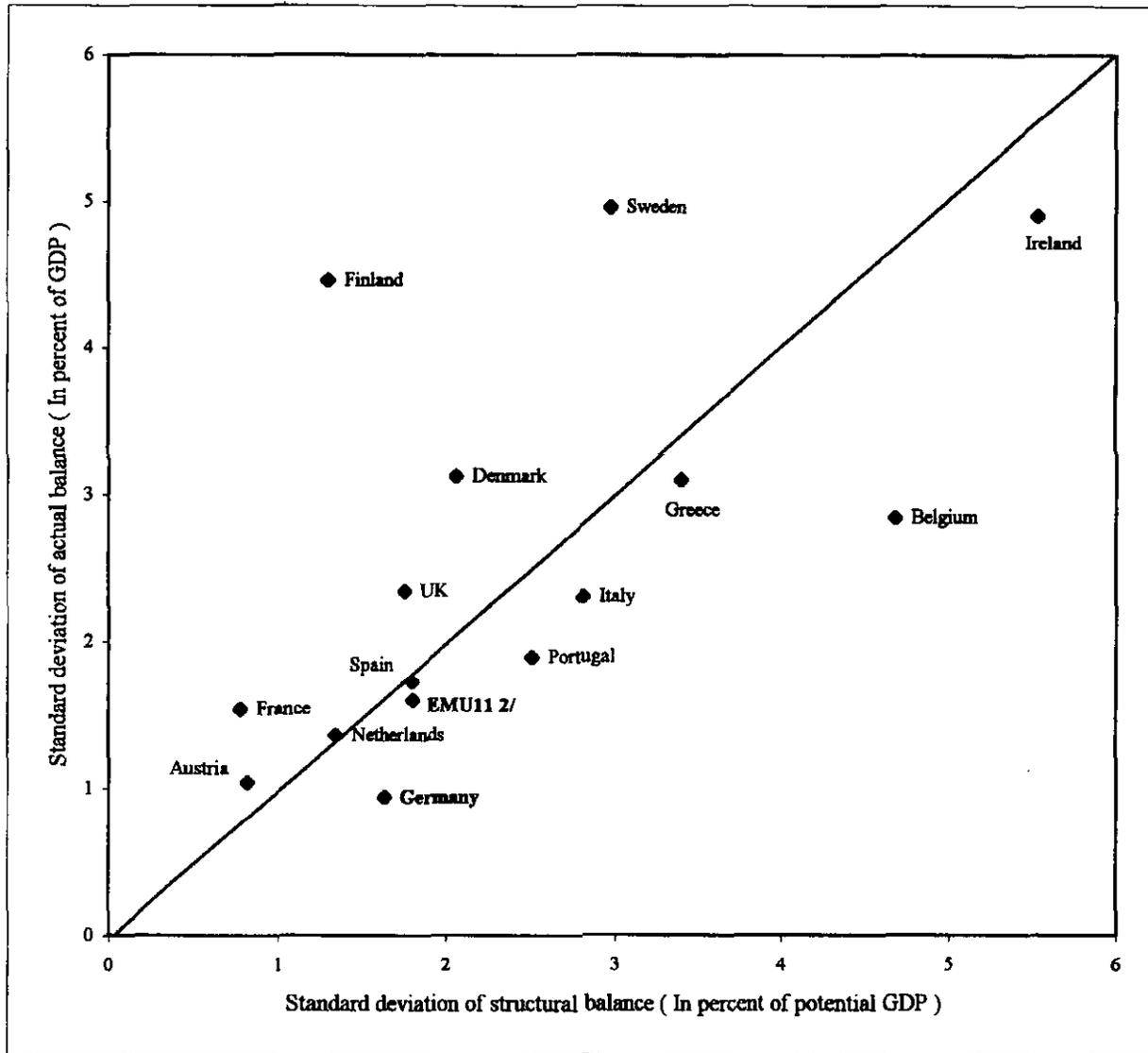
<sup>10</sup>This third characteristic is consistent with the finding of Buti, Franco, and Ongena (1997) that during 1961-96 EU member countries with relatively low fiscal deficit and debt levels were more inclined to use countercyclical fiscal policy during cyclical downturns than EU countries with high fiscal deficit and debt levels.

Figure I-5. Germany: General Government Finances and the Business Cycle, 1960-97  
(In percent of GDP)



Source: IMF, World Economic Outlook database.  
1/ In percent of potential output.

Figure I-6. Germany: Variability of Actual and Structural General Government Balances in the European Union, 1979-97 1/



Sources: IMF, World Economic Outlook database, and staff estimates.

1/ Time ranges for Greece and Finland are restricted to 1984-97 and 1981-97, respectively.

2/ Weighted average excluding Luxembourg.

balance; (ii) movements due to discretionary fiscal policy in response to business cycle fluctuations; and (iii) all other transitory changes of the structural budget balance. The following specification for the structural balance captures these various influences through three unobserved components:

$$bs_t = \mu_t + \gamma GAP_t + \epsilon_t \quad (4)$$

where the parameter  $\gamma$  measures discretionary policy responses to the business cycle, the disturbance term  $\epsilon_t$  captures transitory fiscal shocks unrelated to the cycle, and  $\mu_t$  is the core or underlying budget balance, i.e., the budget balance adjusted for all sources of transitory fluctuations whether due to output gap fluctuations or other disturbances. The sign of the parameter  $\gamma$  is undetermined a priori:  $\gamma < 0$  would indicate procyclical fiscal policy behavior that would offset the operation of automatic fiscal stabilizers;  $\gamma > 0$  would indicate countercyclical fiscal policy behavior that would reinforce the operation of the automatic fiscal stabilizers. Finally, the core budget balance is assumed to be constant except for possible level shifts:

$$\mu_t = \mu_{t-1} + \eta_t \quad (5)$$

where the disturbance term  $\eta_t$  denotes fiscal shocks that have a permanent or enduring impact on the level of the budget balance.<sup>11</sup> Inserting equations (2) and (4) in equation (1) results in the simple fiscal policy reaction function:<sup>12</sup>

$$b_t = \mu_t + (\alpha + \gamma)GAP_t + \epsilon_t \quad (6)$$

24. Equations (5) and (6) define an unobserved components (UC) model with one exogenous variable ( $GAP_t$ ). Equation (6) is the measurement equation, and equation (5) is the transition equation of the state space form of the UC model. The model's likelihood is defined over the three parameters  $(\alpha + \gamma)$ ,  $\sigma_\epsilon$ , and  $\sigma_\eta$ , and can be maximized by Kalman filter recursions.<sup>13</sup> However, given that the parameters  $\alpha$  and  $\gamma$  are not separately identified, estimation of the discretionary policy response parameter  $\gamma$  has to be based on *a priori*

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<sup>11</sup>These permanent shocks may need to be modeled as intervention variables (dummies), as, for example, in the case of the fiscal impact of German unification. Macroeconomic information may provide good proxies for at least some of the permanent shocks to the budget balance, such as permanent shifts in the NAIRU, labor force participation rates, or the inflation rate.

<sup>12</sup>As a complement to his well-known monetary policy rule, Taylor (1996) proposed a fiscal policy reaction function for the U.S. federal government that would be equivalent to imposing the restrictions  $\mu_t = 0$  and  $(\alpha + \gamma) = 0.50$  on equation (6).

<sup>13</sup>See Harvey (1989) for an in-depth discussion of estimation and testing of UC models.

information regarding the size of the automatic fiscal stabilizer response parameter  $\alpha$ . The estimation approach adopted below assumes that the parameter  $\alpha$  is known, and equation (4) is therefore used as the measurement equation in place of equation (6). This approach has also the advantage that it allows the size of the automatic response parameter to vary over the estimation period 1960–97.<sup>14</sup>

25. The general government may comprise several fiscal authorities with largely independent behavior. As a consequence, the behavior of the different fiscal authorities over the cycle could differ in important respects, and equations (5) and (6) would represent the aggregated fiscal policy behavior of the underlying fiscal authorities. Assuming there is only a central and a local government level, equation (6) can be estimated separately for the central (C) and lower (L) levels:

$$\begin{aligned} b_{t,C} &= \mu_{t,C} + (\alpha_C + \gamma_C)GAP_t + \epsilon_{t,C} \\ b_{t,L} &= \mu_{t,L} + (\alpha_L + \gamma_L)GAP_t + \epsilon_{t,L} \end{aligned} \tag{7}$$

Estimates of the disaggregated equations (7) allow to track fiscal policy behavior at the central and lower government levels separately. Equations (6) and (7) yield a three-equation system where only two equations are linearly independent, and the implied cross-equation constraints on the parameters need to be imposed in the estimation procedure.

26. Finally, the analytical framework can also be used to decompose the automatic fiscal stabilizer response coefficient ( $\alpha$ ) and the discretionary policy response coefficient ( $\gamma$ ) into the responses of the underlying revenue and expenditure components. Assuming that the overall balance is defined as the sum of  $n$  individual revenue and expenditure components ( $b_{t,i}$ ),  $n$  equations analogous to equation (6) can be estimated:

$$b_{t,i} = \mu_{t,i} + (\alpha_i + \gamma_i)GAP_t + \epsilon_{t,i} \quad i = 1, \dots, n. \tag{8}$$

The sums of the automatic fiscal stabilizer response coefficients ( $\alpha_i$ ) and of the discretionary policy response coefficients ( $\gamma_i$ ) in equations (8) add up, by construction, to the overall coefficient estimates  $\alpha$  and  $\gamma$  in equation (6).

#### D. Fiscal Policy Behavior During 1960–97

27. This analytical framework was applied to fiscal data and Fund staff estimates of the output gap for Germany covering the period 1960–97. All fiscal data including those for the lower government levels are based on the national income and product accounts (NIPA). The

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<sup>14</sup>As an alternative strategy, equations (5) and (6) could be estimated first, and the size of the discretionary policy response parameter  $\gamma$  could be inferred from available *a priori* information on the size of  $\alpha$ .

estimates of the automatic stabilizer response of the fiscal balance ( $\alpha$ ) to changes in the output gap are based on the approach described in Jaeger (1993).<sup>15</sup> In particular, the automatic response parameters used to estimate the structural budget balance allow for variation of  $\alpha$  over time, reflecting changes in the level of the overall revenue-GDP ratio, as well as changes in the composition of the four components of general government revenue (individual income tax, social security contributions, indirect taxes, and other revenue).<sup>16</sup> Moreover, the estimates of structural balances allow for a response of the general and central government balances to one-year lagged output gap movements, reflecting the lagged response of unemployment (and therefore unemployment benefit spending) to output gap changes. The automatic fiscal stabilizer response parameter of the general government balance—estimated at 0.58—represents the average value of  $\alpha$  during the period 1960–97 and includes lagged responses.<sup>17</sup> The automatic fiscal stabilizer response parameter for the aggregated lower government levels was estimated at 0.20 and was based on the automatic cyclical responsiveness of the revenue data for the states and communes (net of transfers from other levels of government). Finally, the size of the automatic response coefficient for the central government is given by the difference between the estimated responses of the general government and lower government levels.

28. The automatic fiscal response coefficient  $\alpha$  may not provide a fully informative measure of the contribution of automatic fiscal stabilizers to macroeconomic stabilization. Automatic fiscal stabilizers mainly contribute to the stabilization of aggregate demand through helping private households smooth their private consumption spending over the cycle. From this perspective, cyclical fluctuations in some budgetary aggregates are unlikely to contribute much to private consumption smoothing including, e.g., fluctuations in corporate taxes or income taxes on high-income earners that are not subject to liquidity constraints. By the same token, some fiscal reforms that reduce the size of the automatic fiscal response coefficient, e.g. reductions in corporate tax rates or cuts in high marginal income tax rates, are unlikely to impact adversely on macroeconomic stability.

29. Initial estimation results suggested two adaptations of the model's specification. First, as foreshadowed by the background discussion, the parameter capturing the discretionary fiscal policy response to the output gap,  $\gamma$ , underwent a structural break at the end of the

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<sup>15</sup>See Ziebarth (1995) for a discussion of the estimation of automatic fiscal stabilizer coefficients for Germany.

<sup>16</sup>Revenue data were taken from the OECD Revenue Statistics database.

<sup>17</sup>The current and lagged automatic fiscal responses to the output gap during 1960–97 at the general government level are estimated at 0.53 and 0.05, respectively. The total automatic response coefficient increases from 0.45 during 1960–70 to 0.63 during 1970–80 and then declines to 0.60 during 1980–97.

1970s.<sup>18</sup> Second, the impact of unification on the public finances is captured by a dummy variable (DUMUNI). This dummy variable can be interpreted as a one-time increase in the core balance. An alternative dummy variable specification that allowed for a gradual decline of the fiscal impact of unification yielded almost identical results as the one-time shift specification. To check for possible simultaneous equation bias in the parameter estimates—the output gap can be affected by movements in the structural budget balance—all equations were also estimated using an instrumental variables (IV) technique.

30. The parameter estimates for the general government's fiscal policy reaction function and the reaction functions of the central and lower government levels are reported in Table I-1. The parameter estimates confirm the visual impression of a structural break in fiscal policy behavior in the late-1970s (Figure I-5). Fiscal policy at the general government level during 1960–78, and particularly in the immediate aftermath of the first oil price shock in 1973–74, allowed the full operation of the automatic fiscal stabilizers. The discretionary fiscal policy response coefficient,  $\gamma$ , for this period is small and not statistically different from zero. However, since the end of the 1970s, procyclical fiscal policy behavior at the general government level has largely neutralized the operation of automatic fiscal stabilizers. The discretionary fiscal policy response coefficient is negative, statistically significant, and with a value of 0.52 similar in magnitude to the automatic response coefficient (0.58). As a consequence, over the last 20 years, the core general government balance was more closely aligned to movements in the actual budget balance than to the structural budget balance (Figure I-7). In particular, the estimated core deficit for the general government of about 2¾ percent of GDP in 1997 practically coincided with the actual general government deficit. By contrast, the estimated structural general government deficit—at ¾ percent of GDP—was 2 percentage points lower than the estimated core balance, reflecting the procyclical behavior of fiscal policy. Parameter estimates based on an instrumental variables approach yield broadly similar results.

31. The estimated fiscal policy reaction functions of central and lower governments highlight the usefulness of a disaggregated analysis of fiscal policy behavior under a fiscal federation. According to these estimates, the structural break in fiscal policy behavior is largely due to a behavioral change at the central government level. In particular, the central government shifted from a somewhat countercyclical stance during the 1960s and 1970s to a procyclical stance thereafter. At the same time, the lower government levels followed a procyclical pattern throughout the period 1960–97, although this pattern became more pronounced during the second subperiod 1979–97 (Figure I-8).

32. Using alternative output gap estimates for estimating the fiscal policy rule parameters affects the results only slightly. In particular, using output gap estimates produced by the OECD and the German Council of Economic Experts (“wise men”) results in broadly similar

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<sup>18</sup>Chow tests locate the structural break in 1979, and this break point was adopted in the estimation.

Table I-1. Germany: Estimated Parameters of Fiscal Policy Reaction Functions for Budget Balances at Different Levels of Government, 1960-97

Estimated equations:

$$b_t = \mu_t + (\alpha + \gamma)GAP_t + \delta DUMUNI_t + \epsilon_t$$

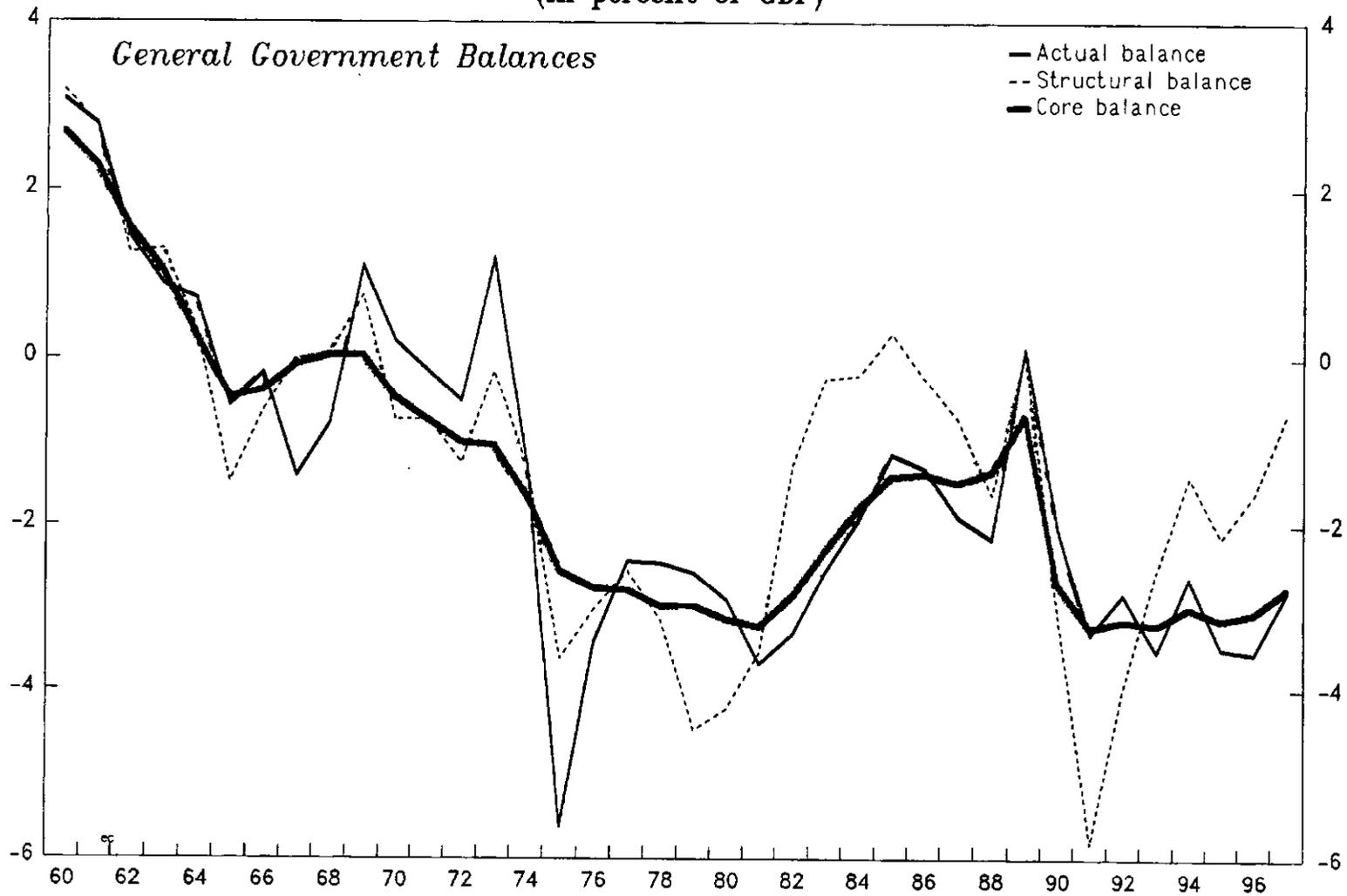
$$\mu_t = \mu_{t-1} + \eta_t$$

	Estimation method	$\alpha$	$\gamma$		$\delta$	R <sup>2</sup>	$\sigma_\epsilon$	$\sigma_\eta$
			1960-78	1979-97				
General government balance	ML	0.58	0.03 (0.12)	-0.52** (0.13)	-2.13* (1.03)	0.76	0.47	0.39
	IV	0.58	-0.04 (0.16)	-0.50** (0.15)	-3.10** (1.02)	0.65	0.65	0.70
Central government balance	ML	0.38	0.13 (0.09)	-0.37** (0.09)	-1.44* (0.72)	0.72	0.34	0.28
	IV	0.38	0.03 (0.12)	-0.34** (0.11)	-2.13** (0.74)	0.62	0.48	0.46
Lower government balance	ML	0.20	-0.10* (0.06)	-0.15** (0.07)	-0.68 (0.58)	0.50	0.28	0.23
	IV	0.20	-0.07 (0.09)	-0.16* (0.08)	-0.97 (0.53)	0.26	0.44	0.29

Source: Staff estimates.

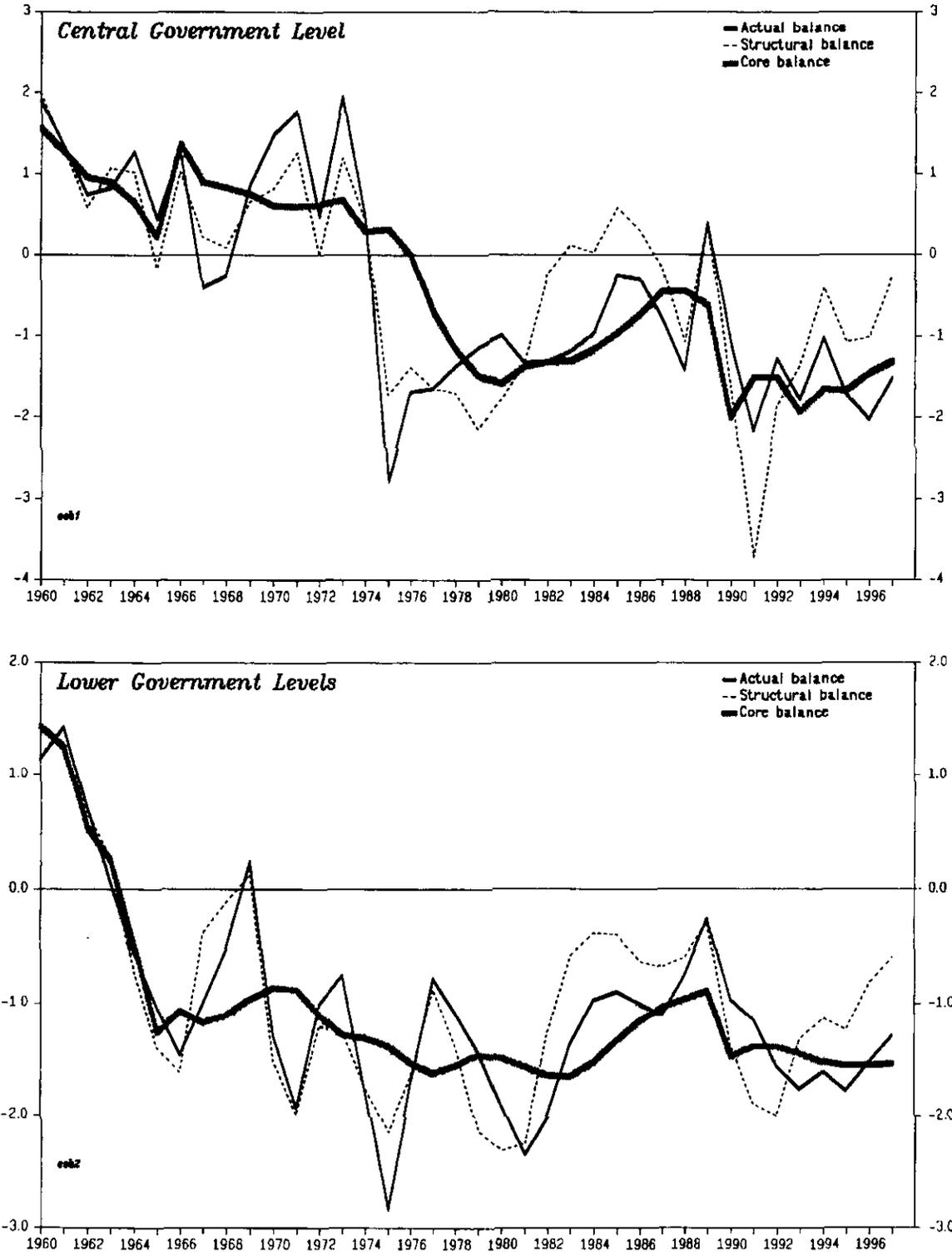
Notes: Equations were estimated by maximum likelihood (ML) using the Kalman filter and assuming that the size of the automatic fiscal response parameter  $\alpha$  is known. The size of  $\alpha$  indicates the percentage point response of the budget balance to a 1 percentage point change in the output gap (averaged during 1960-97 and cumulated current and lagged responses). Instrumental variable (IV) estimates of the equations use fitted values for the output gap based on an auxiliary regression that includes the lags one and two of the output gap and the lagged yield spread, the latter defined as the difference between long-term bond yields and the short-term interest rate. DUMUNI is a dummy variable for German unification and is equal to zero during 1960-89 and equal to one during 1990-97. One or two asterisks indicate whether the coefficient is significant at the 5 or 1 percent level, respectively. Numbers in parentheses are standard errors.

Figure I-7. Germany: Estimates of Core General Government  
Budget Balances, 1960-97  
(In percent of GDP)



Source: IMF, World Economic Outlook database; and staff estimates.

Figure I-8. Germany: Estimates of Core Budget Balances at Different Government Levels, 1960-97  
(In percent of GDP)



Source: IMF, World Economic Outlook database; and staff estimates.

estimates of the core balances, although the markedly different OECD output gap estimate toward the end of the observation period produces a somewhat lower core general government deficit than either the WEO or the wise men's output gap series (Figure I-9).

33. A similar approach to assessing fiscal policy behavior at the central and lower government levels was proposed by Bayoumi and Eichengreen (1995). In particular, these authors postulated the comparable regression equation:

$$b_t = \mu + \beta b_{t-1} + (\alpha + \gamma)\Delta\text{GAP}_t + \delta\text{TREND} + \epsilon_t, \quad (9)$$

to estimate the overall "cyclical responsiveness" ( $\alpha + \gamma$ ) of budget balances. In equation (9), the change in the output gap is used to proxy the real GDP growth rate, which was the cyclical output indicator actually used by Bayoumi and Eichengreen. In this alternative specification, the core budget balance is assumed to follow a deterministic linear trend. The automatic and discretionary responses to the business cycle are lumped together in the parameter ( $\alpha + \gamma$ ), which is estimated with respect to the change in the output gap (instead of the level of the output gap). In the case of Germany, Bayoumi and Eichengreen (1995) report regression results for the central government and an aggregate of the states and communes based on the time period 1971–89 without, however, considering the possibility of a structural break in fiscal policy behavior. For both levels of government, the coefficient estimates for ( $\alpha + \gamma$ ) are positive and significant (0.33 and 0.14, respectively). Thus, these results suggest a lower (higher) cyclical responsiveness of budget balances in the first (second) subsample compared to the results reported in Table I-1. However, once the break in fiscal policy behavior at the end of the 1970s is taken into account and the estimation periods are expanded to cover 1962–97, the approach proposed by Bayoumi and Eichengreen (1995) would, in the case of Germany, result in broadly similar results as reported in Table I-1.

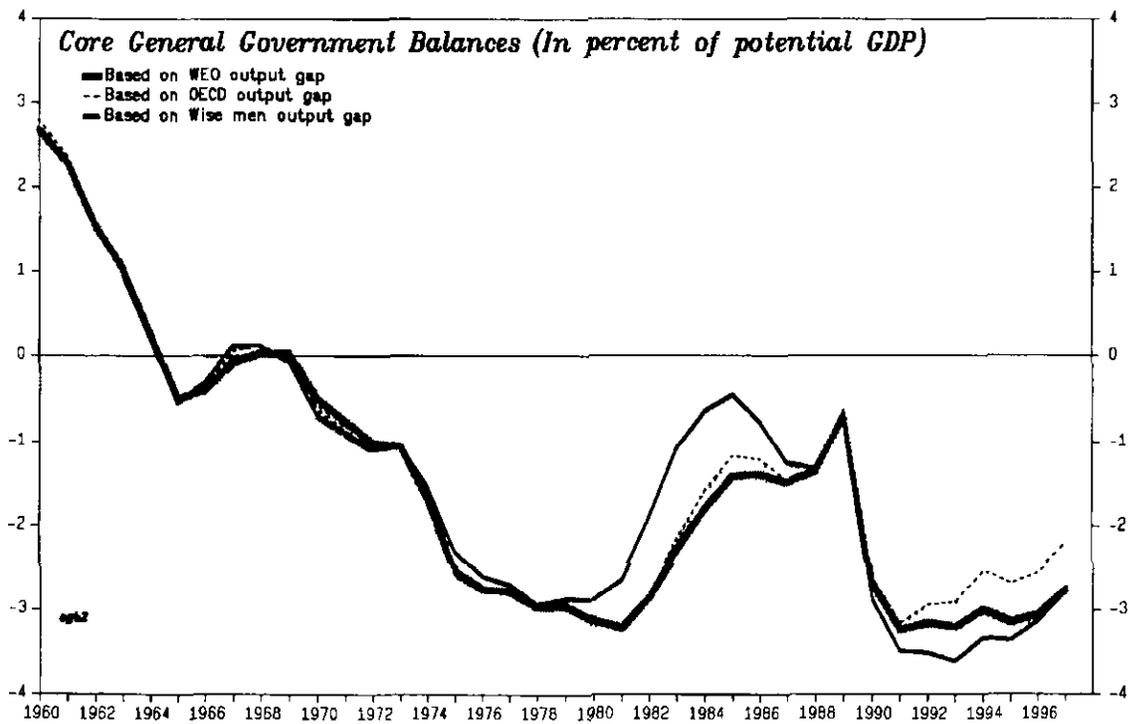
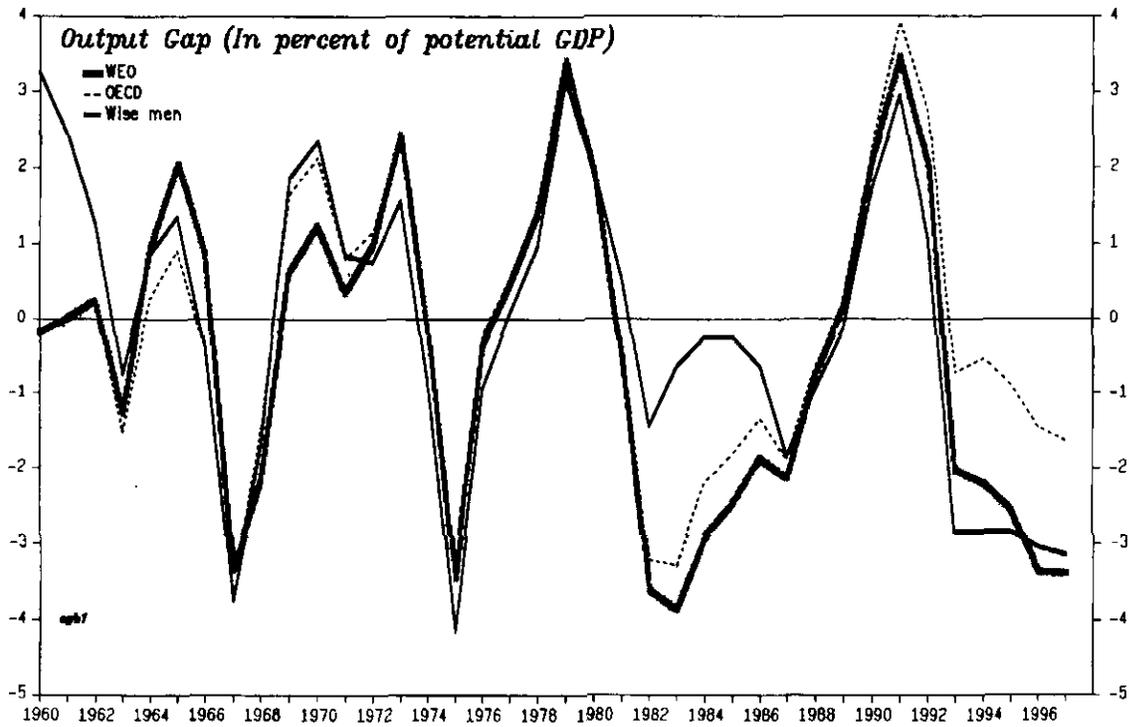
34. The interpretation of the parameter estimates in Table I-1 is subject to four caveats:

- Automatic fiscal stabilizers may remain effective, at least partly, even under a procyclical fiscal policy stance. Assume, for example, that a significant share of private consumption is determined by rule-of-thumb consumers who simply consume their current disposable income, while the remaining share of consumers follows the tenets of the permanent income hypothesis (PIH), i.e., their consumption spending does not respond to cyclical fluctuations in disposable income.<sup>19</sup> In this setting, the social insurance/protection system may transfer resources from PIH consumers to rule-of-thumb consumers during cyclical slowdowns, thus stabilizing aggregate demand, even if the PAYG financing constraint holds on a year-by-year basis. The empirical significance of this effect remains, however, unclear.

