Demographics and Stabilization Policy:

Problems, Feasibility, and Consistency

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Until the end of the century the demographic structure of the Federal Republic of Germany will change dramatically: the relation pensioners to labour force will rise from 0.41 (1985) to 0.48 (2000). This poses problems not only for the allocation of productive resources but also for the social security system.

Rough partial analyses have the following results: With unchanged contribution rates the pensions have to be reduced from 46 % of avarage labour income per capita to 26 % or with pensions growing pari passu with labour incomes the contribution rates have to be raised to 40 %. None of these alternatives seems feasible. But how are these rough results changed, if we use a consistent macro model?

In the paper an econometric macro-model is used, which describes the determinants of potential output as well as the demand side and the foreign sector. First we make a long-run forecast assuming „normal“ development of the world economy and extrapolated monetary and fiscal policy. We assume that rises in contribution rates and reductions in pensions are made only to some feasible amount. A quantitative impression is given, what effects reductions of pensions have on private consumption and GNP, what effects higher contribution rates have on labour costs and potential output, and what public deficits will arise. In a second step we analyze strategies for monetary and fiscal policy to improve the macroeconomic results. Our elaborated model serves as a consistent framework to evaluate these strategies. In a last step the sensitivity of the results with regard to external developments is analyzed.

1 Introduction

This paper analyses problems stemming from demographic changes and the feasibility of stabilization policy to solve them during the last one-and-a-half decades of this century within a consistent macroeconometric framework. The demographic structure in the Federal Republic of Germany will change dramatically: the ratio pensioners to labour force will rise from 1 : 2.5 (1986) to 1 : 2.0 (2000). This poses problems not only for the allocation of productive ressources, but also for financing the social security system. In order to preserve the attained level of pensions in the future and to keep total deductions from gross income in an economically reasonable range, either the government will have to lower tax rates so that contribution rates can be raised or it will have to finance the deficits of the pensions system. In either case the public deficit will rise. This may narrow the feasibility for stabilization policy.

Another important determinant of future developments is the investment performance since the mid-1970s. On the one hand the volume of investment