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<sup>19</sup>The latest version of MULTIMOD (MULTIMOD Mark III) assumes for Germany that 46 percent of disposable income is spent by rule-of-thumb consumers; see Laxton and others (1998, p. 47).

Figure I-9. Germany: Alternative Output Gaps and Estimates of the Core General Government Budget Balance, 1960-97



Source: IMF, World Economic Outlook database; OECD Economic Outlook database; Council of Economic Experts (wise men); and staff estimates.  
1/ Covers only western Germany from 1990 onward.

● Related to the previous point, the implications of a procyclical fiscal stance for macroeconomic stability depend on the specific budget components that offset the operation of the automatic fiscal stabilizers. To provide evidence on this issue at the general government level, the overall automatic and discretionary response parameters need to be decomposed in terms of individual budget components (Table I-2). These estimates indicate that procyclical responses are concentrated on the expenditure side and relate mainly to transfers, public consumption, and public investment. Kopits and Symansky (1998, p. 36) report simulation evidence based on an earlier version of MULTIMOD indicating that procyclical variations in transfers and/or taxes have only a minor impact on macroeconomic stability; at the same time, procyclical variations in public consumption and/or investment increased the variability of output fluctuations markedly. These simulation results may, however, need to be reviewed in light of the recent modification of MULTIMOD's specification of private consumption behavior.

Table I-2. Germany: Estimated Parameters of Fiscal Policy Reaction Functions for General Government Budget Components, 1960-97

$$\text{Estimated equations: } b_{i,t} = \mu_{i,t} + (\alpha_i + \gamma_i) \text{GAP}_t + \delta_i \text{DUMUNI}_{i,t} + \epsilon_{i,t}$$

$$\mu_{i,t} = \mu_{i,t-1} + \eta_{i,t}$$

	$\alpha_i$	$\gamma_i$	
		1960-78	1979-97
General government balance	0.58	0.03	-0.52**
Revenue	0.45	0.05	-0.08*
Taxes	0.30	0.07	0.02
Social contributions	0.11	-0.03	-0.05*
Other revenue	0.04	0.01	-0.05*
Expenditure	-0.13	0.01	0.42**
Public consumption	0.00	-0.05	0.14*
Transfers	-0.13	0.01	0.24**
Interest payments	0.00	-0.01	-0.05*
Public investment	0.00	0.06*	0.09*

Source: Staff estimates.

Notes: Equations were estimated by maximum likelihood (ML) using the Kalman filter and assuming that the size of the automatic fiscal response parameter  $\alpha_i$  for the different budget components is known. One or two asterisks indicate whether the coefficient is significant at the 5 or 1 percent level, respectively.

- Procyclical fiscal policy behavior could result as an unintentional side-effect of pursuing arguably worthwhile fiscal policy objectives. Most recent examples in the case of Germany include singular historical events, like unification and the efforts to meet the Maastricht fiscal criteria. More generally, fiscal policy reaction functions that reflect underlying fiscal objectives such as reducing the actual expenditure-GDP ratio or debt-GDP ratio independently of the cyclical state of the economy may give rise to a procyclical fiscal policy stance.
- Finally, the finding of procyclical policy responses in the regression results need not necessarily indicate that discretionary fiscal policy actions were taken. Some of the procyclical responses of the budgetary components shown in Table I-2 may be close to automatic, in particular during drawn-out periods of deficient aggregate demand (negative output gaps). During long recessionary periods, significant portions of spending—social transfers in particular—expand more slowly due to indexation arrangements. For example, public pensions are indexed to lagged net wage growth, which may slow considerably during prolonged recessions as a result of wage moderation and increases in social contribution rates required by the pension system's PAYG constraint. In fact, during the specific subperiod 1979–97, periods of deficient aggregate demand were unusually long by Germany's business cycle experience during the 1960s and 1970s (see Figure I-9), and this may have contributed to procyclical fiscal policy behavior during this time period.<sup>20</sup>

#### **E. EMU-Consistent Fiscal Policy Reaction Functions**

35. The European Council's resolution on the SGP specifies that the "medium-term budgetary position" of the general government should be "close to balance or in surplus," and it established a deficit limit of 3 percent of GDP except under "exceptional and temporary" circumstances including unusual events or a severe economic downturn (defined as an annual fall in real GDP of at least 0.75 percent and automatically so if real GDP declines by more than 2 percent). The strictures of the SGP can be interpreted as constraints on the parameters of fiscal policy reaction functions. In particular, what constant core budget balance of the general government would allow, under "normal circumstances," the deficit limit to be met for a given variance of the output gap and fixed values for the parameters  $\alpha$ ,  $\gamma$ , and  $\sigma_\epsilon$ ? To identify "normal circumstances," it is assumed that the output gap and the transitory fiscal shocks ( $\epsilon_t$ ) are jointly normally distributed.<sup>21</sup> Moreover, the "escape clauses" of the SGP are interpreted to allow for a 2.5 percent confidence interval for "excessive" deficits (i.e., deficits in excess of 3 percent of GDP should, on average, not occur more than once within a 40-year

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<sup>20</sup>The apparent asymmetry in business cycle durations since 1979 raises the possibility that fiscal policy behavior could also differ in cyclical upswings and downswings.

<sup>21</sup>Statistical tests of normality did not reject these assumptions.

span).<sup>22</sup> The constant general government core balance consistent with these restrictions is given by:

$$\mu = -3.0 + 1.96[(\alpha + \gamma)^2 \text{Var}(\text{GAP}_t) + \text{Var}(\epsilon_t)]^{1/2} \quad (10)$$

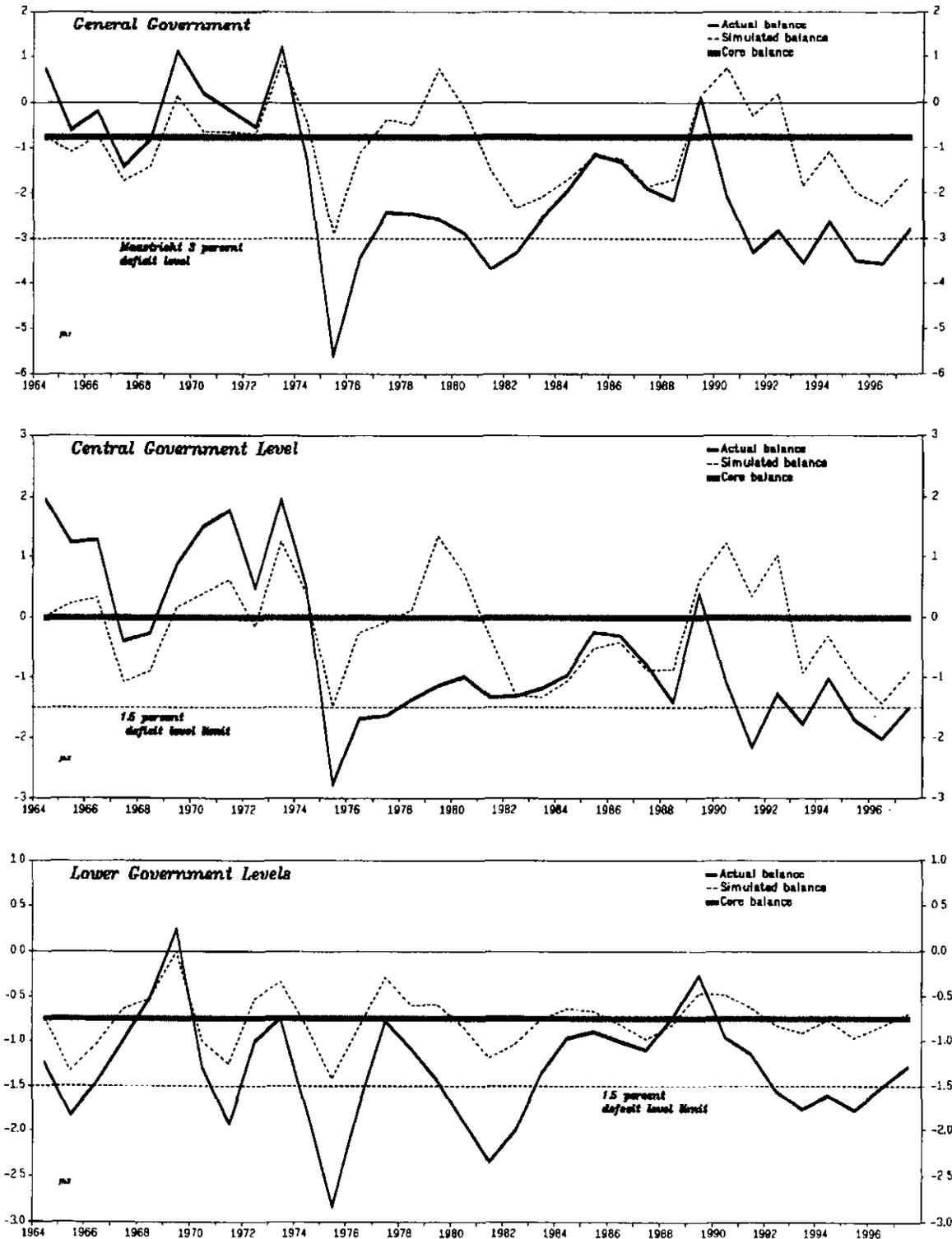
36. Estimates of the required core balance based on equation (10) are sensitive to specific assumptions about the future scope for the operation of automatic fiscal stabilizers at different levels of government (Table I-3). The estimated fiscal policy reaction function parameters for 1979–97 yield a required general government core deficit of 2 percent of GDP (case 1 in Table I-3). In this particular case, automatic fiscal stabilizers are largely offset by procyclical policy behavior and the required “safety margin” under the SGP reflects mainly deficit variations due to other fiscal shocks (the term  $\text{Var}(\epsilon_t)$ ). To permit automatic fiscal stabilizers to be fully operative at the central government level only, an additional safety margin of 1¼ percentage point of GDP would be required, bringing the level of the admissible core deficit down to ¾ percent of GDP (case 2). A counterfactual re-run of fiscal history during 1964–97 based on this specification of the fiscal policy reaction function and with the core deficit fixed at ¾ percent of GDP, together with historical realizations of the WEO output gap and estimated transitory fiscal shocks, suggests that only the 1975 recession would have implied a “close brush” with the Maastricht Treaty’s excessive deficit procedure (Figure I-10). Finally, the calculations suggest that allowing the full operation of automatic fiscal stabilizers at all government levels would require a balanced core fiscal position (case 3).

37. The calculations of the required core balance illustrate that the move to an EMU-consistent fiscal policy reaction function will need to be accompanied by at least two distinct changes in fiscal policy. First, fiscal adjustment measures will be needed to achieve the core balance that is consistent with SGP constraints. The size of the “core balance gap” that would need to be closed will depend on the adopted EMU-consistent fiscal policy behavior. For example, to allow full operation of the automatic fiscal stabilizers only at the central government level would imply a core balance gap of 2 percent of GDP in 1997. Part of this core balance gap could be closed by “locking in” the procyclical consolidation gains already achieved. This means that the usual deterioration in the structural balance that takes place during a cyclical upswing would have to be avoided. Second, revitalizing automatic fiscal stabilizers of the central government requires institutional changes in budget preparation and execution, including a more steady implementation of medium-term public spending plans. Furthermore, insulating social insurance contribution rates from the ups and downs of the

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<sup>22</sup>A confidence interval of 2.5 percent is likely to rule out all but the most severe recessions from giving rise to “exceptional circumstances.” For example, years of severe recessions—defined as years when real GDP declined by more than 0.75 percent—in EU member states during the period 1961–96 accounted for about 5 percent of all annual GDP growth observations. See Buti, Franco, and Ongena (1997, p. 6). Taking account of the slowdown in potential output growth since the mid-1970s, this estimate may, however, underestimate the probability of a severe recession in the coming decades.

Figure I-10. Germany: A Re-Run of Fiscal History Based on EMU-Consistent Fiscal Policy Rules, 1964-97 1/



Source: IMF, World Economic Outlook database; and staff estimates.

1/ The simulated fiscal balances are based on the assumption that automatic fiscal stabilizers are allowed to operate fully at the central government level (case 2 in Table I-3).

business cycle—as already envisaged to some extent in the 1999 Pension Reform Act, which will allow larger variations in the pension fund’s reserves to steady contribution rates over time—could also mitigate the procyclical impact of the PAYG social insurance system.

Table I-3. Germany: Estimates of Required General Government Core Balance Consistent with SGP Under “Normal Circumstances”

	Parameter settings				Estimate of required core balance 1/
	$\alpha$	$\gamma$	$\sigma_e$	$\sigma_{GAP}$	
Case 1: Based on estimated fiscal policy rule parameters for time period 1979–97	0.58	-0.52	0.47	2.44	-2.0
Case 2: Assuming full operation of automatic fiscal stabilizers at central government level only	0.58	-0.15	0.47	2.44	-0.7
Case 3: Assuming full operation of automatic fiscal stabilizers at all government levels	0.58	0.00	0.47	2.44	0.0

Source: Staff estimates.

1/ Estimates are based on the assumptions that output gap and transitory fiscal shocks are independent normally distributed and that a one-sided confidence interval of 2.5 percent (1.96 standard deviations) applies for adverse output gap and/or transitory fiscal shocks.

38. The scope for enhancing the operation of automatic fiscal stabilizers by lower levels of governments appears to be more limited than at the central government level. First, the stabilization of aggregate demand has long been considered a central government function. In any event, even during a period when (most) German policy makers held strong convictions about the need for coordinated fiscal stabilization, lower governments nonetheless adopted largely procyclical fiscal stances. Second, recent empirical research based on Canadian data by Bayoumi and Masson (1998) indicated that automatic fiscal stabilizers at the lower government levels are less effective in stabilizing private consumption. Bayoumi and Masson interpret this finding as indicating that the creation of a future tax liability due to automatic fiscal stabilizers at the lower government levels elicits a stronger “Ricardian response” from private households (i.e. increased private savings) than the creation of an equivalent future tax liability at the central government level.

39. The SGP would likely allow for discretionary fiscal policy actions that could push the deficit above the Maastricht deficit limit in case of large adverse shocks that cause a severe recession. In this light, the “escape clauses” of the SGP would conform well with widely held policy prescriptions regarding the relative roles of discretionary policy actions and automatic

stabilizers in macroeconomic stabilization.<sup>23</sup> In this view, automatic stabilizers are considered best suited to counteract economic shocks that are small, frequent, and difficult to identify. By contrast, discretionary policy actions are considered most effective in the case of large shocks that are tied to events whose sources can be readily identified.

40. Estimates of the core balance target at the general government level under an EMU-consistent fiscal policy rule can be compared with estimates of the core fiscal position consistent with long-run fiscal sustainability. Stabilization of Germany's long-run net debt-GDP ratio ( $d$ ) would require the core fiscal position to be set at  $-g/(1+g)d$ , where  $g$  is the rate of long-run nominal GDP growth, or equivalently, the long-run core primary fiscal position would need to be fixed at  $[(1+i)/(1+g)]d$ , where  $i$  denotes the long-run nominal rate of interest on government net debt. Assuming that the net debt-GDP ratio after the closure of the present output gap amounts to about 50 percent of GDP, plausible long-run assumptions about real GDP growth, interest rates, and inflation would suggest that an EMU-consistent fiscal policy rule would almost certainly meet fiscal sustainability requirements. For example, in the case of the adoption of a fiscal policy rule where automatic fiscal stabilizers at the central government level are allowed to operate, long-run nominal GDP growth could be as low as 2 percent and still be consistent with maintaining a constant long-run net debt-GDP ratio. These mechanical sustainability calculations notwithstanding, the difficult fiscal policy challenge will be to keep the long-run core fiscal position at the level implied by an EMU-consistent fiscal policy rule given projected pressures on primary expenditure levels, in particular in the social area (pensions, health care).<sup>24</sup>

41. In a decentralized fiscal system, the underlying core balances of the central and lower government levels will need to add up to the constraint on the core balance at the general government level:

$$\mu = \mu_C + \mu_L \quad (11)$$

42. However, and reflecting less than perfect covariation between the fiscal balances at the central and lower government levels, the two implicit Maastricht-type limits on the actual central and lower government level deficits need not necessarily add up to 3 percent of GDP. The relevant equations that determine the Maastricht-type limits for the central government ( $M_C$ ) and the lower governments ( $M_L$ ) can be written as:

$$\begin{aligned} \mu_C &= M_C + 1.96[(\alpha_C + \gamma_C)^2 \text{Var}(GAP_t) + \text{Var}(\epsilon_{t,C})]^{1/2} \\ \mu_L &= M_L + 1.96[(\alpha_L + \gamma_L)^2 \text{Var}(GAP_t) + \text{Var}(\epsilon_{t,L})]^{1/2} \end{aligned} \quad (12)$$

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<sup>23</sup>See, for example, Blanchard and Watson (1986).

<sup>24</sup>See Chapter III for a further discussion of this issue.

43. If  $M_C = M_L$ , the three equations (11) and (12) can be solved for the three unknown parameters  $\mu_C$ ,  $\mu_L$ , and  $M_C (= M_L)$ . If  $M_C \neq M_L$ , one equation (12) can be used to solve first for the required core balance at that government level and then use (11) and the other equation (12) to solve for the “Maastricht limit” of the other government level. Intuition suggests that less than perfect positive covariation between the balances at the central and lower levels would lower (loosen) the combined “Maastricht limits” for the central and lower government levels.

44. The present version of a National Stability Pact (NSP) proposed by the Ministry of Finance envisages—in the event that the Maastricht deficit limit is breached—separate ceilings of 1½ percent of GDP on the actual deficits at the central and the lower government levels, respectively. A number of difficult legal problems regarding the constitutional status of a National Stability Pact remain, however, to be resolved. A particularly difficult outstanding issue is the horizontal distribution of the overall deficit ceiling of 1½ percent of GDP among different lower governments. The Ministry of Finance proposed a horizontal split among the states that would be based on population and actual state deficits during an initial reference period of ten years. After the ten years, the horizontal split among states would solely be based on population size. As regards the distribution of SGP sanctions in case of an excessive general government deficit, the Ministry of Finance proposed that the lump-sum sanction (0.2 percent of GDP) would be shared among the central governments and the states. The variable portion of the SGP sanctions—one tenth of the excess above the Maastricht limit of 3 percent of GDP—would be shared among the central government and the individual states based on the horizontal distribution of excess deficits.

45. Calculations based on equations (11) and (12) suggest that most of the fiscal adjustment needed to reach a target core balance consistent with an EMU-consistent fiscal rule at the general government level and the proposed “Maastricht-type deficit limits” of the National Stability Pact would fall on the central government (Table I-4). With estimates of core deficits in 1997 at the central and lower levels amounting to 1½ percent and 1¼ percent of GDP, respectively, the fiscal adjustment requirement at the central government level that would allow for the full operation of automatic fiscal stabilizers at that level would amount to 1½ percent of GDP, while the adjustment need at the level of the states and communes would amount to only ½ percent of GDP.

Table I-4. Germany: Estimates of Required Core Budget Balances at Central and Lower Government Levels Consistent with SGP Under "Normal Circumstances"

	Parameter settings							Estimates of required core balances		Implied Maastricht deficit limits 2/	
	$\alpha_C$	$\alpha_L$	$\gamma_C$	$\gamma_L$	$\sigma_{\epsilon,C}$	$\sigma_{\epsilon,L}$	$\sigma_{GAP}$	Central government	States and communes	Central government	States and communes
<b>Case 1:</b> Based on estimated fiscal policy rule parameters for time period 1979-97	0.38	0.20	-0.37	-0.15	0.34	0.28	2.44	-1.0	-1.0	-1.6	-1.6
<b>Case 2:</b> Assuming full operation of automatic fiscal stabilizers at central government level only	0.38	0.20	0.00	-0.15	0.34	0.28	2.44	0.0	-0.7	-1.7	-1.7
<b>Case 3:</b> Assuming full operation of automatic fiscal stabilizers at all government levels	0.38	0.20	0.00	0.00	0.34	0.28	2.44	0.0	0.0	-1.6	-1.6

Source: Staff estimates.

1/ Estimates are based on the assumptions that output gap and transitory fiscal shocks are independently normally distributed and that a one-sided confidence interval of 2.5 percent (1.96 standard deviations) applies for adverse output gap and transitory fiscal shocks.

2/ Actual deficit limits for central and lower government levels, respectively, implied by core budget balance estimates. As explained in the section E, these limits need not add up to the overall Maastricht deficit limit of 3 percent of GDP for the general government.

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## II. LABOR MARKET TRENDS SINCE UNIFICATION: A VICIOUS CIRCLE PERSPECTIVE<sup>25</sup>

### A. Introduction and Summary

46. The seemingly inexorable upward trend in unemployment since the early 1970s is arguably the most pressing economic problem in Germany. Since unification in 1990, labor market trends have weakened further, even abstracting from the unification-induced employment collapse in eastern Germany. Employment contracted by a cumulative 7 percent during 1991–97, and the unemployment rate rose to a postwar record of close to 12 percent at end-1997. Moreover, the recovery that began in 1993 has been unusual in that aggregate employment has contracted rather than increased after a lag.

47. This chapter has two main themes: First, Germany's **aggregate** labor market trends mask a marked disparity in **disaggregated** employment and unemployment developments. In particular, employment flows disaggregated by **earnings and skill** characteristics show that job losses in the lower half of the earnings/skill distribution more than accounted for the contraction in aggregate employment. Most of the employment losses in the lower half of the earnings/skill distribution were offset by large-scale job creation in the upper half. These disparate employment trends, which antedate unification, highlight the need to look beyond highly aggregated models of labor market behavior and the policy prescriptions based on these models.<sup>26</sup>

48. The chapter's second theme is the interaction between adverse labor market trends at the lower end of the earnings/skill distribution and the spending and financing side of Germany's comprehensive social insurance/protection system. The chapter develops a stylized labor market model illustrating how labor shedding at the lower end of the earnings/skill distribution due to a mismatch of labor productivity and labor cost can trigger a **vicious circle** of higher social spending, increases in social contribution rates, additional employment shedding at the lower end, and further increases in social spending. Moreover, in this model, an adverse exogenous shock to the finances of the social insurance/protection system that causes substantial increases in social contribution rates—as exemplified by the impact of

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<sup>25</sup>Prepared by Albert Jaeger, Kornélia Krajnyák, and Catriona Purfield.

<sup>26</sup>In an earlier staff analysis, van der Willigen (1995) noted that Germany's unemployment problem was overwhelmingly concentrated among the lower-skilled. A number of other authors have recently stressed the need for a disaggregated analysis of labor market trends; see, for example, Saint Paul (1996). Stoker (1993) provides a survey of issues that can arise in highly aggregated macroeconomic models that disregard heterogeneity.

German unification on social insurance finances or population aging—can also trigger a circular chain of declining employment and rising social spending.<sup>27</sup>

49. To put Germany's labor market trends since unification into perspective, Section B lays out some stylized facts. The trends in aggregate output, employment, unemployment, and real wages suggest that labor market trends in western Germany have since 1991 shared many of the broad features of trends observed before unification, including: weak employment growth; a sharp increase in the level of the unemployment rate; rapidly rising labor productivity; and real wage growth that lags behind labor productivity growth. At the same time, the deterioration of labor market conditions has been heavily concentrated in the lower half of the earnings/skill distribution. The underlying labor market developments have been qualitatively similar in western and eastern Germany, although the employment contraction and the rise in unemployment have been much more pronounced in eastern Germany. Finally, while aggregate output growth since unification has been broadly similar in Germany and its EMU partners, employment has slackened markedly more in Germany, suggesting that slow aggregate demand growth cannot explain Germany's adverse labor market trends.

50. Section C develops a simple analytical model to shed light on these stylized facts. The model suggests that labor market trends in Germany are partly explained by the interplay of four key factors: (i) labor productivity of lower-skilled workers lags productivity increases of the better-educated portion of the work force; (ii) wage bargaining leads to real wage increases that are similar across different segments of the skill distribution; (iii) social benefits of effectively unlimited duration provide a fallback position for workers priced out of the market; and (iv) the financing of social benefits requires the levying of social insurance contributions that fall proportionately on all workers across the different segments of the skill distribution.

51. In this stylized model setting, the employment opportunities of lower-skilled workers deteriorate over time because of the mismatch between productivity and labor cost at the lower end of the earnings/skill distribution, and the unemployment rate of these workers trends upward. These implications of the model are consistent with historical developments. Moreover, if perturbed by a shock that increases social contributions, the model would predict a circular chain of falling employment at the lower end of the skill distribution and further increases in social spending and contribution rates, which is consistent with the post-unification experience in Germany.

52. Section D draws attention to two additional dimensions of Germany's labor market trends that are not captured by the stylized model—sectoral reallocation of labor and the duration of business cycle recessions. Sectoral data on employment losses/creation indicate that the shedding of lower-skilled workers took place in the manufacturing sector, mainly

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<sup>27</sup>Some simulation evidence on this second type of vicious circle dynamics in the context of an aggregate model of the labor market is provided in Chapter III.

during the cyclical downturn, while employment creation almost exclusively occurred in the service sector. Moreover, job creation in the service sector in Germany appears to have been concentrated in the upper segment of the skills distribution. In view of the longer-term trend of a declining work force in the manufacturing sector, labor needs to be reallocated to the service sector. However, the pace of the sectoral reallocation of labor appears to have been insufficient—contributing to the observed upward ratcheting of the unemployment rate over business cycles (asymmetric hysteresis). Moreover, the duration of periods of deficient aggregate demand—defined as the number of years where the output gap is negative—increased substantially in Germany in the 1980s and 1990s, compared with the 1960s and 1970s, and may have constituted an additional factor accounting for asymmetric hysteresis in aggregate unemployment.

53. The four key elements of the model provide the background for a brief discussion in Section E of the scope and limits of widely discussed policy options for addressing Germany's labor market problems:

- First, policies can try to tackle the root of the disparate labor market developments—lagging labor productivity growth at the lower end of the skill distribution by increased training and education to lift labor productivity at the low end of the earnings/skill distribution.
- Second, the mismatch between labor productivity and labor cost at the lower end can be ameliorated by more wage differentiation.
- Third, the incidence of nonwage labor cost at the lower end of the skill/earnings distribution can be lowered through targeted public intervention that subsidizes labor cost at the lower end, including the tapering of social contribution rates or explicit wage subsidies.
- Fourth, incentives to seek work can be strengthened by limiting the duration of nonwork benefits and/or smoothing poverty traps.

54. The sectoral and business cycle dimensions of Germany's labor market trends brings out two additional policy levers to address Germany's labor market problem: (i) the fostering of a regulatory environment that promotes faster growth of service sector employment to speed up the absorption of workers laid off in the manufacturing sector; and (ii), given the greater difficulty of reallocating labor during a prolonged cyclical downturn, macroeconomic stabilization policies that keep periods of deficient aggregate demand (or negative output gaps) reasonably short would help mitigate hysteresis effects in unemployment.

55. This chapter's main finding that Germany's adverse labor market trends are largely concentrated at the lower end of the earnings/skill distribution underscores the potential benefits of a targeted approach to labor market reforms. Moreover, as pointed out by Coe and Snower (1997), policy measures in one area can have "complementary effects," suggesting that successful labor market reforms should be combined in a comprehensive package. Finally,

the stylized model developed in this chapter highlights an opportunity for labor market reforms to set in motion a virtuous circle between lower unemployment, improved financial position of the social insurance/protection system, lower social contribution rates, and still lower unemployment.

### **B. Labor Market Trends: Some Stylized Facts**

56. Aggregate trends in the labor market of Germany and other industrial countries have been at the focus of an extensive literature and are therefore only briefly summarized here.<sup>28</sup> During 1970–97, the level of employment in western Germany remained almost flat, while real GDP, and hence labor productivity, rose by some 80 percent (Figure II-1).<sup>29</sup> The unemployment rate ratcheted upward from the early 1970s, while the employment rate (defined as the share of working age population aged 15–64 that is employed) remained broadly stable at around 68 percent. Aggregate real wages in western Germany also increased sharply, keeping pace with productivity gains until the mid-1980s. However, during 1986–97 average real wages lagged productivity gains cumulatively by 11 percentage points. Thus, with stable employment and lagging real wage growth, the labor share in national income has been declining since the 1980s.<sup>30</sup>

57. Employment and unemployment developments in eastern Germany since unification were qualitatively similar to those in western Germany, although there were marked differences in the magnitude of the decline of employment and the level of the aggregate unemployment rate (Figure II-2).<sup>31</sup> Unemployment in eastern Germany rose sharply after unification, and it has become entrenched at a high level as the convergence process in the new Länder has been much slower than anticipated following excessively rapid wage

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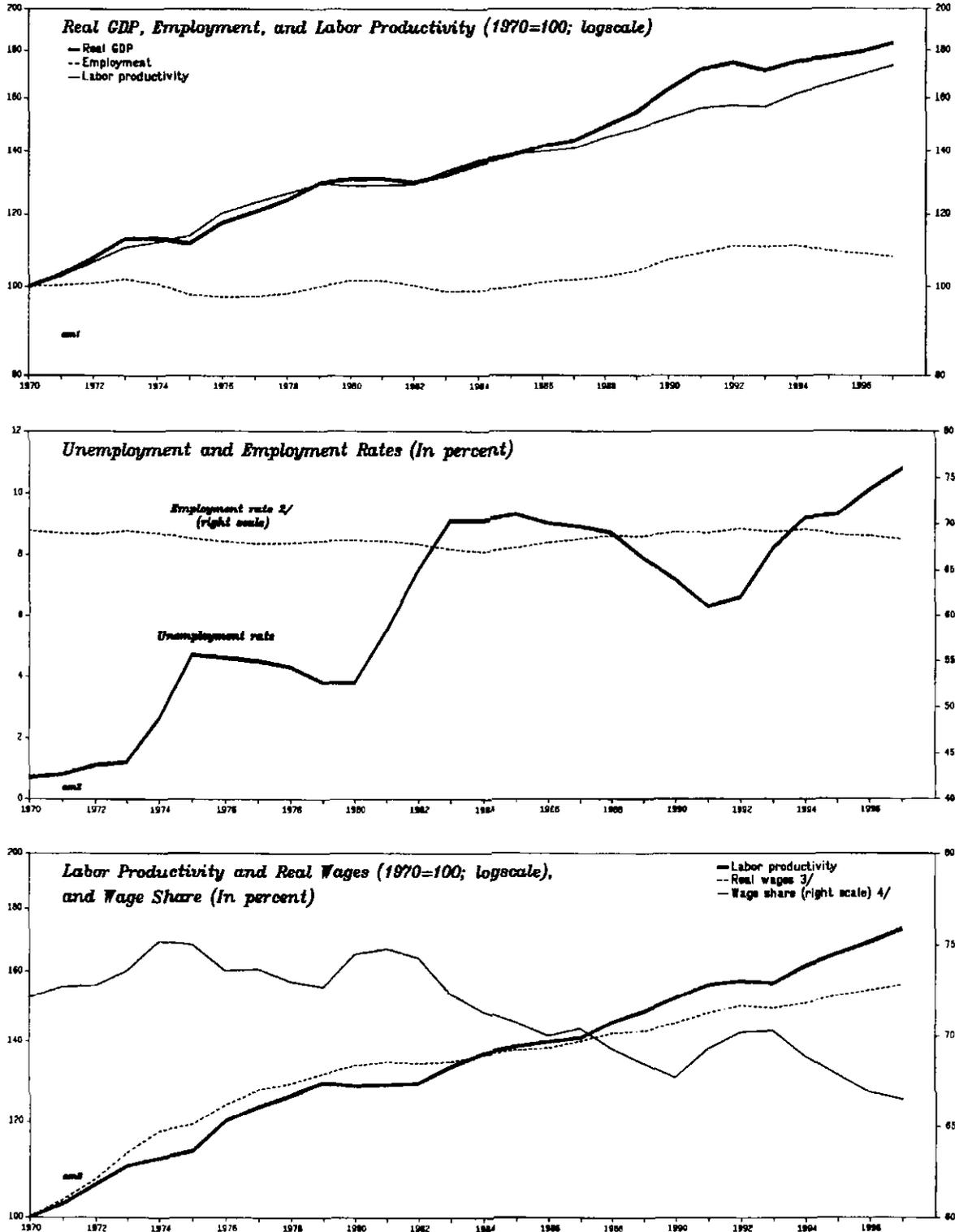
<sup>28</sup>See, for example, Layard, Nickell, and Jackman (1991) and OECD (1994).

<sup>29</sup>These aggregate trends in output and employment are often contrasted with those in the United States, where real GDP during 1970–97 expanded by a similar cumulative amount as in Germany. However U.S. employment rose by some 50 percent and, conversely, labor productivity cumulatively grew by 25 percent. The sharp contrasts between employment and labor productivity performance in Germany and the United States would be even starker if employment were measured in hours worked instead of persons; see, e.g., Gordon (1997).

<sup>30</sup>The lagging of aggregate real wage growth behind labor productivity growth since the mid-1980s has often been interpreted as ruling out an aggregate “wage gap” diagnosis for Germany’s adverse labor market trends; see, for example, van der Willigen (1995). SM/97/206, Chapter II, reports some evidence for a persistent aggregate “wage gap” during the 1990s.

<sup>31</sup>Labor market developments in eastern Germany and the convergence process were reviewed in SM/97/206, Chapter III.

Figure II-1. Germany: Aggregate Labor Market Trends, 1970-97 1/



Source: IMF, World Economic Outlook.

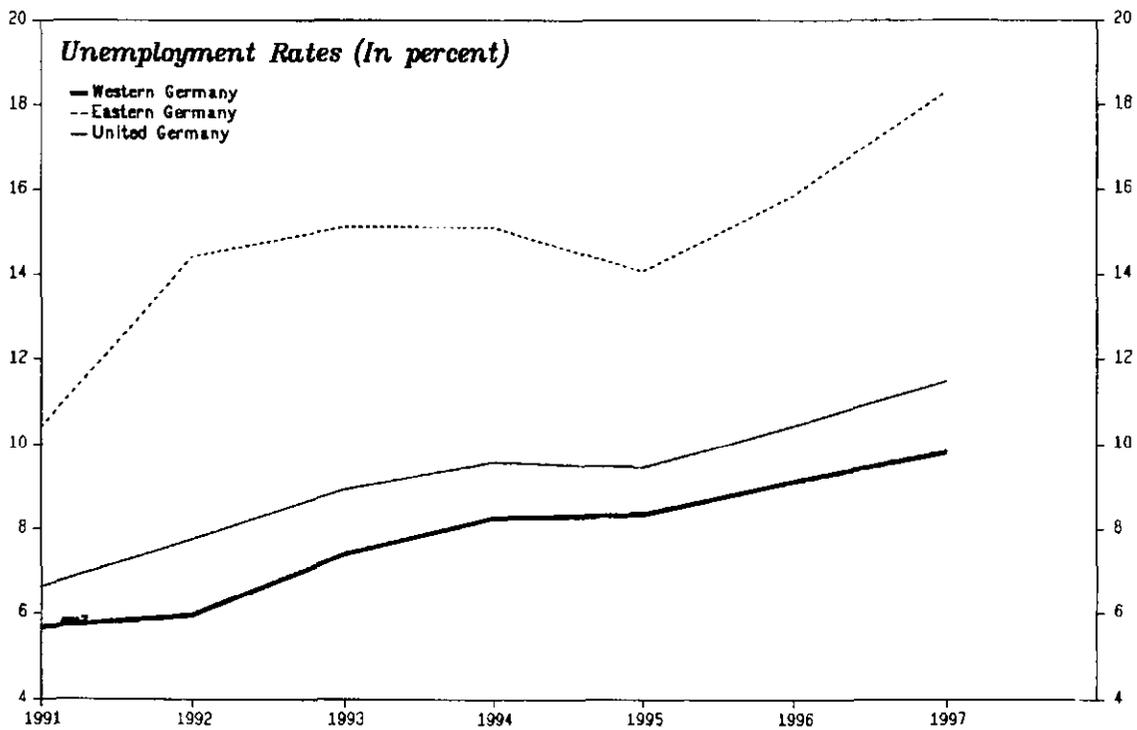
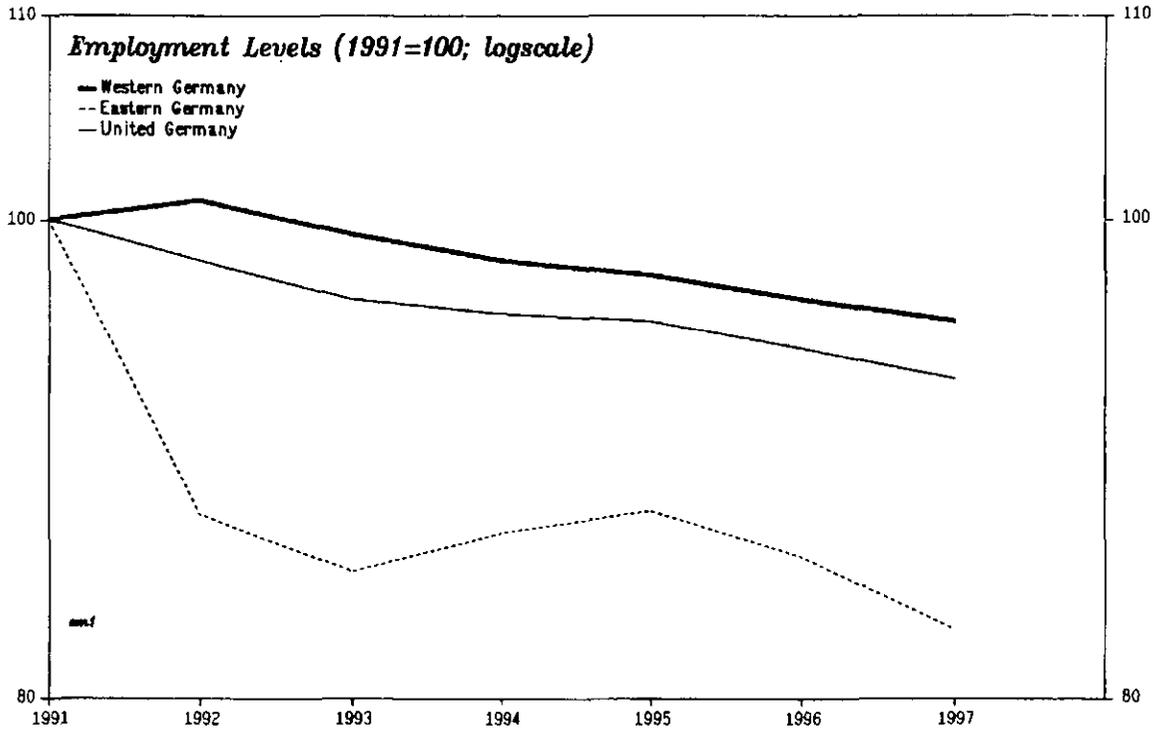
1/ For 1991-97, data refer to western Germany.

2/ Defined as employed population aged 15-64 years old as a percent of the population of working age.

3/ Average gross wages per employee deflated by GDP.

4/ Wage share adjusted for relative shifts in dependent and self-employed work force.

Figure II-2. Germany: Aggregate Labor Market Trends in Western and Eastern Germany, 1991-97



Source: IMF, World Economic Outlook.

convergence in the early 1990s. The initial fall in employment in eastern Germany also reflected a sharp decline in labor force participation rates, owing partly to a normalization of the exceptionally high participation rates in the former German Democratic Republic and to higher hidden unemployment.

58. Germany's aggregate employment contraction since unification has been, however, overstated because the official employment statistics do not include the sharp increase in the number of "small-time jobs." Small-time jobs are fully exempt from paying social insurance contributions if the work time is less than 15 hours per week and monthly pay does not exceed DM 620 (DM 520 in the new Länder) per month. According to estimates based on the employment survey data of the socio-economic panel, the number of small-time jobs amounted to 6.7 million in 1996, an increase of 37 percent from their estimated level in 1991.<sup>32</sup> Simply adding the estimated number of small-time jobs—which is subject to a considerable margin of statistical uncertainty—to official employment numbers would imply a smaller employment contraction—for example, the cumulative decline in employment during 1991–96 of 5½ percent for western and eastern Germany would be reduced to 3 percent.

59. Since unification, Germany's aggregate labor market trends have also been relatively weak compared to developments in most of its EMU partners (Table II-1). Cumulative employment losses in Germany during 1991–97 were significantly higher than in most other EMU partner countries except Italy and Portugal. The contrast in labor market developments between Germany and Austria is particularly noteworthy. Despite similar institutional arrangements in their respective labor markets and similar real output growth trajectories, aggregate employment in western Germany contracted much more sharply than in Austria. The job losses in Germany also contrast with developments in countries with more flexible labor markets, such as Ireland and the Netherlands.

60. Disaggregating labor market trends by skills indicates that labor shedding and rising unemployment in western Germany was heavily concentrated in the lower portion of the skill distribution. In particular, workers with low skills have borne the brunt of the employment contraction, even though they represent a declining proportion of the labor force (Figure II-3). During 1976–95, employment of lower-skilled workers in western Germany fell by about 45 percent, while employment of higher-skilled employees increased by about 120 percent. Over the same period, the unemployment rate of workers with lower skills increased from 6 percent in 1975 to 20 percent 1995, while the unemployment rate for workers with higher skills rose from 2 percent to about 4 percent although their share in the labor force had increased markedly. The position of less skilled workers deteriorated particularly sharply since unification. During 1991–1995 employment of workers with lower skills fell by a cumulative 10 percent compared with a cumulative decline in aggregate employment of only 2.5 percent. In eastern Germany, the adverse labor market trends for less skilled labor were even more

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<sup>32</sup>See Deutsches Institut für Wirtschaftsforschung (DIW) (1997).

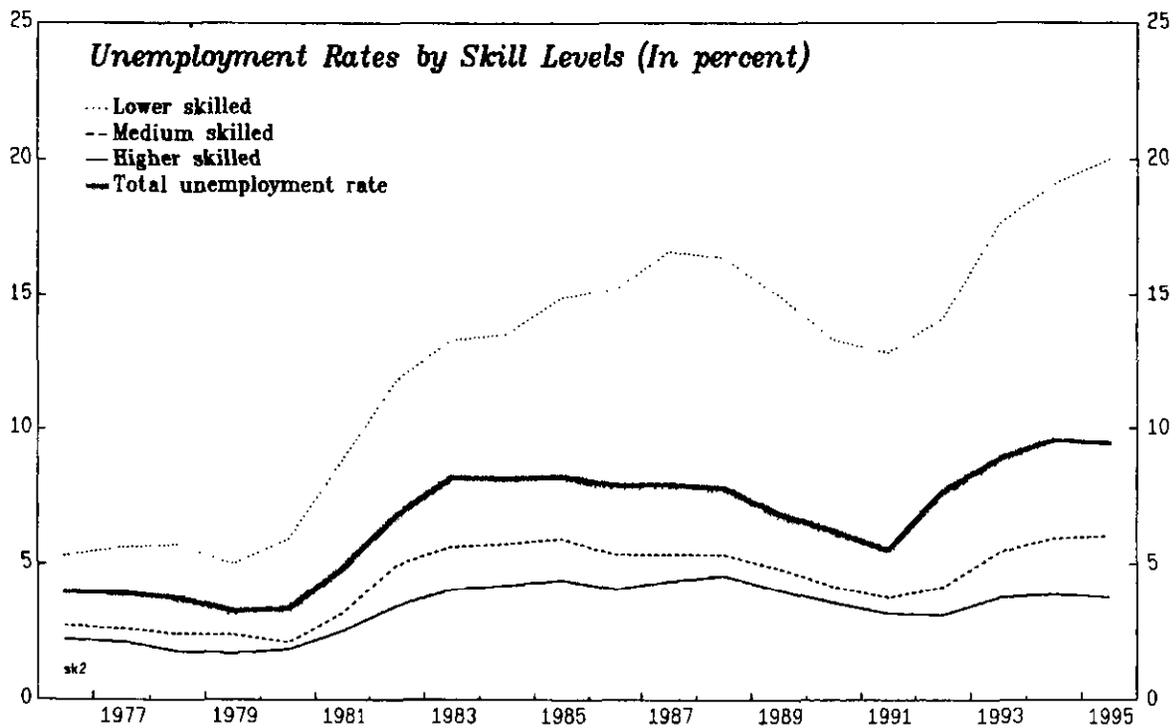
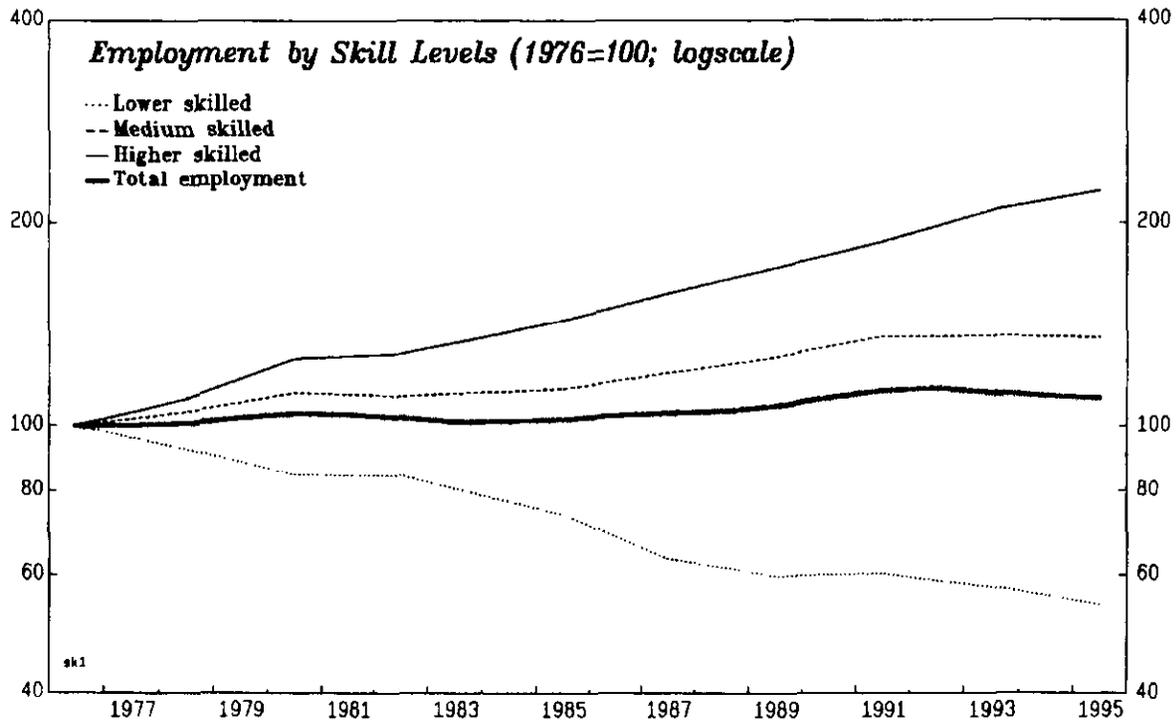
Table II-1. Germany: Cumulative Growth Rates of GDP, Employment, and Labor Productivity, 1991-97

	Real GDP	Employment	Labor productivity
	(In percent)		
Germany	9.4	-6.9	17.5
Western Germany	6.9	-4.5	12.0
Eastern Germany	40.9	-16.5	68.7
France	9.0	-0.4	9.4
Italy	6.8	-7.0	14.8
Spain	10.5	1.2	9.2
Netherlands	15.8	8.4	6.9
Belgium	8.9	-1.2	10.2
Austria	11.0	2.1	8.8
Finland	14.8	-8.1	25.0
Portugal	10.6	-7.2	19.2
Ireland	47.6	21.7	21.3
Luxembourg	34.1	16.0	19.2
EMU 10 1/	10.1	-1.6	8.7
Memoranda items:			
United Kingdom	14.8	1.3	13.4
United States	18.3	10.1	7.5

Source: IMF, *World Economic Outlook*, EU, *European Economy*, 1997; and staff calculations.

1/ All EMU countries excluding Germany.

Figure II-3. Germany: Unemployment Rates and Employment by Skill Level, 1976-95 1/



Sources: Reinberg (1997); and staff estimates.  
1/ Data refer to western Germany.

pronounced, with the unemployment rate of workers with lower skills rising to 45 percent in 1995 relative to an aggregate unemployment rate of 14 percent in the same year.

61. Measures of skills based on schooling characteristics provide, however, only broad indicators of the actual skill distribution. For example, the characteristic “medium skills” covers persons with an apprenticeship education, a group that accounts for some 70 percent of the employed. However, apprenticeship programs can range from very advanced to elementary.<sup>33</sup> Additional evidence on the incidence of employment losses across the skill distribution can be won by considering employment changes in different earnings brackets during 1991–95 (Figure II-4). Most strikingly, in western Germany, employment for those in the lower half of the earnings distribution declined by 2.9 million during 1991–95, while employment in the upper half of the earnings distribution increased by 2.7 million.<sup>34</sup> In eastern Germany, employment losses were even more concentrated in the lower earnings brackets, although this partly reflects the lower wages paid in eastern Germany.

### C. A Stylized Model of the Labor Market

62. This section develops a stylized model to interpret the concentration of adverse employment trends in the lower part of the earnings/skill distribution. An intuitive discussion of the model is provided in this section, while the formal model is presented in the appendix. The model tries to bring out the interplay of four key factors: (i) labor productivity of lower-skilled workers lags productivity increases in the upper part of the skill distribution; (ii) wage bargaining equalizes real wage increases across the skill distribution and introduces a wage floor; (iii) social benefits of unlimited duration provide a fallback position for unemployed workers; and (iv) social benefits are financed by proportional social insurance contributions.

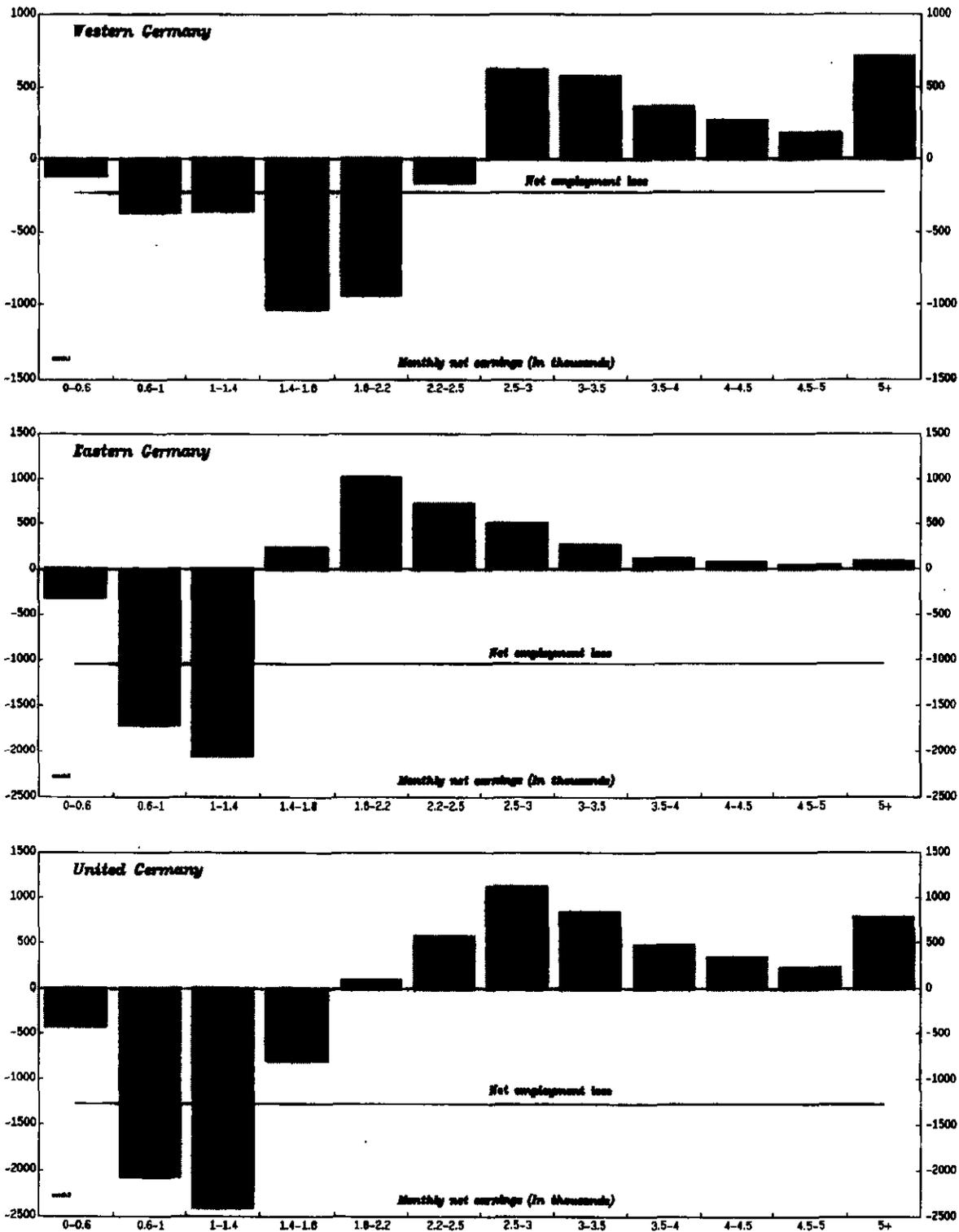
63. In the model, workers are ordered by their productivity from the lowest to the highest skill level, and the productivity differential between higher and lower skilled workers widens over time. Thus, labor productivity (or the marginal product of workers) in the lower portion of the skill distribution is assumed to increase at a slower pace than in the upper portion of the distribution. This stylized assumption can be motivated by skill-biased technological progress,

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<sup>33</sup>Carlin and Soskice (1997) estimate that about 40 percent of apprenticeships, mainly served in the artisan sector (*Handwerk*), are associated with a lower level of skill acquisition.

<sup>34</sup>Mikrozensus data published by the Ministry of Labor and Social Affairs (1997) indicate that similar patterns of job losses and creation by earnings brackets occurred in western Germany throughout the 1980s.

Figure II-4. Germany: Cumulative Employment Changes in Different Earning Brackets, 1991-95 (In thousands)



Source: Reinberg (1997).

reflecting, e.g., increased demand for skills at information handling or the ability to learn on the job (learning to learn).<sup>35</sup>

64. Workers are paid their marginal product. At the same time, wage bargaining partners are assumed to have a "preference for equality," resulting in an effective wage floor. The assumptions of broadly constant wage differentials between the high and the low end of the distribution and an effective wage floor can be motivated by the implications of the wage setting approach pursued by the social partners.<sup>36</sup> Evidence of stable wage differentials generated by the collective bargaining system in Germany is provided by the similar rates of increase in wages at different skills and earnings deciles (Figure II-5). Moreover, data on the shape of the distribution of hourly wages in Germany reported in OECD (1994) suggest that it is characterized by a distinct wage floor.<sup>37</sup> Recent empirical work by Fitzenberger and Franz (1997) indicated that increased wage differentiation could substantially lower unemployment among the lower skilled. In particular, these authors's calculations suggest that equalization of the 1991 unemployment rates across lower and medium skills (based on the skill categories used above) in western Germany would, e.g., have required an additional wage dispersion of 15 percent between the median wages of the lower skilled and of those with medium skills.

65. Unemployment benefits are assumed to be a proportion of the net minimum wage. Any increase in the level of unemployment benefit is financed by corresponding increases in social contribution rates. With increasing social contribution rates the difference between average and minimum wages shrinks and the wage distribution narrows. An increase in the duration of entitlement to unemployment benefits, which represents an increase in the discounted value of the future stream of benefits, implies the same outcome.

66. In practice, unemployed workers in Germany have recourse to three types of social benefits: unemployment compensation (*Arbeitslosengeld*) funded by social contributions; unemployment assistance (*Arbeitslosenhilfe*) and social assistance (*Sozialhilfe*) both funded

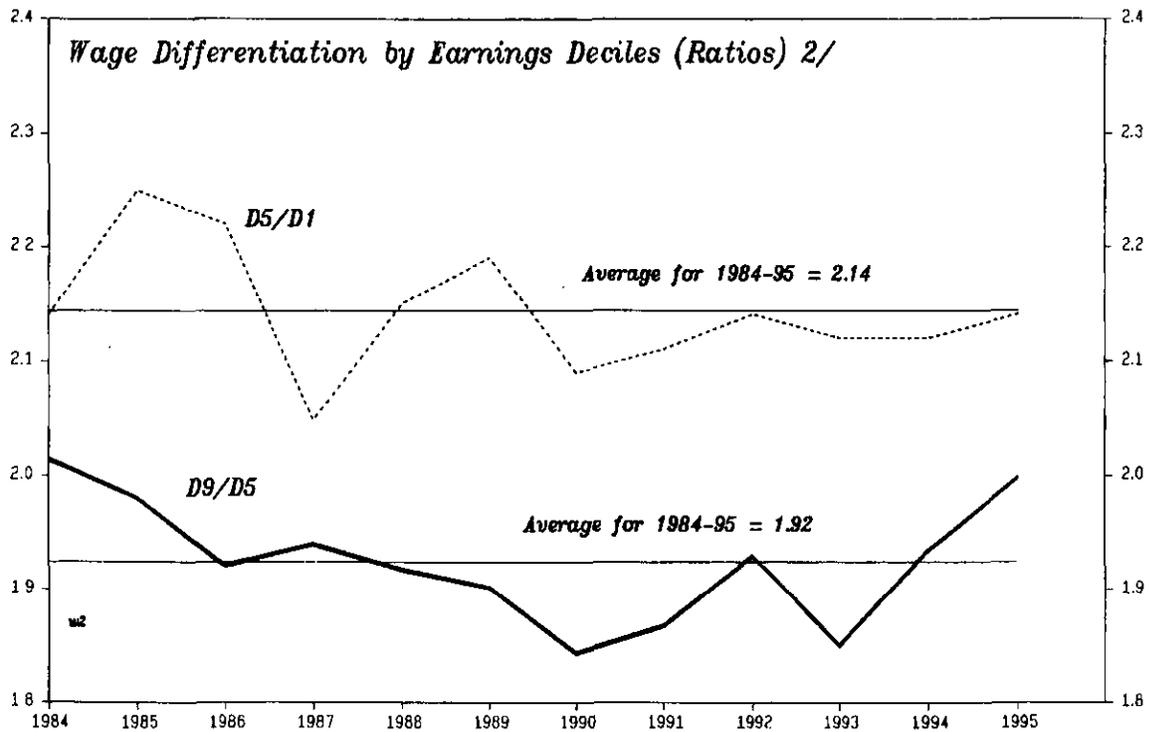
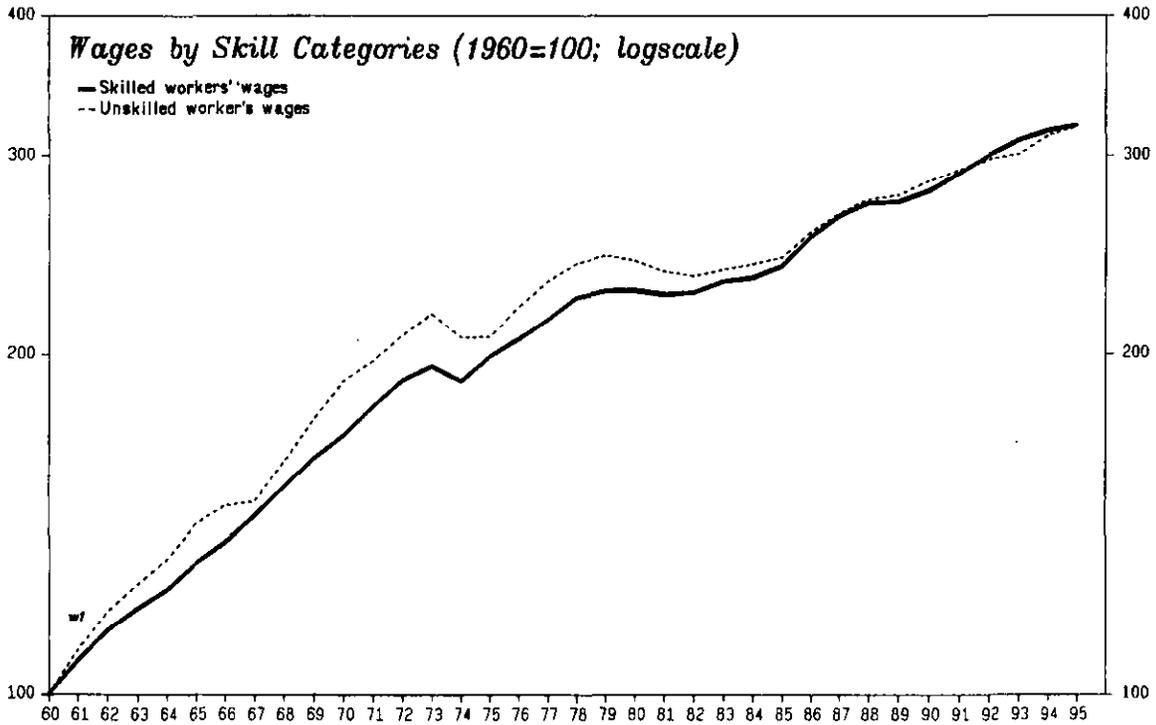
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<sup>35</sup>Phelps (1997, pp. 64–78) discusses other economic factors that can create widening gaps between wages in the lower and upper half of earnings distribution including import competition and rising real interest rates.

<sup>36</sup>See van der Willigen (1995) for a detailed description of the German wage bargaining system.

<sup>37</sup>One example is the hourly wage distribution for German workers aged 25 years and over; see OECD (1994, Part II, p. 39). Wages for young workers in apprenticeship positions can, however, often be far below those of adult workers.

Figure II-5. Germany: Wage Differentiation 1/



Source: Statistisches Bundesamt; United States Bureau of Labor Statistics; and Institut für Weltwirtschaft Kiel.

1/ Data refer to western Germany.

2/ D5/D1 denotes ratio between the fifth and the first deciles of the male earnings distribution. Similarly, D9/D5 denotes ratio between the ninth and the fifth deciles of the male earnings distribution.

by general taxation.<sup>38</sup> The replacement ratio of unemployment compensation for claimants with children (without children) is 67 percent (60 percent) of previous net earnings. For those who exhaust unemployment compensation or do not qualify for it, means-tested unemployment or social assistance is available for an indefinite period.

67. Generous unemployment benefits, in particular long and indefinite entitlement periods, were found to be empirically significant in affecting the length of unemployment spells. Hunt (1995) examined the disincentive effect associated with the unlimited duration of unemployment assistance in Germany by comparing the exit probability from unemployment (hazard rate) to a control group unaffected by the extension of the duration of unemployment benefits. The level of benefits was not found to affect the probability of exiting from unemployment. However, longer unemployment benefit durations increased unemployment durations. Nonetheless, in this empirical work, the duration of benefits accounted for less than one third of the difference between unemployment spells in the United States and Germany in the 1980s.

68. The finding that older individuals and those who exit the labor force experience longer unemployment spells highlights the interrelation between the various elements of Germany's social insurance/protection system. In particular, some employers, seeking to reduce their workforce in response to structural change and unification shocks, may have encouraged older workers to leave the work force via unemployment. The combination of severance pay, high unemployment insurance benefits, long entitlement periods, and the payment of both pension and health insurance contributions for the unemployed by social insurance made unemployment a bridge to early retirement. Thus, some reduction in the workforce was achieved at the expense of the social benefits system.

69. In the model, the social insurance/protection system is financed through flat contribution rates levied across the entire income distribution—there is no lower threshold for, and no upper cap on, contributions.<sup>39</sup> The incidence of social contributions falls on workers, and the combination of a wage floor and increasing social contribution rates can price workers out of the labor market at the lower end of the wage distribution.

70. Endogenizing tax/contribution rates by specifying a government budget constraint that links tax revenues and social expenditures generates a dynamic process that can be vicious or virtuous. Higher unemployment requires additional spending on social benefits. To finance these social benefits, higher contribution rates must be levied. The gross minimum wage rises with the higher tax burden, further increasing unemployment. The lower skilled lose their jobs,

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<sup>38</sup>See van der Willigen (1995) for a detailed description of the German unemployment compensation system.

<sup>39</sup>In practice, social contributions are subject to upper ceilings and, as mentioned in Section B in the context of the recent surge in the number of small-time jobs, to a lower threshold of DM 620.

pushing up average productivity and average wages of the employed. Since the minimum wage is linked to the average wage in the model, the minimum wage is increased further, resulting in still more unemployment and higher taxes/contributions.

71. In this model, German unification can be represented as an adverse exogenous shock to the social contribution rate. After unification, western Germany's social institutions were extended to eastern Germany's workers, and the sudden increase in the number of beneficiaries in the social insurance system required higher contributions and taxes. Social security contribution rates rose by 6 percentage points during 1990-97.

#### **D. Sectoral Reallocation of Labor and Business Cycle Durations**

72. Two additional dimensions of Germany's labor market trends that are not captured by the stylized model in Section C are the sectoral reallocation of labor from industry to the service sector and the longer duration of business cycles during the 1980s and 1990s. Since at least the early 1970s, manufacturing employment (including construction) in Germany has been on a downward trend relative to total employment (Figure II-6).<sup>40</sup> A decline in manufacturing employment would not be problematic if service sector employment expanded sufficiently to absorb employment losses in the manufacturing sector. Indeed, service sector employment grew by a cumulative 60 percent during 1970-96. This was, however, insufficient to absorb the heavy losses in manufacturing employment. In fact, movements in the loss of jobs in manufacturing and in the overall unemployment rate are closely linked (Figure II-6). In each recession since 1970, manufacturing employment declined sharply and the aggregate unemployment rate ratcheted upwards. Thus, from a sectoral angle, the combination of massive labor shedding in the manufacturing sector and sluggish employment growth in services largely accounted for the upward ratcheting of the aggregate unemployment rate in Germany.<sup>41</sup>

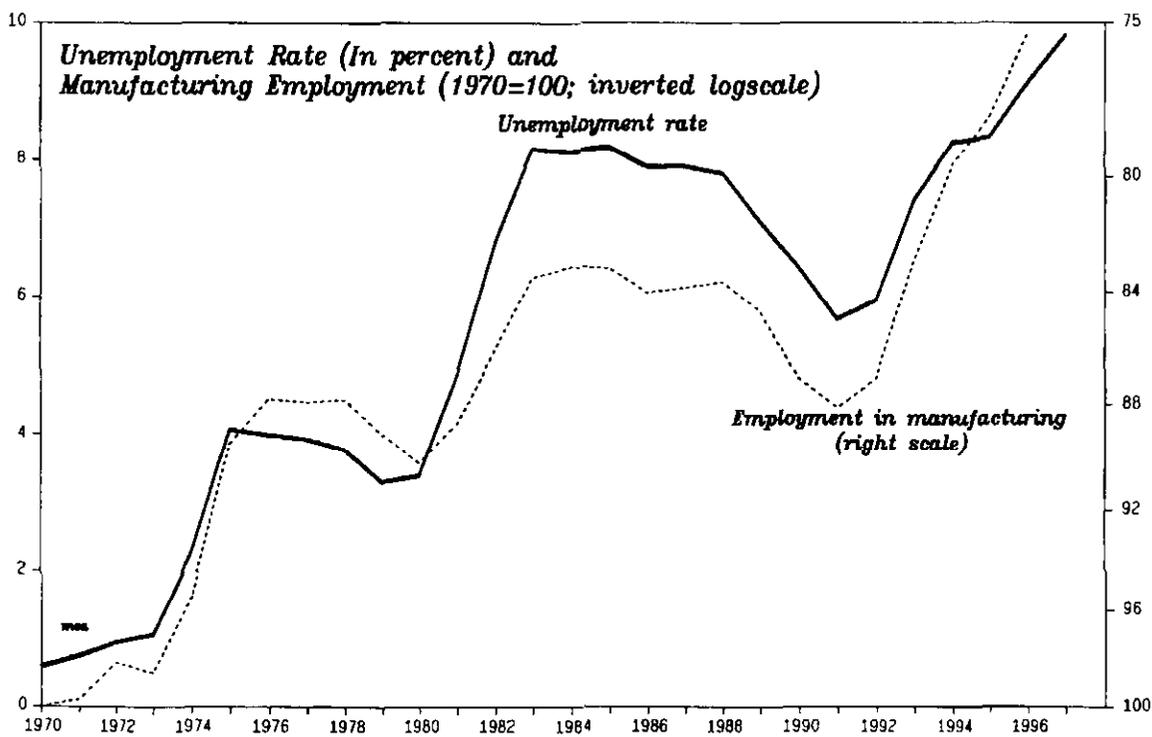
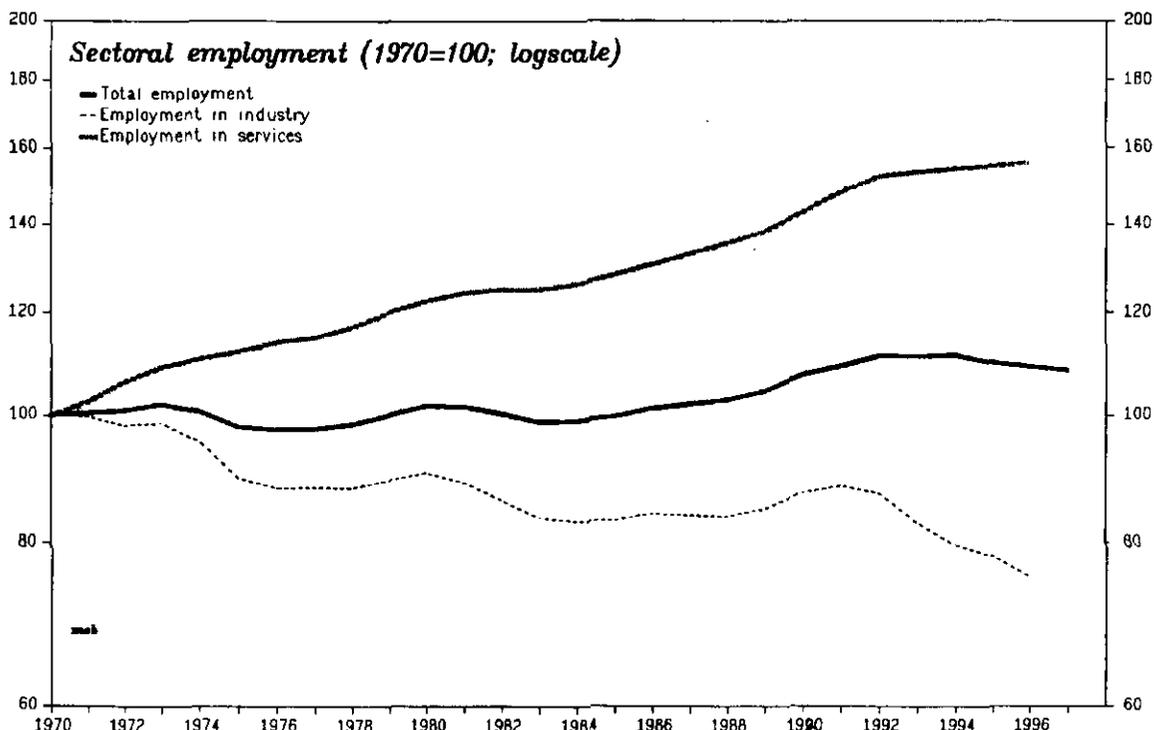
73. Data available for the period 1991-95 shed light on the skill composition of sectoral employment changes (Table II-2). Employment shedding in the secondary sector (manufacturing including construction) in both western and eastern Germany was heavily concentrated in the lower and medium skill categories. For example, the secondary sector in western Germany lost 1.4 million jobs during 1991-95; most of the workers affected by job

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<sup>40</sup>Compared to the United States, deindustrialization was particularly severe in western Germany. While manufacturing employment increased between 1976 and 1997 in the United States, it fell by some 25 percent in western Germany during the same period. In eastern Germany, manufacturing employment in eastern Germany declined by about 65 percent during 1991-1996.

<sup>41</sup>A bivariate linear regression of the aggregate unemployment rate on manufacturing employment explains 86 percent of the variation in aggregate unemployment for western Germany during 1970-96.

Figure II-6. Germany: Sectoral Employment Trends, 1970-97 1/



Source: Statistisches Bundesamt Wiesbaden.  
1/ Data refer to western Germany.

Table II-2. Germany: Cumulative Employment Changes by Sector and Skill, 1991-95

	Employment change by skill level			
	Low skilled 1/	Medium skilled 2/	High skilled 3/	All skills
(In thousands)				
<b>United Germany</b>				
All sectors	-732	-1,226	685	-1,273
Primary sector	-151	-255	0	-406
Secondary sector	-474	-1,813	29	-2,258
Tertiary sector	-107	842	656	1,391
<b>Western Germany</b>				
All sectors	-584	-234	588	-230
Primary sector	-130	-17	5	-142
Secondary sector	-392	-1,070	50	-1,412
Tertiary sector	-62	853	533	1,324
<b>Eastern Germany</b>				
All sectors	-148	-992	97	-1043
Primary sector	-21	-238	-5	-264
Secondary sector	-82	-743	-21	-846
Tertiary sector	-45	-11	123	67

Source: Reinberg (1997) and staff calculations.

1/ No formal qualifications.

2/ Medium qualification: vocational and apprenticeship education.

3/ University education or equivalent degree.

losses had low or medium skill characteristics.<sup>42</sup> In contrast, employment in the tertiary sector (services) increased by some 1.3 million in western Germany, keeping employment losses to only 0.2 million. Moreover, the increase in tertiary sector employment was concentrated in the higher-skilled and higher-paid job categories.

74. The sectoral data on employment losses/creation disaggregated by skill and earnings characteristics add an important sectoral facet to Germany's labor market dynamics. Employment shedding typically takes place in the manufacturing sector among the lower skilled/paid during a cyclical downturn. At the same time, employment creation during the cyclical downswing is concentrated in the service sector among the higher-skilled/better-paid. Moreover, in view of the long-term de-industrialization, this is not just a cyclical phenomenon that involves a spell of temporary unemployment and reabsorption during the recovery. Labor laid off in the manufacturing sector needs to be permanently shifted to the service sector. Moreover, as already discussed in Chapter I, the duration of recessionary periods—defined as periods where the output gap is negative—lengthened substantially in Germany in the 1980s and 1990s compared to the 1960s and 1970s (Figure II-7). Extended periods of deficient aggregate demand can slow the labor reallocation process, and the unemployed may experience a deterioration in their skills and/or work ethic, a phenomenon particularly relevant for the lower skilled. The combination of slow sectoral reallocation of labor and prolonged periods of negative output gaps may have contributed to the observed upward ratcheting of the aggregate unemployment rate during business cycles, a phenomenon that is sometimes referred to as “asymmetric hysteresis” in unemployment.<sup>43</sup>

### **E. Policy Options**

75. The stylized model provides a convenient template for discussing broad policy options grouped around its four key elements: (i) increased training and education that could lift labor productivity at the lower end of the skill distribution; (ii) more flexible wage bargaining to ameliorate the mismatch between labor productivity and labor costs of the lower skilled; (iii) enhancing job search incentives through lowering reservation wages; and (iv) policy measures to reduce nonwage labor costs targeted at the lower paid/lower skilled.

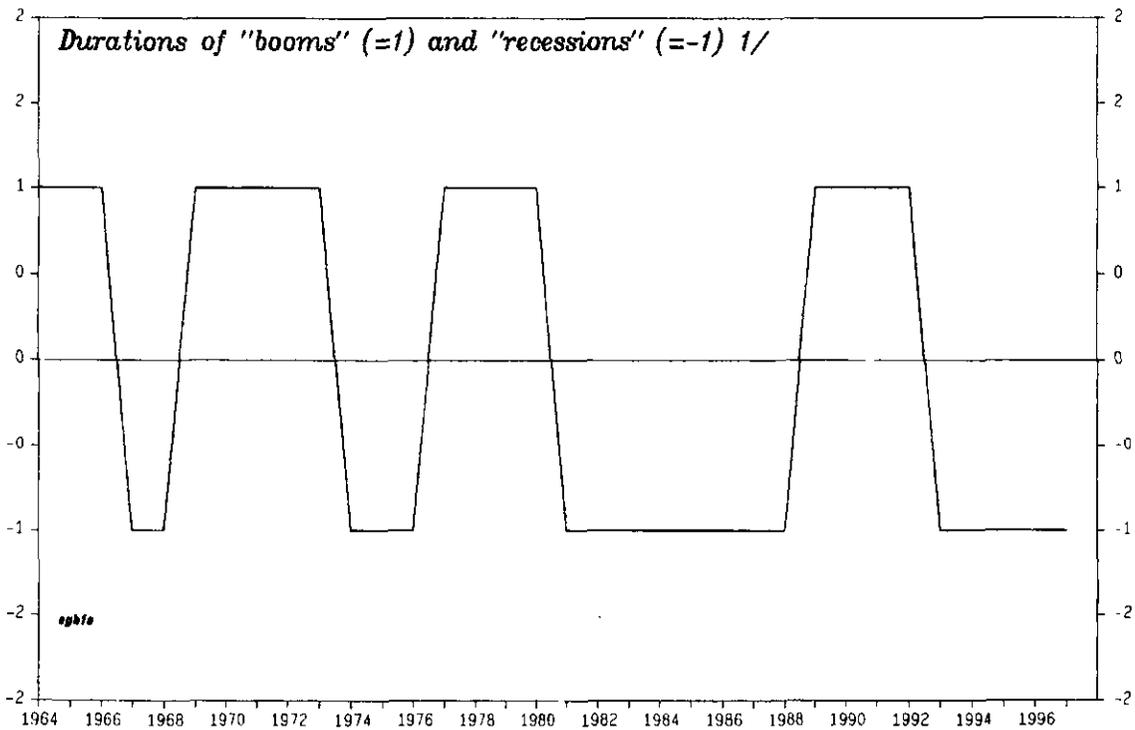
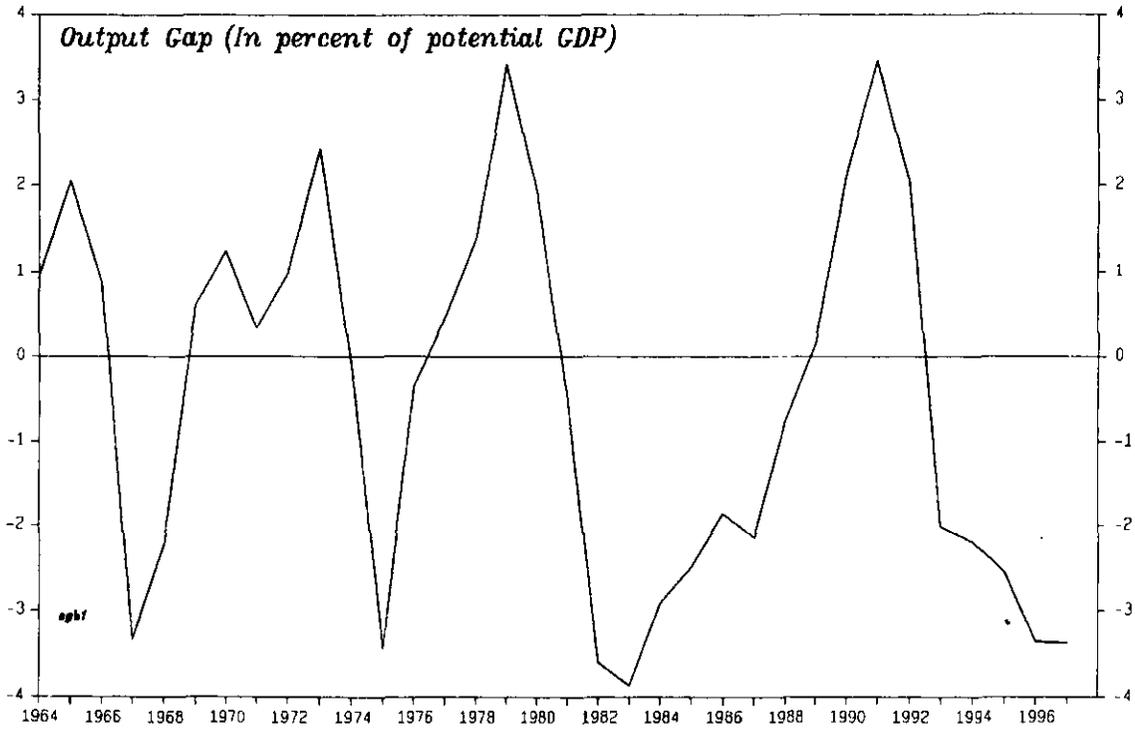
76. The importance of enhanced education and training to upgrade the skills of workers within or outside the context of active labor market policies (ALMPs) has been a longstanding

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<sup>42</sup>Also, available data on job losses/creation by earnings brackets suggest that job losses in manufacturing within a given skill category occurred primarily in the lower-paid earnings brackets of that skill category.

<sup>43</sup>Jaeger and Parkinson (1994) define “asymmetric hysteresis” as permanent upward shifts in the structural rate of unemployment that are due to cyclical labor market slack. By contrast, the definition of “symmetric hysteresis” would also allow for permanent downward shifts in the natural rate of unemployment during cyclical labor market booms.

Figure II-7. Germany: Business Cycle Durations, 1964-97



Sources: IMF, World Economic Outlook;  
1/ "Booms" are defined as periods with positive output gaps.  
"Recessions" are defined as periods with negative output gaps.

theme in policy discussions.<sup>44</sup> In the long term, a permanent reduction in the demand for low skilled workers requires (at a fixed real wage) a shift in the skill distribution of the labor force toward skilled workers. Some of the unemployed may not have the financial resources to acquire adequate training and education. At the same time, the potential public cost of a large-scale education and training program aimed at the unskilled could be quite high. Although no specific estimates are available for Germany, those derived for the United States may well illustrate the magnitude of these cost.<sup>45</sup> However, as pointed out by Nickell and Bell (1996), the skill deficiencies at the lower end of the labor market in Germany appear to be significantly less pronounced than in the United States, which would lower this cost estimate. Moreover, there exist several other less expensive options to sharpen incentives to acquire skills. For example, making unemployment assistance conditional on participation in training would increase the incentives to acquire skills. Moreover, existing education programs could focus more directly on the acquisition of marketable skills.

77. Active labor market policies (ALMP) generally target the unemployed and aim at increasing the employability of workers by providing training, job brokering and placement services, and direct job creation in the public sector. Additional training of the existing work force can fulfil two basic functions. First, it can maintain or increase the skills of the unemployed in times of recession. As such, training reduces the number of discouraged workers and exerts a positive effect on the aggregate supply of labor. Second, training can help overcome structural imbalances in the labor market by adjusting labor supply to demand. And third, re-training may facilitate the sectoral reallocation of labor. Empirical research has, however, detected only weak favorable employment effects of ALMPs. Calmfors and Skedinger (1995), e.g., used pooled time-series and cross-section data from 24 Swedish regions and found that the effect of training on the total jobless rate was positive or negative depending on the equation specification. At the same time, training programs were found to have a slightly more favorable effect on the total jobless rate than public sector job-creation schemes.

78. Greater wage differentiation to accommodate the widening of skill differentials would provide more scope for reabsorbing the unemployed subject to two qualifications. First, even if tariff wages reflected market pricing of labor, generous social benefits could still foster a reservation wage that keeps unemployment high among the lower skilled. And second, increased wage flexibility at the lower end of the wage distribution could result in real wage

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<sup>44</sup>See, e.g. the collection of articles edited by Booth and Snower (1996), Chapter 7 of the *OECD's Jobs Study* (1994), and the many measures to increase the employability of the unemployed listed in Germany's National Employment Program.

<sup>45</sup>For example, Heckman (1993) calculated that assuming a real rate return of 10 percent on resources spent on education and training, a US\$2 trillion (some 25 percent of GDP) investment would be needed just to bring real earnings of the low-skilled back to their relative position in the late 1970s.

levels for the lower skilled that are deemed “too low” to allow workers to support themselves and their families.<sup>46</sup>

79. There is some evidence of increased relative wage flexibility. In an attempt to accommodate productivity differentials among workers, recent collective wage agreements in the western German chemical industry incorporated a provision that allowed new recruits to be paid (for one year) wages 5–7½ percent below tariff wages and 10 percent below tariff wages if they were recruited from long-term unemployment. Further flexibility of the collective wage bargaining system at the firm-level could allow wages to react to local labor market conditions and allow workers freedom to agree on more flexible remuneration methods and working time arrangements. Enterprise bargaining could also accommodate productivity differentials between workers by allowing greater differentiation in tariff wage increases across skill levels. Profit-sharing could also permit a lower base wage at times of downturn which would limit labor shedding.

80. Reforms of the German unemployment benefit system to increase work incentives could take two general dimensions—lower benefits and/or reduced durations.<sup>47</sup> Reductions in unemployment compensation are not considered a high priority for two reasons. First, replacement ratios in Germany are not particularly high by European standards.<sup>48</sup> According to OECD data, the net benefit replacement ratios for single-earner households with no children are the lowest in the EU except for Ireland and Italy. Second, social assistance replacement ratios form a floor for unemployment benefits. Therefore reform may need to focus on the shortening of benefit durations and, in particular, on the reform of open-ended unemployment assistance.

81. Social security contributions in Germany have increased substantially since the 1970s and raised labor costs, exerting downward pressure on labor demand. To expand the demand for labor, especially unskilled labor, non-wage costs could be reduced. The potential employment impact may be significant given that the demand elasticity for unskilled labor seems to be

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<sup>46</sup>E.g., Freeman (1995) reported that the sizeable reductions in pay for the less-skilled in the United States led to a substantial lowering of family incomes at the lower end of the earnings distribution and may have encouraged substitution of illegal activities for work in the formal sector. He noted that in 1993 the equivalent of 6.6 percent of the U.S. male work force was either imprisoned or otherwise subject to the criminal justice system and that this ratio had risen drastically since the widening of wage inequality began in the late-1970s.

<sup>47</sup>See, e.g., Chapters 8 and 9 of the *OECD's Jobs Study* (1994).

<sup>48</sup>The replacement ratios for unemployment insurance and assistance were lowered in 1994 to 60 and 53 percent, respectively, for individuals without children.

substantially higher than for skilled.<sup>49</sup> One option would be to taper social contribution rates at monthly earning levels above DM 620 to reduce nonwage labor cost for these workers. However, this approach would weaken the relatively close link between social contributions and insurance benefits—a key characteristic of the design of Germany’s social insurance system. Another option would be to directly subsidize wage income for low-paid workers (through what is referred to in Germany as combi-wages).<sup>50</sup> Supplementing low wage income by a subsidy could provide incentives for employers to create additional low-skilled jobs where currently wage rates exceed marginal productivity. For the employee, combi-wages would reduce welfare traps and could provide incentives to accept work in the lowest pay grades of collective agreements. Such wage subsidies should be strictly targeted at the low end of the wage scale, but would also need safeguards against abuse by firms and employees. Some abuse can be discouraged by limiting the subsidies to one or two years and by paying only part of the wage-productivity difference. There is, however, the danger that tariff partners might, at the expense of the public finances, raise wages in the lowest pay grades in response to a combi-wage subsidy.

82. The sectoral dimension of the unemployment problem in Germany highlights another policy lever: the need to provide a regulatory environment to foster service sector employment growth. Specific policy measures in this area could include further streamlining of the approval process for new start-up businesses, relaxing licensing practices that curtail competition, and a further extension of shop opening hours, which remain among the most restrictive in Europe. Training of laid-off manufacturing workers aimed at developing the skills needed for service production may also be helpful.

83. The sectoral dimension also underscores the benefits of macroeconomic stabilization policies that keep recessionary periods reasonably short. Although asymmetric hysteresis in unemployment would imply that expansionary stabilization policies can not lower the structural rate of unemployment, shortening the duration of recessionary periods could reduce the “spillover” of cyclical into structural unemployment.

84. As discussed in Coe and Snower (1997)—policy measures of a broad package of reforms will have mutually reinforcing effects. Moreover, the model also indicates the possibility of triggering a virtuous circle between favorable labor market trends and the fiscal situation. Conversely, institutional rigidities reinforce and complement one another. For instance, employers’ social contributions discourage job creation and finance social benefits that discourage job search. The existence of these institutional complementarities lead Coe and Snower (1996) to suggest that the unemployment problem required a package of policies.

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<sup>49</sup>Sneessens (1993) reports that most estimates of own wage elasticities for blue-collar workers range between 0.3 and 1.2 while the elasticity of white-collar workers is substantially smaller.

<sup>50</sup>Among others, Phelps (1997) recommends the payment of employment subsidies as an effective means to improve the employment opportunities of low-productivity workers.

Such a complementary package has a greater impact on unemployment than the sum of the individual measures.

85. Effective labor market reform would utilize the interrelations among the various policy measures. A comprehensive package of measures would have a greater impact on unemployment, and a virtuous cycle could be set in motion. For example, a shortening of the entitlement to unemployment benefits would increase job search; place downward pressure on wage bargaining, and cause unemployment to fall. This fall would be amplified because the decline in unemployment further lowers government expenditure and contribution rates, which in turn reduce labor costs.

86. However, the design of such a package must also pay due attention to political institutions that underlie present labor market rigidities and therefore may hamper reform. Saint-Paul (1997) notes that from a politico-economic perspective, coordination failures are particularly important. Coordination failures arise when agents make decisions without taking into account the actions of others. Lobbyists or unions may create devices to protect their clientele from adjustment to negative shocks. However, if only one sector in the economy is flexible, it bears the entire adjustment cost, making this sector more likely to push for protection. The opportunity cost of introducing rigidities falls as the rest of the economy becomes less flexible.

## APPENDIX II-1

### A MODEL OF LABOR MARKET TRENDS AND VICIOUS CIRCLES

#### Skills and productivity

87. There is a continuum of workers on the interval  $[0,1]$  ordered by their labor productivity. At time  $t$ , the productivity of worker  $i$  is

$$a_{i,t} = c + d_j,$$

where  $d_t$  is an increasing function of time. Output is produced with a constant returns to scale technology,

$$Y_t = \int_{i \in I} (c + d_j) di$$

where  $I$  denotes the set of employed workers.

**Wage formation**

88. Productivity is observable, and workers are paid their marginal product

$$w_{i,t} = c + dj$$

A minimum after-tax wage  $w_{\min}(1-\tau)$  is set as a portion  $\rho \in [0,1]$  of the gross average wage  $w_a$ .

$$w_{\min}(1-\tau) = \rho w_a$$

This relationship can be thought of as a “fair wage norm” or subsistence wage as a function of average productivity. Net minimum wages are assumed to be a function of the gross, rather than the net, average wage to avoid a drop in the subsistence wage whenever taxes increase. Assuming tax rates are unchanged, the ratio between the average and the minimum gross (and net) wage is constant. With increasing taxes, the difference between average and minimum wages will shrink, narrowing the wage distribution.

89. All workers with productivity higher than the gross minimum wage  $w_{\min}$  will be employed. Denoting the marginal worker by  $i^*$  (omitting the time index for simplicity), the average wage is determined as

$$w_a = \frac{1}{2}(w_{\max} + w_{\min}) = c + d(1 + i^*)/2$$

90. Combining this equation with the equation for minimum wages determines the marginal worker  $i^*$ . All workers with an index above  $i^*$  will be employed, and all others will be unemployed. The number of unemployed workers is simply given by  $i^*$ :

$$i^* = \frac{c(\rho - 1 + \tau) + \rho d/2}{d(1 - \tau + \rho/2)}$$

For sufficiently small taxes,  $\tau$ , such that  $(1 - \rho - \tau) > 0$ , unemployment is an increasing function of (i) productivity,  $d$ ; (ii) the subsistence parameter,  $\rho$ ; and (iii) taxes,  $\tau$ .

91. As productivity,  $d$ , increases, the ratio between the wage of the most productive worker and the wage of a less productive one increases. Hence average wages will also increase faster than the wage for the marginal worker. With the ratio  $w_{\min}/w_a$  constant at  $\rho/(1-\tau)$ , unemployment rises. As time progresses, the increase in productivity will widen the productivity distribution. However, since the wage distribution is not allowed to widen, unemployment will have a tendency to rise over time.

92. The parameter  $\rho$  captures the “preference for wage fairness”. Ceteris paribus, an increase in  $\rho$  is equivalent to a relative increase in minimum wages, and thus to a narrower

wage distribution. The narrower wage distribution, however, can only be achieved at the price of higher unemployment. Higher taxes will be passed on to the gross minimum wage. Higher gross minimum wages push up the productivity threshold and thus increase unemployment.

### Social insurance financing

93. The tax/contribution rate,  $\tau$ , is endogenous owing to the government budget constraint. The only revenue source is labor income. The marginal product of labor is equal to the average product of labor, therefore labor income is equal to output. Total tax revenues are given by  $\tau Y$ . The only expenditure item is social spending on pensions and unemployment benefits. Benefits are assumed to be a portion  $\beta \in [0,1]$  of the net minimum wage. The number of beneficiaries is the number of unemployed  $i^*$ , plus the (constant) number of pensioners  $k$ . The government's pay-as-you-go (PAYG) budget constraint is:

$$\beta w_{\min} (1-\tau)(i^*+k) = \beta \rho \frac{Y}{1-i^*} (i^*+k) = \tau Y$$

This gives the contribution rate  $\tau$  as

$$\tau = \beta \rho \frac{i^*+k}{1-i^*},$$

which is equivalent to the traditional PAYG equation linking the equilibrium contribution rate,  $\tau$ , to the effective benefit replacement rate,  $\beta \rho$ , and the social insurance system's dependency ratio (beneficiaries/contributors),  $(k+i^*)/(1-i^*)$ . Taxes increase with the benefit parameter  $\beta$ , with the minimum wage parameter  $\rho$ , with the number of pensioners  $k$ , and with the number of unemployed  $i^*$ .

94. As productivity,  $d$ , increases over time, unemployment will increase (as described above). As the number of beneficiaries increase, and the number of contributors declines, the tax rate will also increase, causing a further hike in unemployment. With a hike in the number of pensioners,  $k$ , the tax rate increases. This raises the minimum wage, pricing lower productivity workers out of the labor market. As a result, unemployment increases further, pushing the required tax rate even higher, and triggering another round of labor shedding at the lower end of the earnings distribution

### Work incentives

95. In this framework, the parameter  $\rho$  summarizes wage setting, or labor supply, behavior. Benefits,  $\beta$ , and the "preference for wage fairness,"  $\rho$ , are assumed to be independent. However, in a richer model, the two parameters would be related: "wage fairness" for those employed can be thought of as underpinned by generous benefits to those unemployed. Low productivity workers priced out of the labor market remain unemployed, so

in a multi-period model, the present value, rather than the level of current benefits would provide the support for limited wage differences. A decrease in the level of benefits, or shorter duration of benefits would presumably contribute to the choice of a wider wage distribution (a lower  $\rho$ ).

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### **III. LABOR MARKET TRENDS AND FISCAL DYNAMICS: SOME SIMULATION EVIDENCE<sup>51</sup>**

#### **A. Introduction and Summary**

96. Since unification, the drop in employment has been at the core of Germany's weak labor market performance. High unemployment boosted social spending while the accompanying decline in the base for income taxes and social contributions posed problems for fiscal revenue raising efforts. This chapter focuses on the interaction between rising social spending, revenue requirements, and labor market institutions which can give rise to a vicious circle of weak labor market performance and deteriorating fiscal positions.

97. In this chapter, a macroeconomic growth model is calibrated for Germany to illustrate the dynamic interplay between labor taxation, employment, and social spending. This technique was selected in order to focus narrowly on key conceptual relationships, which would be clouded in a more realistic, but necessarily more complex structural macroeconomic model. The calibration of the model and the simulation results are designed to be illustrative; they are not intended to be predictive. Moreover, unlike the previous chapter, which focused on a disaggregated characterization of the labor market, this model is an aggregated one. The two chapters should be viewed as complementary, and not competitive, explanations.

98. The simulation results illustrate that in response to fiscal shocks, existing labor market and fiscal structures can interact to produce a vicious circle, with declining employment rates, increasing taxes, and slower output growth. Behavioral changes in the labor market (as captured by parametric changes to the wage-setting equation) can partly offset the effects of the vicious circle. Wage moderation improves employment, output and fiscal performance in the short and long run. Because real wage growth has a strong effect on the overall economy, an unsustainable situation may be reached at relatively low rates of real wage increase. Allowing taxes to affect net wages can mitigate the adverse effects of shocks on employment, output, and the fiscal balance over the medium run. Indeed, improving the downward flexibility of real wages would reduce the employment effects of adverse shocks, while preserving the full benefits from positive shocks. Population aging has effects similar to a series of adverse fiscal shocks under current social insurance arrangements. The simulations suggest that the above-mentioned structural changes would have powerful mitigating effects in the medium run, but long-run trends may remain unsustainable without further pension reforms.

99. The rest of the chapter is structured as follows. Section B describes the model and discusses key parameter values. Section C presents illustrative scenarios to highlight the interaction between labor market characteristics and fiscal policy, and to demonstrate that behavioral changes in the labor market can have beneficial effects for employment and output.

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<sup>51</sup>Prepared by Kornélia Krajnyák

## B. Structure of the Model

100. A simple aggregate growth model is calibrated to German specifications to illustrate the interaction between the labor market and the fiscal sector.<sup>52</sup> The model has many simplifications (e.g., only the real economy is modeled; the business cycle is not considered; the economy is closed to trade). However, it is these same simplifications that allow us to focus on the dynamic interaction of social spending, labor taxation and employment. The major building blocks are: (i) the production sector; (ii) the labor market; and (iii) the fiscal sector. The main equations of the model are outlined below, while technical details are presented in the Appendix.

### Production sector

101. Producers use a *Cobb-Douglas technology*:

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha},$$

where  $Y$ ,  $K$ ,  $L$  stand for real output, real capital stock, and labor input, respectively, and  $A$  denotes total factor productivity. As the income share of capital for Germany has been estimated at about 30 percent,<sup>53</sup> the parameter  $\alpha$  is set at 0.3, which is consistent with estimated values for other industrial countries.

102. The Cobb-Douglas production function, combined with the assumption that productive factors are paid their marginal product,<sup>54</sup> implies that the income shares for labor and capital shares are constant in the long run. The wage share is technologically determined, with the trade-off between employment and wages in the hands of the tariff partners—the trade unions and the employers.<sup>55</sup> The constant labor income share is consistent with different combinations of wages and employment, which are determined by wage-setting behavior. In particular, higher wages necessitate lower employment, given the assumptions. In a competitive market, wages would be set such that full employment would prevail. If, say,

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<sup>52</sup>The model is a close relative of a growth model calibrated for France in Habermeier and Lenseigne (1998).

<sup>53</sup>IMF (1997).

<sup>54</sup>In the short run, payments to labor are allowed to deviate from the marginal product; see the labor demand section below for details.

<sup>55</sup>Assuming a more general aggregate production function with constant, positive elasticity of substitution (CES) would allow the wage share to vary. With high wages and low employment, producers would substitute away from labor, and the wage share would fall. Conversely, cheaper labor would mean higher employment and an increasing wage share.

trade unions demand higher wages, employment declines so that the marginal product of labor increases to match the real wage. Structural unemployment emerges as the result.

103. Because investment and disinvestment are assumed to be costly, the capital stock responds sluggishly to its marginal product.<sup>56</sup> In addition, government spending is assumed to crowd out private investment; hence capital accumulation will depend negatively on the government expenditure-to-GDP ratio  $G$ ,<sup>57</sup>

$$dK/K_t = I(MPK_{t-1}, G_{t-1}/(P_{t-1}Y_{t-1})).$$

104. Social returns to capital are assumed to be larger than private returns. Consistent with the literature on endogenous growth, *total factor productivity* (TFP) growth depends positively on the growth rate of the capital stock:

$$d\ln(A_t) = \theta_d d\ln(K_t).$$

105. TFP growth is calibrated at 1.2 percent per annum at the historical capital stock growth rate (3 percent). Faster capital growth would yield higher TFP growth. Long-run output growth would converge to zero without input growth. Technological progress is represented by TFP growth, and thus the possibility of biased technological progress is excluded.

106. Producers are price takers in the capital market, and hence capital is paid its marginal product. Payments to labor and the quantity of labor input are determined in the labor market, described in the next subsection.

## **Labor market**

### ***Labor demand***

107. In the absence of adjustment costs, labor demand would be determined such that the gross wage equals the marginal product:

$$w_t = (1 - \alpha)A_t K_t^\alpha L_t^{-\alpha}.$$

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<sup>56</sup>The marginal product of capital net of taxes minus a measure of alternative returns should in general be the variable considered. However, both the alternative returns and the taxes on capital remain unchanged over the simulation period to better focus on labor market implications. It is therefore admissible to use the pre-tax marginal product.

<sup>57</sup>In a closed economy government expenditure would likely crowd out some private investment. In the present static framework, savings and investment decisions are not modeled explicitly, therefore a parsimonious specification of this relationship is employed.

108. Owing to adjustment costs, in this model labor demand is assumed to depend on a distributed lag, rather than the contemporaneous value of real wages:

$$\lambda_0 w_t + \lambda_1 w_{t-1} + \lambda_2 w_{t-2} = (1-\alpha) A_t K_t^\alpha L_t^{-\alpha},$$

where  $\sum_i \lambda_i = 1$ . Given that the capital share,  $\alpha$ , is 0.3, the long-run elasticity of employment with respect to real wages is -3.33, i.e., employment declines by more than 3 percent in response to a 1 percent increase in real wages.<sup>58</sup>

### *Wage setting*

109. The labor force is assumed to be organized by a trade union. The trade union is a monopolist and sets the wage unilaterally. Real wage demands by trade unions depend on labor market conditions. Slack in the labor market, as indicated by low employment rates in the previous period, depresses real wages. If wage-setting behavior is governed by insiders (e.g., workers who are currently employed), labor market conditions would have a limited effect on real wages. Furthermore, it is assumed that after-tax, rather than gross, real wages are targeted by the trade union. (This is consistent with workers regarding government spending as less utility enhancing than private spending.) In addition, there is a rate of “autonomous wage growth”, which is assumed to capture, inter alia, the impact of trend productivity growth on wage setting. Finally, in the short run sluggish wage adjustment is assumed, reflecting staggered wage contracts. The wage-setting equation takes the form:

$$d\ln(w_t) = \theta d\ln(w_{t-1}) + \beta d\ln(e_{t-1}) + \gamma d\ln(\tau_{t-1}) + \omega,$$

where  $e$  denotes the employment rate defined as the ratio of employment to labor force ( $e_t = L_t/L_t^*$ );  $\tau$  represents the “tax wedge” between net and gross wages which is defined as the ratio of gross to net real wages ( $\tau_t = w_t/w_t^N$ ); and  $\omega$  is autonomous wage growth. The labor supply  $L_t^*$  is given exogenously based on the growth rate and the age structure of the population. From the assumption of a full tax pass-through,  $\gamma = 1 - \theta$  is imposed.

110. Empirical evidence suggests that trade unions in Germany have successfully shifted wage taxes to producers, which supports the assumption of a full tax pass-through. Tyrväinen (1995) finds full long-run tax shifting into real labor costs in Germany. Alesina and Perotti (1997) find near-full tax shifting (about 60–75 percent) into real relative unit labor costs for a group of countries—including Germany—characterized by moderately centralized bargaining

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<sup>58</sup>This elasticity appears to be fairly large. However, Symons and Layard (1983) estimated values of long-run aggregate labor demand elasticities for six large OECD economies and in four cases found an elasticity below -1, with the lowest value being -2.6. Layard, Nickell, and Jackman (1991) estimated aggregate price-setting relationships (which correspond to labor demand curves under the assumption that producers have some monopoly power in the goods market) for OECD countries which indicate that price setting in Germany is relatively unresponsive to the unemployment rate. In the framework of our model, this would also translate into a highly elastic labor demand curve.

practices.<sup>59</sup> Other studies, as reviewed in Leibfritz, Thornton, and Bibbee (1997), also indicate that increases in labor taxes are not fully absorbed by net real wages. The extent of tax shifting, however, remains a controversial subject.<sup>60</sup> On balance, though, much of the empirical literature places Germany on the list of countries where significant tax shifting occurs. Consequently, and to establish a baseline, a full long-run tax pass-through to real labor costs is assumed, i.e.,  $\gamma=(1-\theta)$  holds in the wage-setting equation. This restriction will be relaxed later.

111. The elasticity of real wages with respect to the employment rate—the parameter  $\beta$ —indicates the degree of real wage flexibility. The higher the elasticity, the more sensitive real wage demands are to the employment situation. In a competitive labor market, the value of  $\beta$  would be infinite.<sup>61</sup> In contrast, in an economy where wages are set based on insider behavior, this parameter value would be near zero. To pick a value for  $\beta$ , Layard, Nickell, and Jackman (1991) were followed, who estimated a wage-setting curve for Germany. Their estimates implied a unitary long-run semielasticity of real wages with respect to the unemployment rate. This translates approximately into a unit elasticity with respect to the employment rate; hence the value was set at  $\beta=1-\theta$ . As to the *dynamics* of the wage-setting equation,  $\theta=0.5$  is assumed, which is close to the value estimated by Layard, Nickell, and Jackman. Finally, *autonomous wage growth* was set at 0.8 percent per annum ( $\omega=0.008$ ), which corresponds to the average residual real wage growth over the 1980s after accounting for lagged real wage growth, the employment rate, and the tax burden.

112. Alesina and Perotti (1997), Scarpetta (1996), and Layard, Nickell, and Jackman (1991) provide some support for the parsimonious approach to modeling labor market behavior adopted here. The approach implicitly assumes that all relevant *institutional factors* are captured in the wage-setting equation, namely, by the values of  $\beta$  and  $\omega$ , and by the full pass-through of taxes to real labor costs. Alesina and Perotti find a mapping between the institutional setup of wage bargaining and the extent of the tax pass-through. This finding supports the use of the tax pass-through in the wage-setting equation as a proxy for more detailed modeling of the wage bargaining institutions. Further, Scarpetta shows that after controlling for the effect of a richer set of labor market institutions,<sup>62</sup> the tax pass-through becomes insignificant in explaining the unemployment rate, again suggesting that the extent of the pass-through could be a valid proxy for labor market institutions. Layard, Nickell, and

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<sup>59</sup>IMF (1996).

<sup>60</sup>For example Steiner (1996), who finds no evidence of tax shifting in the long run for Germany, cites other empirical work with similar results.

<sup>61</sup>In a competitive setting, wage growth would in general depend on contemporaneous, rather than lagged, employment growth.

<sup>62</sup>These include among others active labor market policies, unemployment benefits, employment protection legislation, union density, and the degree of centralization of wage bargaining.

Jackman find evidence that cross-country differences in  $\beta$  are also related to differences in labor market institutions, as suggested by theoretical considerations.

### **Fiscal sector**

113. A simplified fiscal structure is modeled. Over the medium term (over a four-year period), the deficit is assumed to narrow to  $\frac{1}{2}$  percent of GDP via discretionary changes in revenues and expenditures. This fiscal adjustment is assumed to take place in a “*symmetric*” manner—so that the tax burden is lowered along with the deficit, with both financed by spending cuts.<sup>63</sup> The deficit is financed by government borrowing.

114. Over the longer run, a balanced budget is targeted, and the evolution of expenditure and revenue components is determined by corresponding policy reaction functions, which are assumed to remain stable over the simulation period. Four *expenditure components* are considered: pensions, unemployment benefits, interest on government debt, and other expenditures. Two alternative assumptions are used for pension expenditures. In the baseline, pension expenditures remain fixed as a percentage of GDP at their initial level. In the alternative simulation, pension expenditures increase, influenced by demographic forces.<sup>64</sup> Expenditures on unemployment benefits are determined by the level of unemployment and the constant income replacement rate. Public sector interest payments are the product of the interest rate and government debt, which is determined by cumulated deficits. Long-term interest rates are linked to the marginal product of capital. Revenues are collected as taxes on capital and labor. Tax rates on capital are assumed constant. Labor taxes are adjusted so that the deficit converges over the longer run to the desired target (in this case, balance).

### **C. Simulation Results**

115. This section is organized as follows. First, the baseline is presented and the sensitivity of the simulations to parametric changes is examined. Then, the implications of a temporary fiscal shock—an increase of 1 percentage point of GDP in both expenditures and tax revenues—is explored. Finally, pension expenditures are allowed to increase over time in line with prospective demographic changes. It is useful to recall at this point that the scenarios are merely numerical calculations based on calibrated behavioral equations and *not* projections. The results are not predictive but they do provide an illustration of the dynamic forces at play.

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<sup>63</sup>This assumption is consistent with the authorities’ medium-term fiscal strategy and the Stability and Growth Pact (see Chapter I).

<sup>64</sup>Pension expenditures follow a path sketched out by demographics and the major features of the German pension system. Initial replacement rates gradually decline, reflecting increasing longevity; and subsequent increases are linked to net wages.

## **Baseline**

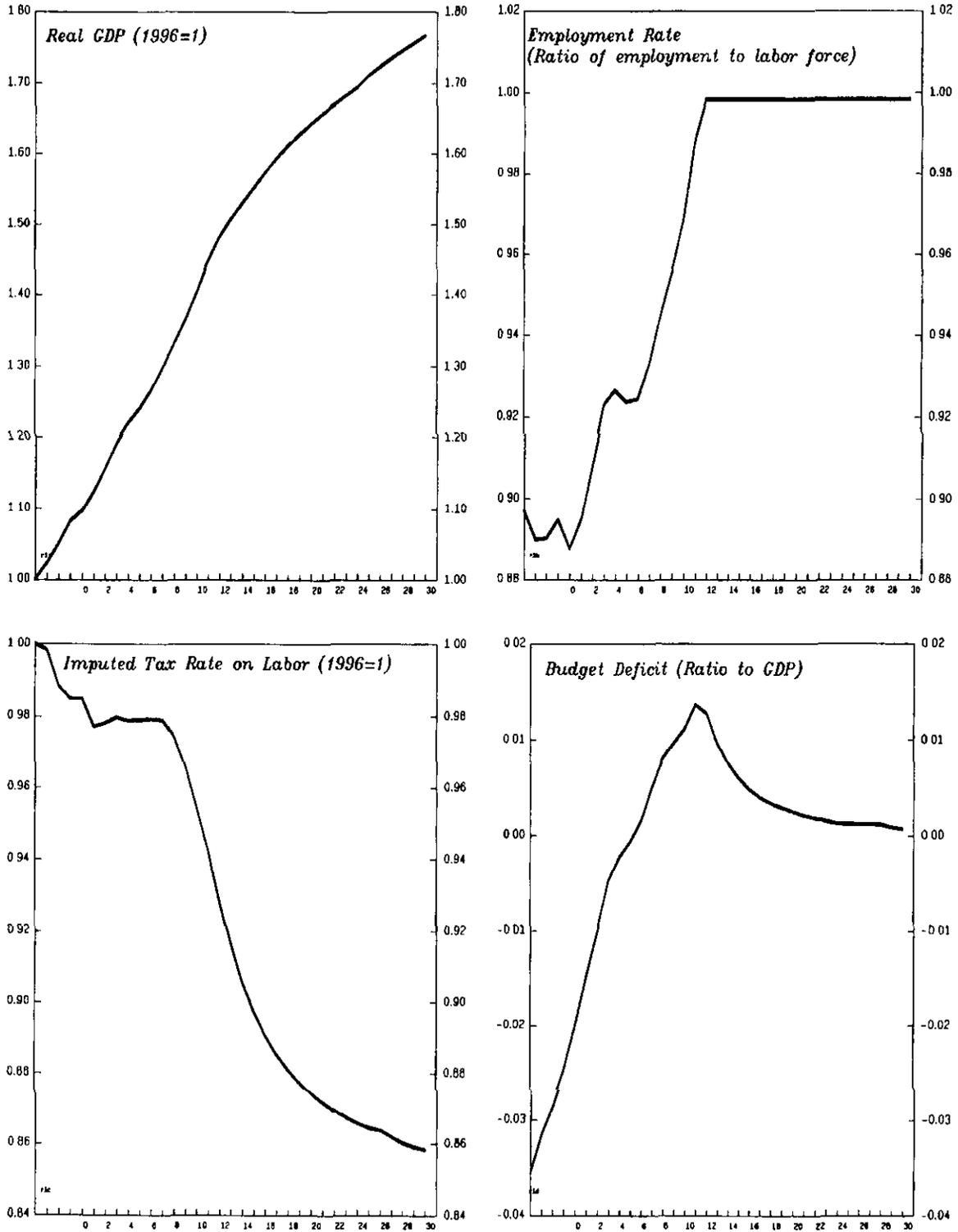
116. To establish a baseline, demographic effects are filtered out from government expenditures as pension expenditures are assumed to remain constant as a share of GDP at their initial level. In the labor market, key parameters of the wage setting equations are set at the values discussed in detail earlier. In particular, the long-run elasticity of real wages with respect to the employment rate is assumed to be unity ( $\beta=0.5$ ); taxes are assumed to be fully passed on to real wages over the long run ( $\gamma=0.5$ ); and autonomous wage growth is assumed to be 0.8 percent per annum ( $\omega=0.008$ ).

117. Under the baseline assumptions, real GDP growth slows to about  $\frac{1}{2}$  percent per annum in the long run, while full employment is reached in about 12 periods (Table III-1, Figure III-1). The slowdown in output growth is caused largely by the decline in the labor force (about  $1\frac{1}{4}$  percent per annum) and the assumed absence of labor-augmenting technological change.<sup>65</sup> The growth of output per worker, however, remains close to 2 percent in the long run (about its historical average). The government budget turns into surplus after seven periods, and converges to its target of balance over the long run. This relatively benign scenario derives from the joint assumptions of a “symmetric fiscal policy” in the near term, and a stable expenditure-to-GDP ratio over the longer run. The “symmetric fiscal policy” allows the tax burden on labor to fall, slowing the growth in labor costs. Employment expands and output growth remains high, easing the task of deficit reduction, and thus allowing for further decreases in labor taxes.

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<sup>65</sup>See the Appendix for demographic assumptions.

Figure III-1. Baseline 1/



1/ Assumes the baseline value for real wage flexibility, full tax pass-through, autonomous wage growth of 0.8 percent per annum; pension expenditures remain constant as a share of GDP.

Table III-1. Scenario 1—Baseline

	0	5	10	15	20	25	30
Output 1/	1.10	1.24	1.40	1.55	1.64	1.71	1.77
Average output growth (in percent) 2/	2.4	2.0	2.1	1.4	0.9	0.6	0.5
Average growth of output/worker (in percent) 2/	3.0	1.7	1.6	2.0	2.1	2.0	1.8
Capital stock 1/	1.13	1.32	1.54	1.81	2.11	2.42	2.74
Employment rate 3/	0.89	0.92	0.97	1.00	1.00	1.00	1.00
Tax rate on labor 4/	0.98	0.98	0.95	0.90	0.87	0.86	0.86
Average gross real wage growth (in percent) 2/	2.5	1.7	1.6	1.9	2.1	2.0	1.8
Average net real wage growth (in percent) 2/	3.1	1.7	2.3	3.2	2.5	2.1	2.0
Budget deficit (percent of GDP)	-2.0	-0.1	1.1	0.6	0.2	0.2	0.1

Source: Staff calculations.

1/ 1996=1.

2/ Annual average growth rates.

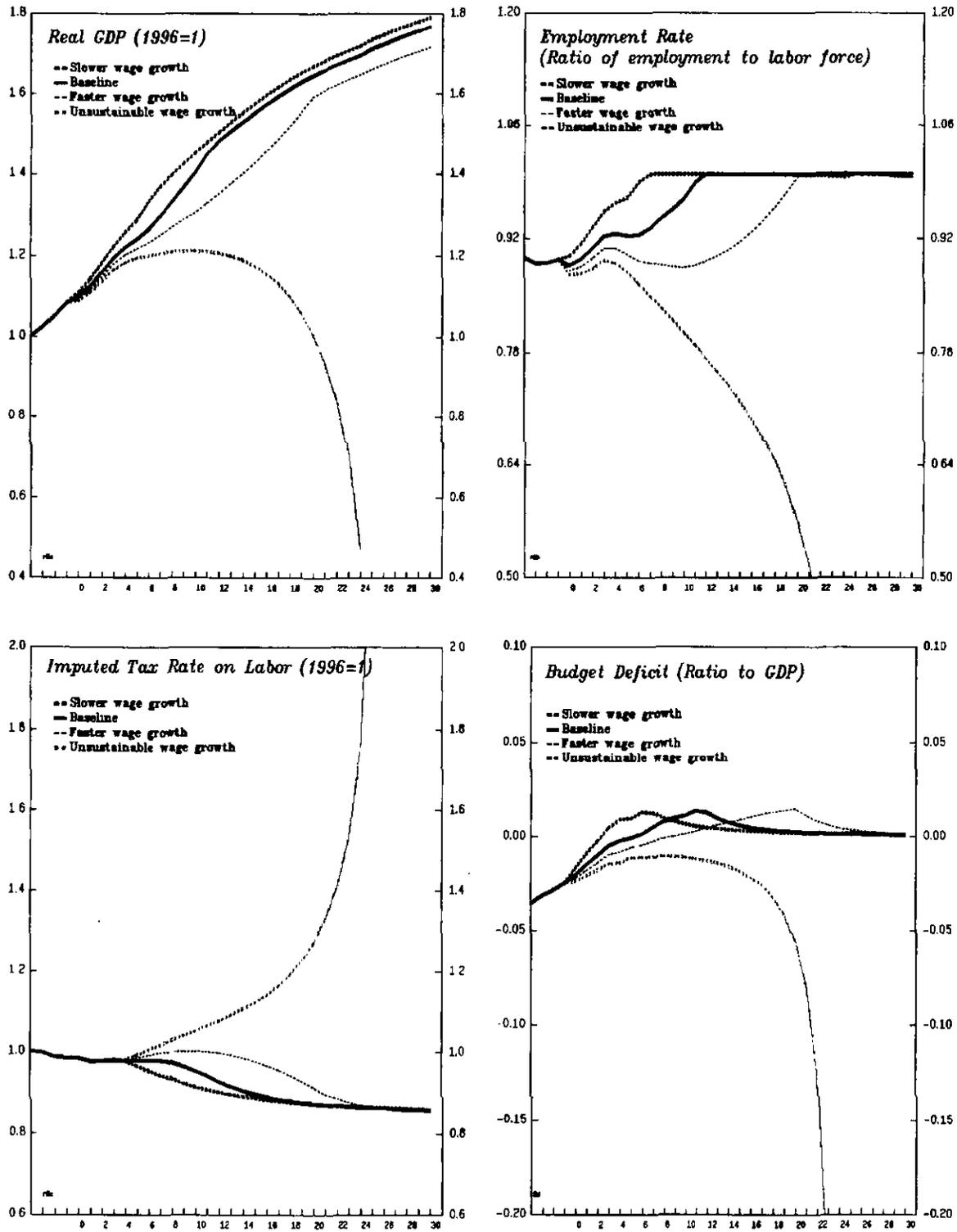
3/ Employment as a share of labor force.

4/ Imputed tax rate on labor, 1996=1.

118. Changes in autonomous wage growth have strong effects on the long-run outcome (Figure III-2). From an initial position below full employment, a lower trend increase in real wages—autonomous wage growth ( $\omega$ )—can put the economy on a trajectory that reaches full employment faster. Halving autonomous wage increases shortens the time required to reach full employment by about five periods, and leads to higher output and faster improvements in the budget deficit (despite lower taxes on labor). Wage moderation can have two origins: (i) voluntary wage moderation to improve the labor market situation;<sup>67</sup> and (ii) changes in the generosity of the social benefit system, which would act as a deterrent to excessive wage demands. In the first case, wage moderation is due to a shift in preferences, while in the second, to a change in incentives.

<sup>67</sup>An example of this is the 1982 Dutch agreement between the social partners.

Figure III-2. Baseline Under Alternative Assumptions About Autonomous Wage Growth 1/



1/ Autonomous wage growth is 0.4, 0.8, 1.0, and 1.2 percent per annum; respectively for the slower, baseline, faster, and unsustainable scenarios.

119. In contrast, faster autonomous wage increases<sup>68</sup> lead to a prolonged time (about 15 periods) of stagnant employment. Lower employment depresses the marginal product of capital, discouraging investment, and thus adversely affecting TFP growth. Even over the longer run, the level of output is lower than in the baseline scenario. Increasing autonomous wage growth further to what appears still to be feasible levels<sup>69</sup>, results in an unsustainable economic situation. Excessive wage demands push up real labor costs, which triggers layoffs to raise the marginal product of labor to the higher level of real wages. More unemployment boosts spending on unemployment benefits and hence raises the tax rate on labor, further increasing labor costs. Although the deteriorating employment situation moderates wage demands, this moderation is insufficient to compensate for the effects of higher taxes and fast autonomous wage growth. As employment losses escalate, the marginal product of capital declines, depressing investment and TFP growth. Output and the tax base shrink further, and the budget deficit balloons despite rapidly rising tax rates.

#### **The effects of a temporary fiscal shock**

120. In this section the effects of a deficit-neutral temporary fiscal shock are considered. While maintaining the assumption of no demographic effects on expenditures, in period 4 the expenditure-to-GDP ratio is assumed to increase temporarily by 1 percentage point compared with the baseline. The temporary increase in expenditures is fully financed by higher taxes. Subsequently, the evolution of taxes and expenditures follows the standard dynamics as described above.

121. Tracing the response of the economy to this fiscal impulse reveals the interaction of the labor market and fiscal structures. The initial shock reverberates throughout the economy, and depresses employment for about seven periods (Figure III-3 and Table III-2). As the tax burden on labor rises, employment declines sharply and output levels off. Although the budget deficit is initially unchanged, it widens subsequently, owing to higher spending on unemployment benefits (unemployment expenditures increase by about 1 percent of GDP), and due to lower revenues stemming from worse output performance. The employment rate remains below its pre-shock level for about seven periods after the shock. In the long run, however, the economy reaches full employment, output grows at the same rate as in the baseline scenario, and the government budget remains close to balance. The capital stock and the level of output, however, remain below their baseline paths over the long run. Since employment is lower, the marginal product of capital is smaller, and hence capital accumulation is less rapid.<sup>70</sup> The temporary fiscal shock thus has long-term consequences.

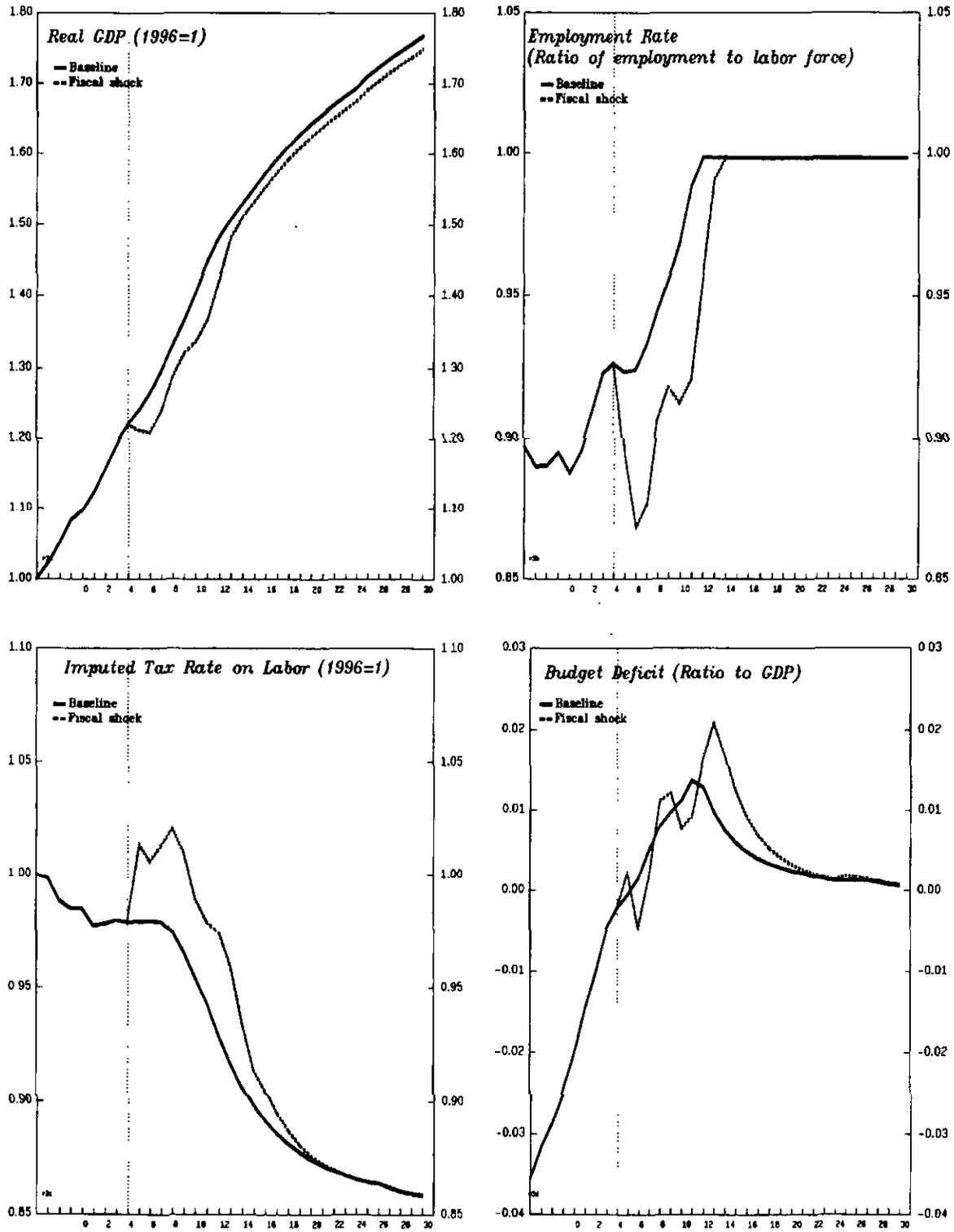
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<sup>68</sup>The baseline autonomous wage growth rate of 0.8 percent is increased to 1 percent.

<sup>69</sup>For example, to 1.2 percent per annum.

<sup>70</sup>The increase in expenditures is assumed to have an adverse effect on capital accumulation, see Appendix for details.

Figure III-3. Fiscal Shock 1/



1/ Government expenditures and revenues increase by 1 percentage point of GDP in period 4.

Table III-2. Scenario 2—Fiscal Shock

(Deviation from baseline)

	0	5	10	15	20	25
Output 1/	0.00	-0.03	-0.07	-0.02	-0.02	-0.02
Average output growth (in percent) 2/	0.0	-0.5	-0.1	0.9	0.0	0.0
Average growth of output/ worker (in percent) 2/	0.0	0.2	-0.1	-0.5	0.0	0.0
Capital stock 1/	0.00	0.00	-0.02	-0.03	-0.03	-0.04
Employment rate 3/	0.00	-0.03	-0.06	0.00	0.00	0.00
Tax rate on labor 4/	0.00	0.03	0.04	0.02	0.00	0.00
Average gross real wage growth (in percent) 2/	0.0	0.4	-0.2	-0.6	0.0	0.0
Average net real wage growth (in percent) 2/	0.0	-0.7	-0.4	0.1	0.3	0.0
Budget deficit (percent of GDP)	0.0	0.3	-0.3	0.6	0.1	0.0

Source: Staff calculations.

1/ 1996=1.

2/ Annual average growth rates.

3/ Employment as a share of labor force.

4/ Imputed tax rate on labor, 1996=1.

122. The reaction of the economy to the fiscal shock can be influenced by changes in wage-setting behavior. In the present framework the possible changes include the following: (i) greater real wage flexibility represented by an increase in the parameter  $\beta$ , and (ii) a partial tax pass-through represented by a decrease in the parameter value  $\gamma$ . Further, it is also possible to consider *asymmetric* changes in these parameter values—greater *downward* real wage flexibility, and partial pass-through of tax *increases* to real wages. These structural changes in wage-setting behavior—greater downward real wage flexibility, and less tax pass-through—can moderate the adverse effects of the fiscal shock on output and employment by modifying the dynamic interaction between the labor market and the fiscal sector. As a result, the economy could converge back to full employment more quickly, and long-run output costs could be reduced.

123. If wages are more sensitive to labor market conditions, perturbances in the labor market tend to be absorbed more by changes in real wages than by changes in employment. To illustrate how greater wage flexibility helps to stabilize employment, let us consider the effect of an exogenous increase in taxes on labor. On impact, gross real wages rise, and therefore employment declines, independent of the degree of real wage flexibility. Subsequent effects depend on the parameter value  $\beta$ . With more flexible real wages (higher  $\beta$ ), real wage growth becomes more subdued in response to the initial deterioration of the employment situation, eventually leading to a smaller decline in employment over longer periods. With

employment and output higher, the tax base shrinks less and fiscal pressures decrease, dampening further the after-effects of the initial shock. The mechanism is similar in the case of a favorable fiscal shock caused by a decline in the tax rate on labor. On impact, this leads to slower gross wage growth, and higher employment. Greater real wage flexibility allows real wage growth to pick up as labor market conditions improve. This dampens the initial decline in real labor costs, and partially offsets the initial increase in employment.

124. Greater downward wage flexibility introduces asymmetry into the dynamics. Assume real wage growth reacts more to a deterioration in the labor market, while an improvement in the labor market does not trigger correspondingly faster real wage growth. Consequently, the employment effect of adverse fiscal shocks would be reduced, but the beneficial effects of positive fiscal shocks would remain unchanged. Greater downward wage flexibility is modeled as a *higher value in the parameter value  $\beta$ , but only when the employment rate drops*: after observing a decline in the employment rate, unions, ceteris paribus, are satisfied with smaller wage increases. This asymmetric behavioral change is the observational equivalent of several institutional changes. For example, trade unions could become more concerned about the number of their employed members. A widening of the wage distribution allowed for by lower minimum wages and supported by less generous social assistance could also produce more downward real wage flexibility. If the alternative to staying employed becomes less appealing, the employment objective might become relatively more important than the wage objective for the trade union, yielding a modified trade-off.

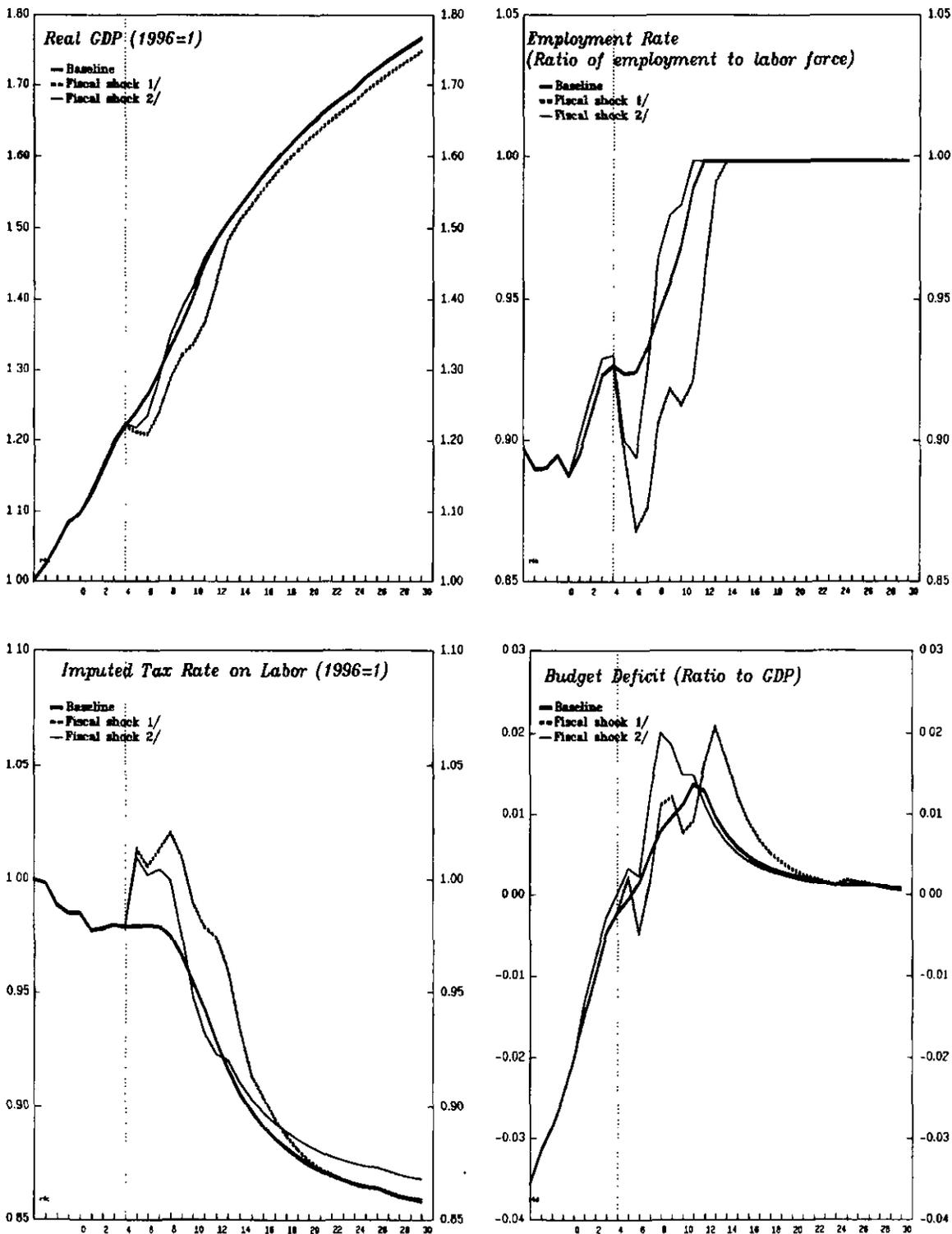
125. Figure III-4 shows the effects of the fiscal shock with varying degrees of downward wage flexibility. If real wages are more flexible downward, the initial employment effect of the fiscal shock subsequently moderates real wage demands. As a result, the employment rate starts increasing rapidly shortly after the shock, and the economy reaches full employment about five periods earlier than with less downward wage flexibility. Adverse implications for output and the budget deficit remain limited.

126. When taxes are only partly passed through to real wages, fiscal shocks have a smaller effect on real wages, and thus on employment. In the case of a tax hike, only a portion of the increase in labor taxes boosts real labor costs because the rest is "absorbed" in lower net real wages, leading to higher employment and real growth (compared with a full tax pass-through). Conversely, in the case of favorable fiscal shocks, a partial tax pass-through mutes the beneficial effects on employment, since tax cuts are partly mopped up by higher after-tax wages instead of being fully reflected in declining labor costs. While an incomplete tax pass-through helps the employment situation in times of increasing labor taxes, it decreases the employment effect of fiscal measures aimed at reducing non-wage labor costs.<sup>71</sup> Relaxing the

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<sup>71</sup>Introducing asymmetry, i.e., assuming a full pass-through of tax decreases but only a partial pass-through of tax increases, would allow for full employment effects to take place after favorable fiscal shocks, but would scale down the employment effects of adverse shocks.

Figure III-4. Fiscal Shock and Downward Wage Flexibility



1/ Government expenditures and revenues increase by 1 percentage point of GDP in period 4.  
2/ Fiscal shock with greater downward wage flexibility.

assumption about a full long-run tax pass-through to employers requires  $\gamma < (1 - \theta)$  in the model. As with the change in  $\beta$ , this can be the reflection of several underlying behavioral or institutional shifts.<sup>72</sup> In contrast to the conditional change in  $\beta$ , however, the change in the extent of the pass-through is assumed to be symmetric. With net real wages partly absorbing fiscal shocks, the employment effects of both adverse and beneficial shocks will be dampened.

127. If the increase in taxes is partially absorbed as a cut in net real wages (Figure III-5), the drop in the employment rate following the shock is smaller than under the baseline parameter values. Because net wages partly absorb not only tax increases, but also tax cuts, the subsequent rise in the employment rate is slower than with a more complete tax pass-through, so that the economy reaches full employment about the same time as in the case of a full tax pass-through.

### **The effects of population aging**

128. This section examines the implications of a series of fiscal shocks stemming from demographic changes and the characteristics of the German public pension system. Although public pension benefits are linked to previous contributions, the pension system is financed on a pay-as-you-go basis by social security contributions of those currently working. Thus, an increase in public pension expenditures raises the tax burden on labor. Demographic trends<sup>73</sup> indicate that over the simulation period, the ratio of the "retirement age" population (those above 65) to the "working age" population (those between 15 and 65) will double (from around 32 percent to 64 percent). Furthermore, the increase in the elderly dependency ratio is expected to speed up considerably after period 15. The resulting steady increase in pension obligations is tantamount to a series of fiscal shocks.

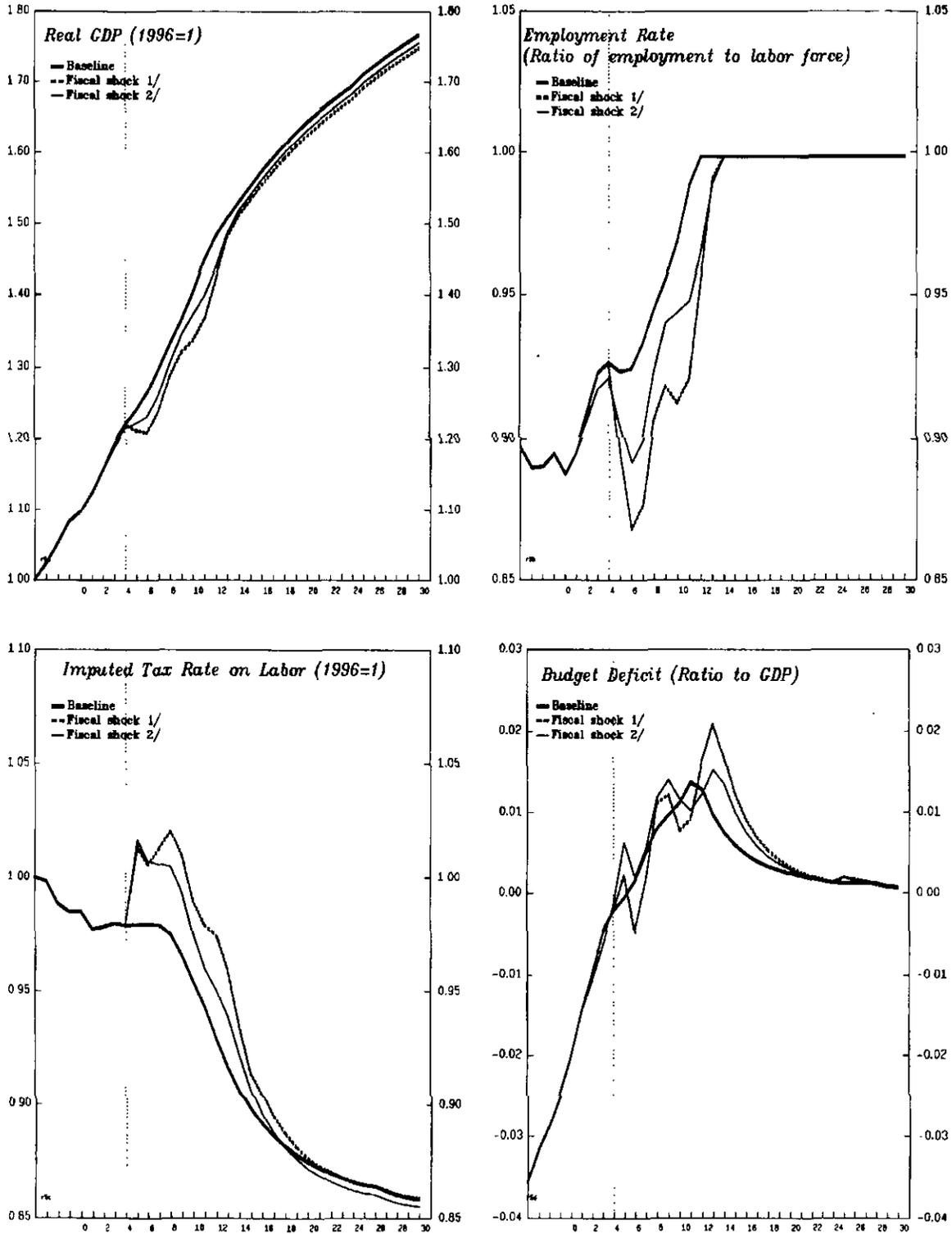
129. Over the short run, major economic indicators are similar to the baseline—the employment rate rises, output grows by more than 2 percent, and the budget deficit improves (Table III-3, and Figure III-6). Shortly after period 5, however, the increasing elderly dependency ratio exerts upward pressure on pension expenditure, and thus on the tax burden on labor. As taxes are passed through to real wages, labor costs increase, and producers lay off workers to keep the marginal product of workers in line with real wages. Output growth slows, which is due in part to the decline in labor input and to slower capital accumulation. Unemployment expenditures increase, triggering a new round of labor tax hikes, higher real wages, and further labor shedding. At the same time, capital accumulation is discouraged as low employment depresses the marginal product of capital, and higher public expenditures crowd out private investment. As population aging continues to push up tax rates, the economy quickly degenerates into a vicious circle of declining employment, shrinking output, increasing taxes, and worsening budget deficits. The process becomes unsustainable by period 10.

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<sup>72</sup>These institutional changes could include a deterioration of the unions' bargaining position, or the fact that the membership considers contributions as savings.

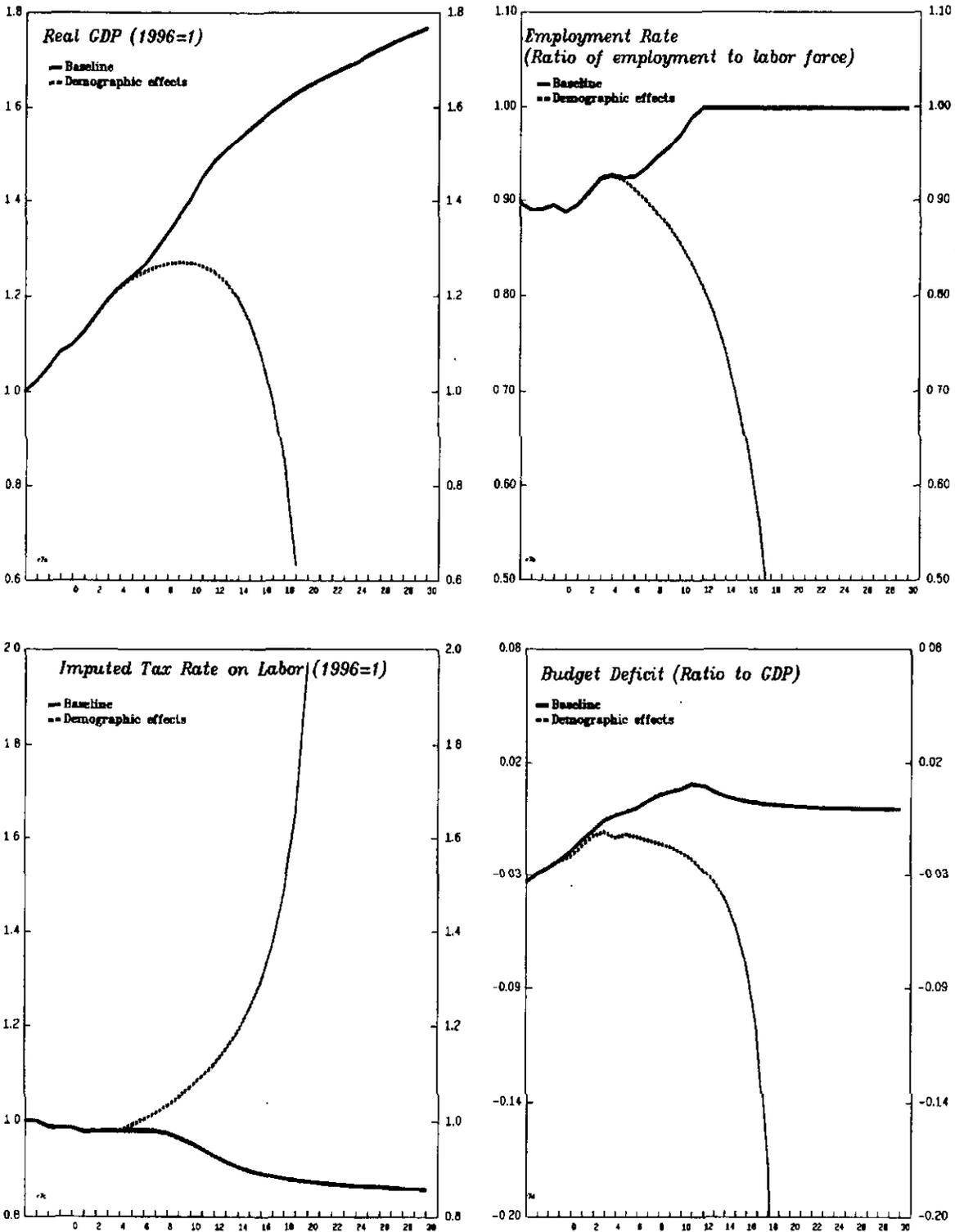
<sup>73</sup>See Appendix for details.

Figure III-5. Fiscal Shock and Partial Tax Pass-Through



1/ Government expenditures and revenues increase by 1 percentage point of GDP in period 4.  
2/ Fiscal shock with partial tax pass-through.

Figure III-6. Pension Scenario: Demographic Effects 1/



1/ In the baseline scenario, pension expenditures are constant as percent of GDP; in the alternative scenario, pension expenditures include demographic effects.

Table III-3. Scenario 3—Aging Population

(Deviation from baseline)

	0	5	10	15	20	25
Output 1/	0.00	0.00	-0.13	-0.41	n.a.	n.a.
Average output growth (in percent) 2/	0.0	0.0	-1.8	-3.3	n.a.	n.a.
Average growth of output/ worker (in percent) 2/	0.0	0.0	0.5	0.5	n.a.	n.a.
Capital stock 1/	0.00	0.00	-0.03	-0.14	n.a.	n.a.
Employment rate 3/	0.00	0.00	-0.11	-0.30	n.a.	n.a.
Tax rate on labor 4/	0.00	0.01	0.12	0.34	n.a.	n.a.
Average gross real wage growth (in percent) 2/	0.0	0.0	0.5	0.8	n.a.	n.a.
Average net real wage growth (in percent) 2/	0.0	-0.4	-2.4	-6.4	n.a.	n.a.
Budget deficit (percent of GDP)	-0.3	-1.1	-3.1	-6.3	n.a.	n.a.

Source: Staff calculations.

1/ 1996=1.

2/ Annual average growth rates.

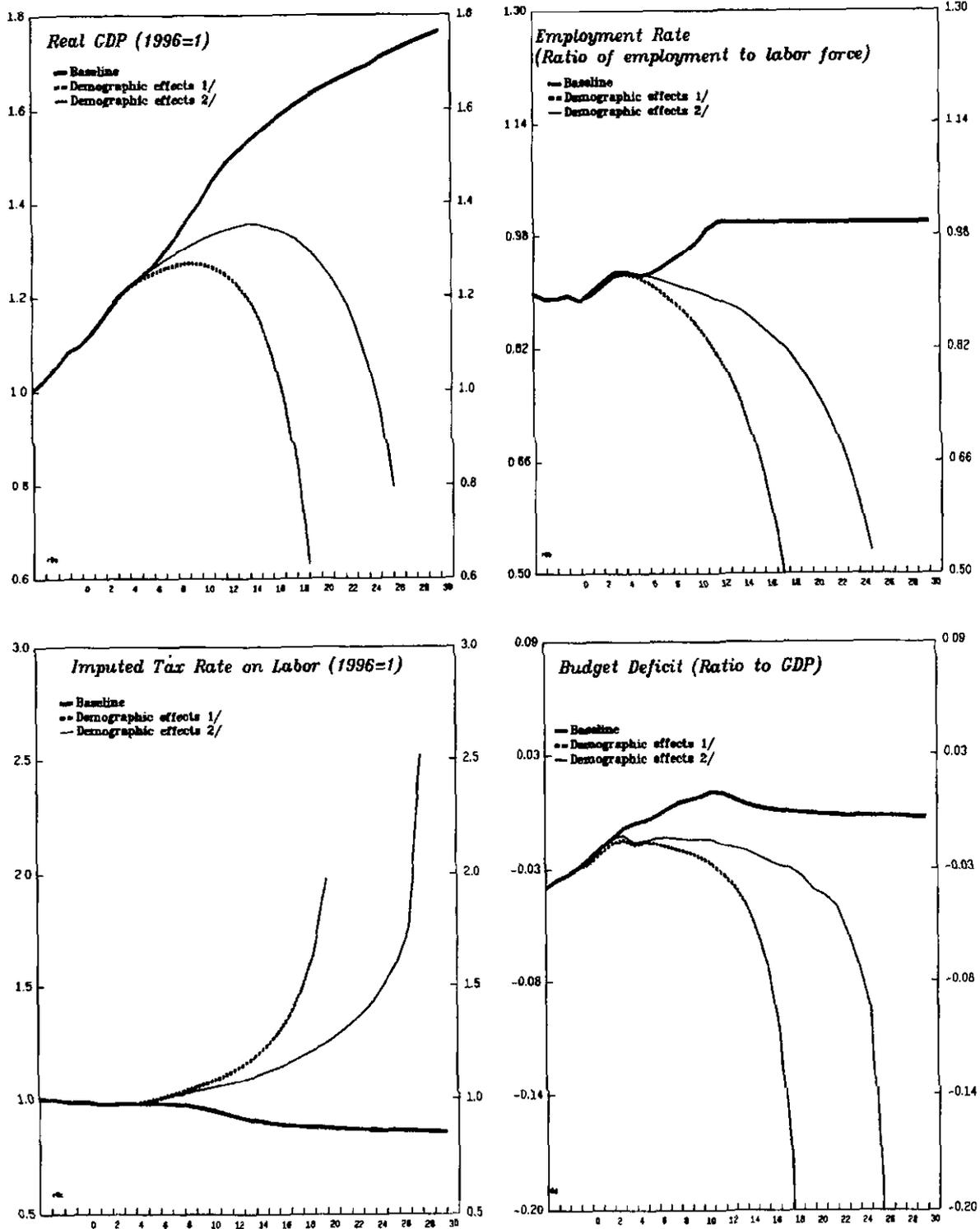
3/ Employment as a share of labor force.

4/ Imputed tax rate on labor; 1996=1.

130. As Figures III-7 and III-8 illustrate, structural changes in the labor market (such as greater downward wage flexibility, and a partial tax pass-through) can have powerful effects in the medium run, improving employment, real output, and the budget deficit. Over the long run, however, the sustained adverse fiscal shocks once more trigger a vicious circle. Greater downward wage flexibility (Figure III-7) helps to slow the employment decline after period 5 by increasing the sensitivity of real wages to changes in the employment rate. In response to the rapidly deteriorating labor market conditions, trade unions curtail wage demands. A partial tax pass-through (Figure III-8) slows down the increase in unemployment by buffering the adverse shock to labor costs. Both changes unambiguously improve the labor market outcome over the medium run. Relatively higher employment has beneficial effects for capital accumulation and for output growth. With a larger tax base, the rise in the tax rate on dependent labor necessitated by population aging is smaller, and thus the negative effect of fiscal pressures on employment is more contained. Over the long run, however, the structural changes in the labor market considered here may not be sufficient to combat the effects of population aging without further pension reforms.<sup>73</sup> As the elderly dependency ratio rises, a virtuous circle becomes unattainable. Steadily increasing social contribution rates set in motion a vicious circle between the labor market and the fiscal sector.

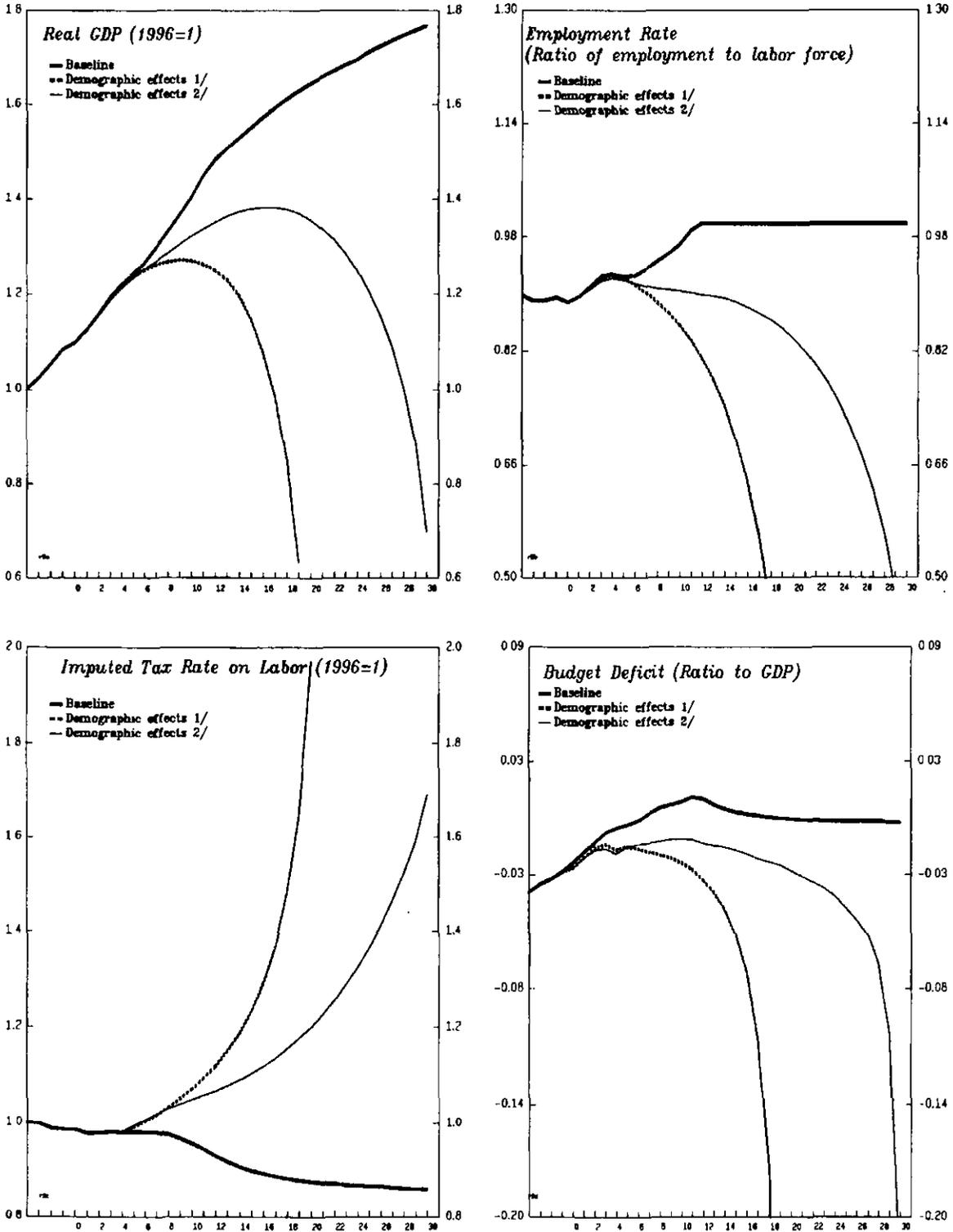
<sup>73</sup>Börsch-Supan and Schnabel (1998) reach a similar conclusion.

Figure III-7. Pension Scenario: Demographic Effects and Downward Wage Flexibility



1/ Pension expenditures rise in line with demographic projections.  
2/ Pension expenditures rise in line with demographic projections and greater downward wage flexibility is assumed.

Figure III-8. Pension Scenario: Demographic Effects and Partial Tax Pass-Through



1/ Pension expenditures rise in line with demographic projections.  
2/ Pension expenditures rise in line with demographic projections and only partial tax pass-through is assumed.

### A Model for Simulating Labor Market and Fiscal Dynamics

131. This describes the structure of the model and its calibration. The focus of the model is to provide a framework that tracks the interaction between fiscal and labor market dynamics.

#### Real economy

132. The real economy is modeled according to a neoclassical production function. For simplicity and tractability, a standard Cobb-Douglas production function with neutral technological progress is assumed. The factor inputs, capital (K) and labor (L) are combined to yield output (Y) in the following manner (Tables III-A1 and III-A2):

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha}$$

133. The capital stock is assumed to grow as a positive function of the marginal product of (private-sector) capital in the previous period, and a negative function of the share of government expenditure to GDP, G,

$$dln(K_t) = \theta_k \alpha Y_{t-1} / K_{t-1} (\phi_k - G_{t-1} / (Y_{t-1} P_{t-1}))$$

134. Total factor productivity (TFP) growth depends on capital stock growth:

$$dln(A_t) = \theta_a dln(K_{t-1})$$

135. As this model simplifies the economy by assuming away financial assets, the marginal product of capital is the main determinant of the real interest rate. Nominal interest rates are equal to the real interest rate plus the rate of inflation. Simulated real interest rates are calibrated to follow historical data by applying a multiplicative constant.

$$i_t = (1 + \pi_t)(1 + \theta_r \alpha Y_t / K_t) - 1$$

#### Labor market

136. Labor demand is determined by the marginal product of labor, which in equilibrium is assumed to adjust to a weighted average of present and past real wages (see below).

$$L_t = L_{t-1} (\sum_{i=0}^2 \lambda_i w_{t-i} / w_{t-1-i})^{-1/\alpha} \left( \frac{A_t}{A_{t-1}} \right)^{1/\alpha} \frac{K_t}{K_{t-1}}$$

Table III-A1. List of Variables

<b>Name</b>	<b>Description</b>
Y	real output
A	total factor productivity
K	real capital stock
L	employment
L*	labor force
e	employment rate
G	nominal government expenditures
Gu	unemployment benefit expenditure (nominal)
Gp	pension expenditure (nominal)
Go	other expenditure (nominal)
Gi	interest expenditure (nominal)
P	price level
w	gross real wage
r	real interest rate
$\pi$	inflation rate
i	nominal interest rate
$\tau$	imputed tax rate on labor
Rev	nominal government revenues
s	share of dependent labor
GB	government deficit in nominal terms
D	stock of government debt

Table III-A2. List of Baseline Parameter Values

Name	Value	Description	Source
$\alpha$	0.300	Capital share	IMF (1997)
$\theta_k$	0.586	Smoothing factor in capital accumulation equation	calculated
$\phi_k$	0.800	Threshold level of government expenditure in investment equation	Habermeier and Lenseigne (1998)
$\theta_k$	0.400	Elasticity of TFP with respect to capital	Habermeier and Lenseigne (1998)
$\pi$	0.020	Inflation rate	assumption
$\theta_r$	0.285	Smoothing factor in interest rate equation	calculated
$\lambda_0$	0.500	Weight on contemporaneous real wages in labor demand equation	assumption
$\lambda_1$	0.250	Weight on lagged (1 year) real wages in labor demand equation	assumption
$\lambda_2$	0.250	Weight on lagged (2 years) real wages in labor demand equation	assumption
$\theta$	0.500	Adjustment parameter in wage setting equation	Layard & al (1991)
$\beta$	0.500	Elasticity of wage setting with respect to employment rate	Layard & al (1991)
$\gamma$	0.500	Tax passthrough parameter in wage setting equation	Layard & al (1991)
$\omega$	0.008	Autonomous wage growth in wage setting equation	calculated
$\theta_t$	0.300	Effective average tax rate on capital	IMF (1997)
$\theta_u$	0.420	Gross replacement rate for unemployment benefits	OECD (1996)
$\theta_{Go}$	0.020	Adjustment parameter for other primary expenditures	assumption
$\theta_{Rev}$	0.350	Adjustment parameter in revenue equation	assumption
GB*	0.000	Target government balance in percent of GDP	assumption

137. The wage-setting process is a dynamic one where wage growth is assumed to be determined by labor market conditions, changes in  $\tau$ , and an autonomous trend ( $\omega$ ) which proxies for, inter alia, productivity growth.

$$d\ln(w_t) = \theta d\ln(w_{t-1}) + \beta d\ln(e_{t-1}) + \gamma d\ln(\tau_{t-1}) + \omega$$

138. In calibrating the model, the effects of lagged employment and wage rates are included to reflect the effects of staggered wage contracting. The simulations replace  $e_{t-1}$  and  $\tau_{t-1}$  in the above equation with a weighted average (with weights of 2/3 and 1/3, respectively) of their respective values one and two periods back in time.

139. If the economy is operating at full employment, wage growth is determined as the larger of the extent of wage growth implied by the wage setting equation, or the wage growth implied by the increase in labor's marginal product under maintained full employment.

#### Fiscal sector

140. The imputed tax rate on the employed is calculated under the assumption of a given level of revenues and a constant tax rate on capital.

$$\tau_t = Rev_t / (Y_t P_t) / s_{t-1} - \theta_\tau (1 - s_{t-1}) / s_{t-1}$$

141. Total government expenditures are the sum of unemployment benefits, pension expenditures, other primary expenditures, and interest expenditures.

$$G_t = Gu_t + Gp_t + Go_t + Gi_t$$

142. Unemployment expenditures are equal to the number of unemployed times the benefit rate. The benefit rate is calculated as the product of gross nominal wages and the replacement ratio.

$$Gu_t = (L^*_t - L_t) w_t P_t \theta_u$$

143. Pension expenditures for a given population cohort are determined as the number of pensioners in the cohort times the level of pensions at retirement times an indexation factor. Expenditures for all cohorts are added to obtain total pension expenditure. The number of pensioners for a given cohort  $c$  at a given time  $t$  ( $N_{t,c}$ ) is calculated on the basis of assumed demographic projections. Pensions at retirement ( $\kappa_c$ ) are calculated as gross nominal wages times the pension replacement ratio. The replacement ratio is assumed to decline over time, corresponding to the recently passed pension reforms. The indexation factor allows pensions to rise with net nominal wages (index factor  $I_{t,c} = (1 - \tau_t) w_t P_t / (1 - \tau_c) w_c P_c$ ).

$$Gp_t = \sum_c N_{t,c} \kappa_c I_{t,c}$$

144. Other primary expenditures are adjusted to bring the government fiscal balance (as a ratio to GDP) closer to its target value.

$$d(Go/(P_t Y_t)) = \theta_{Go} (GB_{t-1}/(P_{t-1} Y_{t-1}) - GB^*)$$

145. Interest expenditures in a give period are equal to the nominal interest rate times the average stock of government debt in that period.

$$Gi_t = i_t (D_{t-1} + D_t) / 2$$

146. Revenues as a share of GDP are also assumed to be adjusted to bring the government deficit closer to its target value.

$$d(Rev/(P_t Y_t)) = \theta_{Rev} (GB_{t-1}/(P_{t-1} Y_{t-1}) - GB^*)$$

147. Government debt is determined as cumulated government deficits.

### Demographic assumptions

148. Demographic assumption are based on the World Bank's population projections for Germany, which assume zero net immigration after 2005.<sup>74</sup>

Table III-A3. Demographic Assumptions

(In percent)

	1996– 2000	2001– 2005	2006– 2010	2011– 2015	2016– 2020	2021– 2025	2026– 2030
Average annual population growth	0.0	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3
Average share of population above 65	22.0	24.1	25.4	27.1	29.3	32.3	35.4
Average share of population 15-65	68.2	67.7	67.0	66.0	64.5	61.9	58.6

<sup>74</sup>For a comparison of the projections with those of *Prognos-Gutachten*, see IMF (1997).

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Table A1. Germany: Key Data on Output, Income and Demand

	1993	1994	1995	1996	1997
(In billions of deutsche mark)					
Gross national product	3,168.8	3,320.2	3,442.7	3,515.3	3,612.2
Gross domestic product	3,163.7	3,328.2	3,459.6	3,541.5	3,641.8
Domestic demand	3,145.9	3,307.2	3,433.0	3,498.4	3,580.6
Private consumption	1,829.3	1,906.0	1,973.9	2,040.0	2,084.0
Public consumption	634.9	658.6	686.5	704.8	705.2
Gross investment	681.8	742.6	772.6	753.6	791.4
Labor income 1/	1,777.9	1,824.1	1,883.4	1,902.7	1,906.6
Household disposable income	2,083.9	2,156.8	2,226.4	2,302.0	2,339.6
(In millions)					
Population	81.2	81.4	81.7	81.9	82.2
Employment 2/	35.2	35.0	34.8	34.4	33.9
(In deutsche marks)					
GDP per employed person	89,824	95,168	99,365	103,058	107,504
Average monthly labor income 1/ 3/	3,816	3,908	4,047	4,136	4,182
Investment per employed person	19,358	21,233	22,189	21,931	23,363

Sources: Statistisches Bundesamt, Volkswirtschaftliche Gesamtrechnungen; Deutsche Bundesbank, Monthly Report.

1/ According to place of residence.

2/ According to place of work.

3/ Excludes social security contributions paid by employers.

Table A2. Germany: Aggregate Demand

(Percentage changes at 1991 prices)

	In billions of deutsche mark at current prices in 1997	1993	1994	1995	1996	1997
Private consumption	2,084.0	0.1	1.2	1.8	1.4	0.2
Public consumption	705.2	-0.5	2.1	2.0	2.6	-0.4
Gross fixed investment	731.1	-5.6	3.5	0.8	-1.2	0.2
Construction	451.6	1.3	6.5	0.3	-3.1	-2.2
Machinery and equipment	279.5	-14.4	-1.0	1.6	1.9	3.9
Stockbuilding 1/	60.3	-0.1	0.8	0.4	-0.3	1.1
Total domestic demand	3,580.6	-1.4	2.7	2.0	0.8	1.2
Export of goods and nonfactor services	967.9	-5.0	7.9	6.6	5.1	10.7
Imports of goods and nonfactor services	906.7	-5.9	7.7	7.3	2.8	7.0
Foreign balance 1/	61.2	0.3	-0.0	-0.2	0.6	1.0
Gross domestic product	3,641.8	-1.2	2.7	1.8	1.4	2.2
Western Germany	3,219.7	-2.0	2.1	1.5	1.3	2.2
Eastern Germany	422.1	9.3	9.6	5.2	1.9	1.6

Sources: Statistisches Bundesamt, Volkswirtschaftliche Gesamtrechnungen.

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

Table A3. Germany: Household Income, Consumption, and Saving

(Percentage changes)

	1993	1994	1995	1996	1997
<u>Germany</u>					
Gross compensation from					
dependent employment	2.1	2.6	3.3	1.0	0.2
Gross compensation per employee	5.9	1.3	2.3	3.3	3.9
Net compensation from					
dependent employment	2.6	-0.5	0.3	2.1	-1.5
Net compensation per employee	6.3	-1.7	-0.6	4.4	2.1
Disposable income 1/	3.5	3.5	3.2	3.4	1.6
Final consumption expenditure	4.2	4.2	3.6	3.4	2.2
Real disposable income 1/ 2/	-0.6	0.5	1.5	1.4	-0.3
Real final consumption					
expenditure	0.1	1.2	1.8	1.4	0.2
Saving ratio	12.2	11.6	11.3	11.4	10.9
<u>Western Germany</u>					
Gross compensation per employee	2.7	3.2	3.5	2.3	1.7
Gross wages and salary per employee	2.8	2.0	3.2	1.9	0.9
Net compensation per employee	3.1	0.0	0.0	3.7	-0.4
<u>Eastern Germany</u>					
Gross compensation per employee	15.0	7.1	6.6	3.6	2.5
Gross wages and salary per employee	15.9	6.0	6.6	3.1	1.8
Net compensation per employee	15.3	3.9	5.2	5.9	0.4

Sources: Statistisches Bundesamt, Volkswirtschaftliche Gesamtrechnungen.

1/ Disposable income in the official national accounts in 1994 is understated because of underrecording of net investment income inflows from abroad.

2/ Deflated by private consumption deflator.

Table A4. Germany: Labor Market

(In thousands, unless otherwise indicated)

	1994	1995	1996	1997	1998Q1	1998Q2
<b>Germany</b>						
Employment 1/	34,981	34,856	34,421	33,961	33,852	...
(Percent change)	-0.7	-0.4	-1.2	-1.3	-0.5	...
Unemployment	3,700	3,616	3,968	4,388	4,433	4,342
(In percent of labor force) 2/	9.6	9.4	10.4	11.4	11.6	11.2
Vacancies	286	322	328	338	375	430
<b>Western Germany</b>						
Employment 1/	28,653	28,462	28,155	27,883	27,855	...
(Percent change)	-1.2	-0.7	-1.1	-1.0	-0.2	...
Unemployment	2,557	2,566	2,798	3,022	2,981	2,926
(In percent of labor force) 2/	8.2	8.3	9.1	9.8	9.7	9.4
Vacancies	235	267	271	282	311	335
<b>Eastern Germany</b>						
Employment 1/	6,327	6,394	6,266	6,078	5,997	6,012
(Percent change)	1.8	1.0	-2.0	-3.0	-2.1	-1.6
Short-time workers	97	71	71	49	47	39
Persons employed under employment promotion schemes	284	310	277	233	182	285
Persons undergoing vocational training	258	254	239	180	124	155
Unemployment	1,135	1,051	1,172	1,374	1,580	1,381
(In percent of labor force) 2/	15.1	14.1	15.7	18.3	19.2	18.5
Vacancies	52	55	57	56	69	97

Sources: Deutsche Bundesbank, and data provided by authorities.

1/ According to place of work.

2/ Labor force calculated from employment and unemployment data.

Table A5. Germany: Wages and Prices

(Percentage changes)

	1994	1995	1996	1997	1998Q1 1/
GDP deflator	2.4	2.1	1.0	0.6	0.5
Private consumption deflator	3.0	1.8	2.0	1.9	1.0
Fixed investment deflator	1.5	1.4	-0.4	-0.1	-0.6
Export deflator	0.6	1.7	0.3	1.0	1.3
Import deflator	0.5	0.6	0.7	3.0	1.1
Producer price index	0.6	1.7	-0.4	1.1	0.6
Western Germany	0.6	1.7	-0.6	1.0	0.6
Eastern Germany	1.2	1.4	1.4	1.8	0.4
Consumer price index	2.7	1.8	1.5	1.8	1.2
Western Germany	2.6	1.8	1.4	1.7	1.1
Eastern Germany	3.6	2.1	2.3	2.0	1.5
Unit labor costs					
in producing sector	-6.0	-0.1	-0.8	-5.4	-6.7
Western Germany	-5.3	0.6	-0.6	-5.2	-6.3
Eastern Germany	-6.0	-2.5	-3.1	-7.6	-10.2
Negotiated hourly wages					
Western Germany					
Overall economy	2.1	4.0	2.2	1.2	1.1
Producing sector 2/	2.2	5.3	3.3	1.5	0.6
Eastern Germany					
Overall economy	9.6	8.7	5.0	2.5	1.1
Producing sector 2/	16.9	13.9	8.0	5.0	0.6

Sources: Statistisches Bundesamt, Volkswirtschaftliche Gesamtrechnungen; Deutsche Bundesbank, Monthly Report.

1/ Percentage change from a year ago.

2/ Excluding construction and energy.

Table A6. Germany: General Government Finances 1/

(In billions of deutsche mark; national accounts basis)

	1993	1994	1995 2/	1996	1997	1998 3/
	(National definition)					
Total expenditure	1,600.1	1,668.1	1,752.1	1,770.8	1,778.0	1,820.7
Expenditure on goods and services	721.7	745.0	769.7	781.5	774.7	783.8
Public consumption	634.9	658.6	686.6	704.8	705.2	713.0
Public investment	86.8	86.4	83.1	76.7	69.5	70.8
Transfer payments	878.4	923.1	852.5	989.3	1,003.3	1,037.0
Social benefits	578.4	613.9	649.9	663.4	674.8	690.5
Subsidies	61.9	69.1	71.5	70.0	66.9	69.6
Interest	104.2	112.2	131.1	131.8	135.9	141.0
Other	133.9	127.9	129.9	124.1	125.7	135.9
Total revenue	1,488.2	1,580.9	1,631.3	1,645.0	1,676.0	1,717.8
Tax revenue	772.9	811.5	838.8	818.6	822.2	846.2
Indirect taxes	409.6	443.8	447.4	449.5	454.9	...
Direct taxes	363.4	367.7	391.4	369.1	367.3	...
Social security contributions	596.4	642.6	672.8	705.0	731.2	744.6
Other revenue	118.9	126.8	119.7	121.4	122.6	127.1
Financial balance	-111.8	-87.3	-122.9	-125.9	-101.9	-102.9
(in percent of GDP)	(-3.5)	(-2.6)	(-3.5)	(-3.5)	(-2.8)	(-2.7)
Of which						
Territorial authorities	-119.2	-94.1	-113.0	-115.3	-106.6	-117.2
Federal	-72.1	-42.2	-54.0	-68.7	-58.6	...
Länder	-40.5	-44.6	-45.9	-43.9	-47.4	...
Local governments	-6.6	-7.3	-10.0	-2.7	-0.6	...
Social security system	7.4	6.9	-11.1	-10.6	4.7	14.3
	(Maastricht definition)					
Memorandum items:						
Financial balance	-101.1	-79.5	-113.0	-120.2	-96.5	-97.5
(in percent of GDP)	(-3.2)	(-2.4)	(-3.3)	(-3.4)	(-2.7)	(-2.5)
Of which						
Territorial authorities	-108.5	-86.3	-102.0	-109.6	-101.2	-111.8
Federal	-67.9	-40.9	-52.6	-68.7	-58.6	...
Länder	-37.8	-42.0	-42.5	-40.2	-44.8	...
Local governments	-2.8	-3.4	-6.9	-0.7	2.2	...
Social security system	7.4	6.9	-11.1	-10.6	4.7	14.3

Source: Federal Ministry of Finance.

1/ Including the German Unity Fund.

2/ Excluding the assumption of Treuhand debt.

3/ Interim technical projections provided by the authorities.

Table A7. Germany: Territorial Authorities' Finances

(Administrative basis; in billions of deutsche mark)

	1993	1994	1995	1996	1997	1998 1/
Total expenditure	1,122.6	1,167.0	1,203.1	1,188.3	1,175.4	1,143
Current expenditure	936.0	984.4	1,019.9	1,019.2	1,015.3	984½
<i>Of which</i>						
Wages and salaries	336.1	355.6	367.0	368.3	367.1	325
Goods	153.5	155.2	155.6	156.1	154.9	134½
Interest	101.9	113.8	128.7	130.4	131.8	137½
Current transfers	344.3	358.1	368.7	364.4	361.1	387½
Capital expenditure	186.7	182.7	183.2	169.1	160.1	158½
<i>Of which</i>						
Investment	99.2	95.1	92.8	87.5	83.9	77½
Capital transfers	50.2	45.5	47.6	45.2	41.9	49½
Loans	34.5	39.1	37.5	33.6	32.9	29
Total revenue	984.8	1,050.8	1,093.7	1,067.8	1,078.4	1,065
Current revenue	950.0	1000.9	1,032.9	1,014.2	1,006.4	979½
Taxes	750.5	785.3	815.1	800.5	797.5	820½
Other	199.5	215.7	217.8	213.7	208.9	159
Capital revenue	34.7	49.9	60.8	53.6	72.0	85½
Financial balance	-137.8	-116.3	-109.4	-120.3	-97.6	-78
(In percent of GDP)	(-4.4)	(-3.5)	(-3.2)	(-3.4)	(-2.7)	(-2)
<i>Of which</i>						
Federal Government	-66.9	-50.6	-50.5	-78.5	-63.4	-57
States (west) 2/	-22.5	-24.7	-28.6	-32.1	-26.8	-21
States (east) 3/	-19.9	-19.9	-16.4	-14.8	-12.7	-11½
Municipalities (west)	-8.9	-5.9	-12.4	-5.1	-6.3	-5½
Municipalities (east)	-4.4	-4.8	-1.9	-2.4	-1.4	-1½
German Unity Fund	-13.5	-3.0	2.3	2.7	3.3	½
Inherited Debt Fund	...	...	7.3	9.5	8.0	21
Other special funds 4/	-1.7	-7.5	-9.1	0.3	1.7	-3

Source: Federal Ministry of Finance.

1/ Interim technical projections provided by the authorities; from 1998 onward without public hospitals.

2/ Including Berlin (west).

3/ Including Berlin (east).

4/ European Recovery Program (ERP), Burden Equalization Fund (LAF), European Community accounts, Credit Repayment Fund (KAF) (until 1994), Bundeseisenbahnvermögen (BEV) (1994), Entschädigungsfonds (from 1994), Steinkohlefonds (from 1996).

Table A8. Germany: Federal Government Finances

(Administrative basis; in billions of deutsche mark)

	1994	1995	1996		1997			1998		1999	
	Actual	Actual	Draft 1/	Amended draft	Actual draft	Draft 1/	Amended draft	Actual	Draft 1/	Amended draft	Draft 1/
Total expenditure 2/	471.2	464.7	452.0	451.3	455.6	440.2	444.8	441.9	461.0	456.8	465.3
Current expenditure	408.9	397.0	383.6	383.7	393.4	378.1	393.4	383.8	402.0	398.3	406.7
Wages and salaries	52.7	52.9	54.2	53.1	52.9	53.0	53.1	52.5	52.8	52.5	52.6
Goods	37.9	37.8	39.9	40.0	39.1	38.7	39.4	38.1	39.2	39.6	41.2
Interest	53.1	49.7	55.6	53.4	50.9	56.6	53.7	53.4	56.4	56.5	57.6
Current transfers to other levels of government	77.7	63.0	68.9	67.9	66.8	65.4	57.9	57.7	64.7	58.9	51.4
Other current transfers 2/	187.6	193.5	164.9	169.3	183.7	164.4	187.5	182.1	188.9	190.9	204.0
Other current expenditure	0.0	0.0	-0.2	-0.3	0.0	-0.3	1.8	0.0	0.0	0.0	0.0
Capital expenditure	62.3	67.7	68.7	67.9	62.1	62.4	58.7	58.1	59.6	59.5	58.9
Investment	12.0	12.3	12.3	12.4	12.1	13.1	12.8	12.2	13.8	13.7	14.5
Capital transfers and loans to other levels of government	16.8	23.8	25.9	25.8	24.5	22.2	20.2	20.5	19.7	19.9	19.4
Other capital transfers and loans	13.4	13.4	30.5	29.7	11.8	27.1	27.6	9.9	26.1	13.6	14.5
Total revenue 2/	420.6	414.1	392.0	391.2	377.0	383.6	373.9	378.4	403.1	400.3	409.0
Current revenue 2/	410.6	395.0	384.6	374.7	365.9	374.1	363.0	359.4	374.4	359.6	390.8
Taxes 2/	379.0	366.1	361.3	351.2	338.6	350.3	330.2	331.1	347.6	331.8	364.8
Other	31.6	28.8	23.2	22.2	27.3	23.8	26.3	28.3	26.8	27.9	26.1
Capital revenue	10.0	19.2	7.4	16.5	11.1	9.4	24.3	19.0	28.7	40.7	18.2
Financial balance	-50.6	-50.5	-60.0	-60.1	-78.5	-56.6	-71.0	-63.4	-57.9	-56.5	-56.3
(In percent of GDP)	(-1.5)	(-1.5)	(-1.7)	(-1.7)	(-2.2)	(-1.5)	(-1.9)	(-1.7)	(-1.5)	(-1.5)	(-1.4)
Memorandum item:											
Defense expenditure	48.4	47.7	48.7	48.5	47.4	46.6	46.6	46.4	46.9	46.9	47.8
(In percent of GDP)	(1.5)	(1.4)	(1.4)	(1.4)	(1.3)	(1.3)	(1.3)	(1.3)	(1.2)	(1.2)	(1.2)

Source: Federal Ministry of Finance.

1/ As approved by the Cabinet.

2/ For 1996, includes an approximate DM 20 billion reduction due to reclassification of child allowances from an expenditure to a tax deduction.

Table A9. Germany: Länder Government Finances

(Administrative basis; in billions of deutsche mark)

	1994		1995		1996		1997		1998 (Proj.) 1/	
	West Germany 2/	East Germany 3/								
Total expenditure	343.1	109.7	357.6	116.1	364.5	119.7	362.6	118.3	365½	117½
Current expenditure	295.6	79.0	308.9	84.0	316.0	87.2	317.5	86.9	321	88
Wages and salaries	139.6	27.8	145.1	29.5	145.4	30.4	146.2	30.7	148½	31
Goods	32.8	9.5	32.6	9.9	34.7	10.7	33.9	10.5	34	10½
Interest	26.9	3.1	27.4	4.2	28.0	5.2	29.2	6.1	30½	6½
Current transfers to other levels of government	59.6	25.5	67.0	27.2	63.5	26.3	63.0	25.0	62½	25
Other current transfers	36.7	13.2	36.8	13.2	44.3	14.7	45.3	14.6	45½	14½
Capital expenditure	47.5	30.7	48.7	32.1	48.5	32.5	45.1	31.4	44½	29½
Investment	11.9	5.5	11.9	5.6	10.5	5.2	10.8	4.6	11	4½
Capital transfers and loans to other levels of government	17.5	10.6	17.9	11.4	15.1	10.5	13.3	10.8	13	10
Other capital transfers and loans	18.1	14.6	18.9	15.1	22.9	16.8	21.0	15.9	20½	15
Total revenue	318.4	89.7	329.1	99.4	333.3	104.7	336.5	105.4	344½	106
Current revenue	298.6	79.9	305.7	84.7	315.3	87.0	312.9	88.0	322½	89
Taxes	236.7	34.1	246.9	51.2	252.7	49.6	249.7	50.3	259½	52
Other	61.8	45.8	58.8	33.5	62.5	37.4	63.3	37.7	63	37
Capital revenue	19.8	9.9	23.4	14.8	18.0	17.7	23.5	17.3	22	17½
Financial balance (In percent of GDP)	-24.7 (-0.7)	-20.0 (-0.6)	-28.4 (-0.8)	-16.7 (-0.5)	-31.1 (-0.9)	-15.0 (-0.4)	-26.7 (-0.7)	-12.9 (-0.4)	-21 (-½)	-11½ (-½)

Source: Federal Ministry of Finance.

1/ Interim technical projections provided by the authorities.

2/ Including Berlin (west).

3/ Including Berlin (east).

Table A10. Germany: Municipalities' Finances

(Administrative basis; in billions of deutsche mark)

	1994		1995		1996		1997		1998 (Proj.) 1/	
	West Germany	East Germany								
Total expenditure	235.0	59.2	237.9	60.8	231.6	57.4	226.4	53.4	227½	52½
Current expenditure	183.3	40.3	188.5	42.5	186.2	40.8	183.2	37.9	185	37½
Wages and salaries	60.0	17.7	61.3	18.0	60.8	17.0	60.8	15.7	61	15
Goods	43.0	10.5	41.5	10.7	41.3	10.2	41.8	9.8	42½	9½
Interest	9.9	1.2	9.8	1.5	9.7	1.7	9.4	1.7	9½	2
Current transfers to other levels of government	7.4	0.5	7.6	0.1	7.6	0.4	6.4	0.4	6½	½
Other current transfers	63.0	10.2	68.3	12.3	66.8	11.6	64.8	10.3	66	10½
Capital expenditure	51.7	18.9	49.4	18.2	45.4	16.6	43.2	15.5	42½	15
Investment	41.9	17.5	40.3	16.1	37.4	14.4	35.7	13.3	35	13
Capital transfers and loans to other levels of government	2.4	0.4	2.1	0.5	1.0	0.4	1.1	0.4	1	½
Other capital transfers and loans	7.5	1.1	7.0	1.6	7.0	1.8	6.4	1.7	6½	1½
Total revenue	228.9	53.9	225.6	58.7	227.5	54.9	222.1	51.8	222	51
Current revenue	198.1	42.7	196.7	46.4	196.9	42.9	193.3	39.7	193	39½
Taxes	81.0	6.5	78.5	7.5	79.7	6.4	80.7	6.8	82	8
Other	117.1	36.2	118.2	38.9	117.2	36.5	112.5	32.9	111	32
Capital revenue	30.8	11.1	28.9	12.3	30.6	12.0	28.9	12.1	29	11½
Financial balance (In percent of GDP)	-6.1 (-0.2)	-5.3 (-0.2)	-12.3 (-0.4)	-2.1 (-0.1)	-4.0 (-0.1)	-2.5 (-0.1)	-4.2 (-0.1)	-1.6 (-0.0)	-5½ (-0.1)	-1½ (-0.0)

Source: Federal Ministry of Finance.

1/ Interim technical projections provided by the authorities.

Table A11. Germany: Tax Revenue of the Territorial Authorities 1/

(Cash basis; in billions of deutsche mark)

	1993	1994	1995	1996	1997	1998 2/
Total tax revenue	749.1	786.2	814.3	800.0	797.2	820.5
By type of tax						
Personal income tax	314.0	323.5	326.4	288.3	280.5	296.6
Corporate tax	27.8	19.6	18.1	29.5	33.3	34.2
Wealth tax	6.8	6.6	7.9	9.0	1.8	1.0
Trade tax 3/	42.3	44.1	42.2	45.9	48.6	44.5
Value-added tax 4/	216.3	235.7	234.6	237.2	240.9	253.4
Petroleum tax	56.3	63.8	64.9	68.3	66.0	66.8
Tobacco tax	19.5	20.3	20.6	20.7	21.2	21.2
Motor vehicle tax	14.1	14.2	13.8	13.7	14.4	14.4
Other taxes	52.1	58.4	85.8	87.4	90.5	88.4
By level of government						
Federal Government	360.3	386.1	390.8	363.7	356.2	363.3
Länder	256.4	262.2	288.5	302.9	302.8	314.0
Municipalities 5/	95.8	97.1	95.0	94.0	96.4	99.4
European Communities 6/	36.6	40.7	40.0	39.4	41.7	43.8

Source: Federal Ministry of Finance.

1/ Tax revenue data in this table are calculated on a cash basis, and may differ from data on an administrative basis.

2/ Interim technical projections provided by the authorities.

3/ Tax based on capital stock of businesses and on return to capital.

4/ Including turnover tax on imports.

5/ Including municipal taxes in Berlin, Bremen, and Hamburg.

6/ Collection of import duties and the EU's share of value-added tax collections. Also includes other revenue which is calculated based on GNP.

Table A12. Germany: Social Security Funds 1/

(In billions of deutsche mark)

	1992	1993	1994	1995	1996	1997
Total Revenue	628.5	679.8	715.0	745.2	787.8	814.5
(In percent of GDP)	(20.4)	(21.5)	(21.5)	(21.5)	(22.2)	(22.4)
Contributions	533.1	565.3	607.0	636.4	667.4	692.1
Other current transfers	82.6	102.4	97.2	98.2	111.1	113.1
<i>Of which:</i>						
From territorial authorities	80.6	100.2	94.8	95.1	107.4	108.7
Other revenue	12.8	12.1	10.7	10.1	9.5	9.3
Total expenditure	630.7	672.3	708.2	756.3	798.4	809.8
(In percent of GDP)	(20.5)	(21.3)	(21.3)	(21.8)	(22.5)	(22.2)
Consumption (net)	217.9	220.3	237.8	253.9	271.6	276.6
Social transfers	397.9	436.6	455.7	484.3	510.4	520.2
Other expenditure	14.9	15.4	14.7	16.7	15.3	13.0
Financial balance	-2.2	7.4	6.9	-10.1	-10.6	4.7
(In percent of GDP)	(-0.1)	(0.2)	(0.2)	(-0.3)	(-0.3)	(0.1)

Source: Federal Ministry of Finance.

1/ On a national accounts basis.

Table A13. Germany: Interest Rates  
(In percent per annum, period averages)

	Discount Rate 1/ Rate	Securities Repurchase Rate	Lombard Rate 1/ Rate	Money Market Rate	10-year Government Bond Yield	Lending Rates		3-month Time Deposits
						Current Account Loans	Discount Loans	
1992	8.2	9.4	9.7	9.5	7.8	13.6	10.5	8.5
1993	6.9	7.4	8.1	7.2	6.4	12.8	9.1	6.7
1994	4.8	5.2	6.3	5.3	7.1	11.5	6.9	4.8
1995	3.8	4.4	5.8	4.5	6.9	10.9	6.1	4.1
1996	2.6	3.2	4.7	3.3	6.2	10.0	4.9	3.0
1997	2.5	3.1	4.5	3.3	5.6	9.1	4.7	2.9
1995								
I	4.3	4.8	6.0	5.1	7.5	11.3	6.6	4.6
II	4.0	4.5	6.0	4.6	7.0	11.0	6.2	4.2
III	3.7	4.4	5.8	4.4	6.9	10.9	6.0	4.1
IV	3.3	4.0	5.4	4.0	6.3	10.6	5.6	3.7
1996								
I	3.0	3.4	5.0	3.4	6.3	10.3	5.2	3.2
II	2.5	3.3	4.6	3.3	6.5	10.1	4.9	3.1
III	2.5	3.2	4.5	3.2	6.3	10.0	4.8	3.0
IV	2.5	3.0	4.5	3.2	5.8	9.6	4.7	2.9
1997								
I	2.5	3.0	4.5	3.2	5.6	9.2	4.7	2.9
II	2.5	3.0	4.5	3.2	5.7	9.1	4.7	2.9
III	2.5	3.0	4.5	3.2	5.5	9.1	4.7	2.9
IV	2.5	3.3	4.5	3.7	5.5	9.1	4.7	3.1
1998								
I	2.5	3.3	4.5	3.5	5.0	9.1	4.7	3.1
II	2.5	3.3	4.5	3.6	4.9	9.0	4.7	3.1
1996								
Jan.	3.0	3.7	5.0	3.6	5.9	10.4	5.2	3.5
Feb.	3.0	3.3	5.0	3.3	6.5	10.3	5.2	3.1
Mar.	3.0	3.3	5.0	3.3	6.5	10.3	5.2	3.1
Apr.	2.5	3.3	4.8	3.3	6.3	10.2	5.1	3.1
May	2.5	3.3	4.5	3.2	6.4	10.1	4.8	3.0
June	2.5	3.3	4.5	3.3	6.6	10.1	4.8	3.0
July	2.5	3.3	4.5	3.3	6.4	10.0	4.8	3.1
Aug.	2.5	3.2	4.5	3.3	6.4	10.1	4.8	3.0
Sep.	2.5	3.0	4.5	3.1	6.1	10.0	4.7	2.9
Oct.	2.5	3.0	4.5	3.1	6.0	10.0	4.7	2.9
Nov.	2.5	3.0	4.5	3.2	5.7	9.3	4.7	2.9
Dec.	2.5	3.0	4.5	3.2	5.8	9.3	4.7	2.9
1997								
Jan.	2.5	3.0	4.5	3.1	5.7	9.3	4.7	2.9
Feb.	2.5	3.0	4.5	3.2	5.4	9.2	4.7	2.8
Mar.	2.5	3.0	4.5	3.2	5.8	9.2	4.7	2.9
Apr.	2.5	3.0	4.5	3.2	5.7	9.2	4.7	2.9
May	2.5	3.0	4.5	3.1	5.8	9.1	4.7	2.9
June	2.5	3.0	4.5	3.1	5.5	9.1	4.7	2.8
July	2.5	3.0	4.5	3.1	5.4	9.1	4.7	2.8
Aug.	2.5	3.0	4.5	3.2	5.6	9.1	4.7	2.9
Sep.	2.5	3.0	4.5	3.3	5.5	9.1	4.7	2.9
Oct.	2.5	3.2	4.5	3.5	5.6	9.1	4.7	3.0
Nov.	2.5	3.3	4.5	3.7	5.5	9.1	4.8	3.1
Dec.	2.5	3.3	4.5	3.7	5.3	9.0	4.7	3.3
1998								
Jan.	2.5	3.3	4.5	3.5	5.0	9.0	4.7	3.2
Feb.	2.5	3.3	4.5	3.5	4.9	9.1	4.7	3.0
Mar.	2.5	3.3	4.5	3.5	5.0	9.1	4.7	3.1
Apr.	2.5	3.3	4.5	3.6	5.1	9.1	4.7	3.1
May	2.5	3.3	4.5	3.6	4.9	9.0	4.7	3.2
June	2.5	3.3	4.5	3.5	4.8	9.0	4.7	3.1
July	2.5	3.3	4.5	3.5	4.7	9.0	4.8	3.1

Sources: Deutsche Bundesbank; and IMF International Financial Statistics.

1/ End-period data.

Table A14. Germany: Monetary Survey

(Percentage changes from a year earlier)

	(In billions of deutsche mark at end 1997)	1996				1997				1998	
		Mar.	June	Sep.	Dec.	Mar.	June	Sep.	Dec.	Mar.	June
<b>Banking assets</b>											
Lending to domestic non-banks	5,067.1	8.1	8.0	7.3	7.5	7.4	7.0	7.4	6.0	6.3	6.6
Of which:											
Enterprises and individuals	3,849.2	7.0	6.8	6.7	7.6	7.3	7.6	7.4	6.2	6.8	6.6
Public authorities	1,209.2	12.0	12.3	9.5	7.6	7.7	5.1	7.7	5.3	4.7	6.6
External assets, net 1/	310.6	0.8	0.6	1.5	2.4	0.2	-0.1	-0.5	-0.8	-1.0	0.0
Other assets, net 1/ 2/	-214.6	0.4	0.5	0.7	1.3	1.6	0.8	2.6	1.4	0.9	2.8
<b>Banking liabilities</b>											
Money stock (M3)	2,259.7	7.2	7.6	8.0	8.7	6.6	6.4	5.4	3.6	4.1	4.2
Currency in circulation	247.0	6.0	6.9	5.9	3.9	4.7	3.0	1.4	0.1	-1.4	-1.5
Sight deposits	691.0	13.4	12.8	13.7	15.8	12.0	12.5	10.3	3.1	8.5	8.4
Time deposits	392.9	-12.7	-12.5	-12.1	-9.6	-8.9	-7.1	-6.3	-1.5	-2.8	-0.7
Savings deposits at 3-months' notice	928.8	18.0	18.2	17.8	15.5	12.1	10.2	8.9	7.3	5.7	5.1
Monetary capital 3/	2,903.3	8.9	8.0	7.1	7.2	6.7	6.6	6.4	5.8	6.3	6.1
<b>Memo items:</b>											
Narrow money (M1)	938.0	11.1	10.9	11.3	12.4	9.8	9.6	7.7	2.3	5.6	5.6
Money stock (M2)	1,330.9	1.1	1.6	2.2	4.6	3.0	3.9	3.0	1.1	2.9	3.7

Sources: Bundesbank, Monthly Report.

1/ Change in percent of M3 one year earlier.

2/ Including counterpart of coins in circulation and excess of interbank liabilities.

3/ Time deposits for 4-years and over; savings deposits at agreed notice; bank savings bonds; bearer bonds outstanding; capital and reserves.

Table A15. Germany: Exchange Rate Developments

	DM/\$	FF/DM	Y/DM	DM/£	Effective Exchange Rates	
					Nominal	Real 1/
1990	1.62	3.37	89.55	2.87	100.0	100.0
1991	1.66	3.40	81.28	2.93	99.1	98.8
1992	1.56	3.39	81.26	2.75	102.1	102.5
1993	1.65	3.43	67.34	2.48	106.1	109.5
1994	1.62	3.42	63.02	2.48	106.4	113.7
1995	1.43	3.48	65.59	2.26	111.8	122.9
1996	1.50	3.40	72.29	2.35	108.9	122.5
1997	1.73	3.37	69.89	2.84	103.9	114.3
1995						
I	1.48	3.49	64.99	2.34	110.9	120.6
II	1.40	3.52	60.45	2.23	112.9	123.1
III	1.43	3.46	65.65	2.25	111.5	121.9
IV	1.42	3.46	71.27	2.22	112.0	125.8
1996						
I	1.47	3.43	72.02	2.25	110.6	125.7
II	1.52	3.39	70.64	2.32	108.5	122.4
III	1.50	3.40	72.77	2.33	108.9	121.4
IV	1.53	3.38	73.74	2.51	107.5	120.4
1997						
I	1.66	3.37	73.11	2.70	105.6	117.6
II	1.71	3.37	69.84	2.80	104.3	116.4
III	1.81	3.37	65.29	2.94	102.2	111.1
IV	1.76	3.35	71.32	2.91	103.3	112.1
1998						
I	1.82	3.35	70.43	2.99	102.7	111.0
II	1.79	3.35	75.64	2.97	103.7	111.7
1996						
Jan.	1.46	3.42	72.30	2.24	110.8	125.7
Feb.	1.47	3.44	72.09	2.25	110.8	126.3
Mar.	1.48	3.42	71.66	2.26	110.1	125.1
Apr.	1.50	3.39	71.35	2.28	109.1	123.5
May	1.53	3.38	69.30	2.32	108.1	122.1
June	1.53	3.39	71.28	2.36	108.2	121.6
July	1.50	3.39	72.61	2.34	108.7	121.5
Aug.	1.48	3.41	72.75	2.30	109.3	121.6
Sep.	1.51	3.41	72.95	2.35	108.6	121.1
Oct.	1.53	3.38	73.55	2.42	107.8	120.7
Nov.	1.51	3.38	74.27	2.51	107.8	121.0
Dec.	1.55	3.38	73.40	2.58	106.9	119.6
1997						
Jan.	1.60	3.37	73.50	2.66	106.1	118.2
Feb.	1.67	3.38	73.42	2.72	105.4	117.2
Mar.	1.69	3.37	72.42	2.72	105.4	117.3
Apr.	1.71	3.37	73.40	2.79	104.9	117.2
May	1.71	3.37	69.94	2.78	104.5	117.1
June	1.73	3.38	66.18	2.84	103.6	114.9
July	1.79	3.37	64.29	2.99	102.0	111.6
Aug.	1.84	3.37	64.08	2.95	101.8	110.2
Sep.	1.79	3.36	67.49	2.86	102.8	111.4
Oct.	1.76	3.35	68.84	2.87	103.3	112.1
Nov.	1.73	3.35	72.26	2.92	103.5	112.3
Dec.	1.78	3.35	72.87	2.95	103.2	111.8
1998						
Jan.	1.82	3.35	71.29	2.97	102.8	111.3
Feb.	1.81	3.35	69.35	2.97	102.7	111.1
Mar.	1.83	3.35	70.64	3.03	102.5	110.6
Apr.	1.82	3.35	72.64	3.03	102.9	111.0
May	1.78	3.35	75.94	2.91	104.1	112.1
June	1.79	3.35	78.32	2.96	104.1	112.0
July	1.80	3.35	78.28	2.95	104.1	111.9

Sources: IMF, International Financial Statistics.

1/ Based on relative normalized unit labor costs in manufacturing.

Table A16. Germany: Trade Flows by Destination

(In billions of deutsche mark)

	1993	1994	1995	1996	1997
<b>Exports</b>	632.2	694.7	749.5	788.9	887.3
Industrial countries	487.8	533.4	576.7	601.6	608.1
Of which:					
EU	368.6	401.4	437.2	452.7	449.6
Other European countries	48.2	50.2	56.0	57.4	57.6
U.S.A.	46.8	54.2	54.6	60.1	69.7
Japan	15.8	17.9	18.8	21.2	18.9
Countries in transition	57.0	64.1	71.8	82.7	93.2
Developing countries	81.9	91.9	99.1	102.4	105.9
Of which:					
NIEs 1/	20.2	24.3	...	...	...
OPEC countries	18.2	17.5	16.8	16.7	18.0
Other	5.4	5.3	1.9	2.2	80.1
<b>Imports</b>	571.9	622.9	664.2	690.4	765.5
Industrial countries	439.1	474.2	511.6	530.4	520.6
Of which:					
EU	317.7	343.6	375.1	388.3	374.2
Other European countries	40.7	45.0	48.0	50.8	51.8
U.S.A.	40.3	44.7	45.3	49.5	53.7
Japan	34.1	34.1	35.4	34.4	33.6
Countries in transition	54.8	65.6	74.5	80.3	88.2
Developing countries	72.4	77.0	77.5	78.7	81.3
Of which:					
NIEs 1/	21.5	22.7	...	...	...
OPEC countries	13.7	12.9	11.1	12.5	12.8
Other	5.6	6.2	0.6	0.9	75.4

Sources: Bundesbank, Monthly Report.

1/ Hong Kong, Korea, Singapore, and Taiwan, Province of China.

Table A17. Germany: Financial Transactions with Non-Residents  
(In millions of DM)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
<b>Balance financial transactions</b>										
Total	-125,556	-134,652	-90,519	20,196	91,542	14,037	66,417	72,294	28,096	-12,582
Direct investment	-19,271	-15,252	-34,666	-32,492	-26,342	-22,166	-24,978	-36,316	-48,561	-57,835
Portfolio investment	-64,271	-4,396	-5,688	41,339	46,938	182,887	-39,302	51,999	86,733	-10,600
Credit transactions	-40,250	-112,766	-47,656	14,603	73,734	-144,110	132,178	61,743	-6,055	60,189
Other transactions	-1,767	-2,238	-2,510	-3,254	-2,795	-2,574	-1,482	-5,132	-4,022	-4,333
<b>Net German investment abroad</b>										
Total	-155,242	-248,598	-183,378	-105,975	-116,775	-295,948	-107,917	-175,643	-198,164	-385,650
Direct investment	-21,227	-28,540	-38,691	-39,276	-30,500	-25,326	-27,883	-55,588	-44,469	-57,509
Portfolio investment										
Total	-71,659	-50,124	-25,076	-29,881	-75,565	-52,847	-84,288	-32,616	-54,034	-161,326
Of which: Equities	-4,910	-3,075	561	-2,077	-1,499	-8,228	-11,988	1,729	-21,342	-52,343
Debt securities	-53,325	-39,876	-24,487	-12,619	-7,708	-12,539	-27,281	-24,108	-21,851	-76,969
Credit transactions										
Total	-60,632	-167,782	-117,500	-33,646	-8,119	-215,228	6,560	-83,294	-95,754	-163,468
Credit institutions	-28,299	-88,183	-60,249	-2,478	7,564	-146,311	30,383	-77,841	-60,712	-141,594
Enterprises and individuals	-27,834	-70,959	-44,674	-22,639	-5,361	-57,310	-27,447	3,993	-34,446	-18,322
Public authorities	-4,499	-8,641	-12,581	-8,532	-10,321	-11,610	3,622	-9,445	-595	-3,555
Other investment	-1,726	-2,154	-2,111	-3,172	-2,594	-2,546	-2,306	-4,143	-3,910	-3,344
<b>Net foreign investment in Germany</b>										
Total	29,686	113,945	92,860	126,171	208,315	309,984	174,332	247,936	226,257	373,069
Direct investment	1,958	13,287	4,026	6,783	4,158	3,158	2,907	19,273	-4,094	-325
Portfolio investment										
Total	7,386	45,729	19,390	71,221	122,500	235,732	44,986	84,617	140,766	150,725
Of which: Equities	5,632	22,774	-2,994	3,103	-4,299	8,577	1,258	-1,697	22,480	27,156
Debt securities	1,768	22,212	19,758	58,818	120,953	211,382	22,605	86,033	102,403	121,844
Credit transactions										
Total	20,380	55,014	69,843	48,250	81,853	71,118	125,619	145,039	89,697	223,660
Credit institutions	20,211	42,490	42,722	15,198	73,443	58,673	111,359	120,249	55,692	204,986
Enterprises and individuals	10,267	17,826	26,963	33,919	10,158	6,128	11,019	19,495	28,559	31,825
Public authorities	-10,098	-5,303	158	-865	-1,748	6,319	3,242	5,296	5,448	-13,153
Other investment	-41	-84	-399	-82	-201	-28	824	-989	-112	-989

Source: Deutsche Bundesbank, Balance of Payments Statistics.

Table A18. Germany: Aid and Other Resource Flows to Developing Countries and Multilateral Agencies 1/

(Net disbursements in millions of deutsche mark)

	1980	1985	1990	1993	1994	1995	1996	1997 2/
Official Development Assistance	6,476.1	8,656.7	10,213.3	11,504.6	11,057.3	10,787.3	11,437.1	10,253.6
Bilateral	4,219.0	5,826.1	7,238.3	7,472.9	6,720.0	6,903.2	6,824.1	6,414.8
Grants	4,098.3	4,197.7	7,312.7	5,978.5	5,755.9	6,296.6	6,781.2	5,933.7
Technical cooperation 3/	1,798.9	2,576.3	2,917.3	3,211.7	3,447.9	3,554.0	3,605.9	3,430.6
Other grants 4/	2,299.4	1,621.4	4,395.4	2,766.8	2,308.0	2,742.6	3,175.3	2,503.1
Loans/other capital aid/debt relief	120.7	1,628.4	-74.4	1,494.4	964.1	606.6	42.9	481.1
Multilateral	2,257.1	2,830.6	2,974.9	4,031.7	4,337.3	3,884.1	4,613.0	3,838.7
Grants	1,164.0	1,608.0	1,796.1	2,487.1	2,807.5	2,755.4	2,560.4	2,816.0
Shares/subscriptions	1,079.7	1,235.3	1,196.9	1,564.6	1,550.5	1,149.9	2,074.1	1,040.9
Loans	13.4	-12.7	-18.0	-20.0	-20.7	-21.1	-21.5	-18.2
Other official flows	1,144.1	1,985.0	3,410.0	3,033.6	5,740.3	1,260.4	292.4	...
Bilateral	1,149.5	2,017.1	3,412.8	3,001.8	6,001.7	1,662.2	792.4	...
Export credits	344.0	798.5	137.9	437.8	390.2	464.0	877.4	...
Rescheduling (refinancing)	760.4	1,179.3	3,243.9	2,388.5	5,607.2	1,082.4	-178.9	...
Other credits	45.1	39.3	30.9	175.5	4.3	115.8	93.9	...
Multilateral	-5.4	-32.1	-2.8	31.8	-261.4	-401.8	-500.0	...
Private flows at market terms	10,923.9	4,314.0	7,073.0	9,449.2	20,438.4	16,807.9	18,561.2	...
Bilateral	8,461.9	3,194.2	5,939.2	8,053.7	20,143.7	16,383.7	18,280.0	...
Investments and other capital transactions	5,939.6	2,504.0	3,396.7	4,698.3	15,315.9	11,776.6	15,703.9	...
Export credits	2,522.3	690.2	2,542.5	3,355.4	4,827.8	4,607.1	2,576.1	...
Multilateral	2,462.0	1,119.8	1,133.8	1,395.4	294.7	424.3	281.2	...
Net grants by private voluntary organizations 5/	763.9	1,246.9	1,222.7	1,434.1	1,591.3	1,593.8	1,571.1	...
Total net disbursements	19,308.0	16,202.6	21,918.9	25,421.5	38,827.3	30,449.4	31,861.8	...
ODA as a percentage of GNP	0.44	0.47	0.42	0.36	0.33	0.31	0.33	0.28

Sources: Federal Ministry of Finance; and OECD Development Assistance Committee.

1/ Prior to October 1990, data refer to western Germany only. GDP used for 1990 is a weighted average of western and united German GDP.

2/ Preliminary.

3/ From 1989 onward, DAC figures, excluding grants to churches and private agencies.

4/ Primarily grants for financial cooperation, food aid, and humanitarian aid.

5/ Grants given by non-governmental organizations (e.g., churches, societies) from their own funds or donations.

Table A19. Germany: Support for Economies in Transition, 1990-97

(In billions of deutsche mark)

	Republics of the Former Soviet Union 1/	Central and Eastern Europe
Grants	21.6	14.2
Loans, loan guarantees, investment guarantees	84.1	37.0
German equity stake in EBRD	1.4	2.0
Balance of transfer rubles	22.3	10.6
Financing of investment projects	3.7	--
Total	133.1	63.8

Source: Data provided by the German authorities.

1/End-1989 to 1997.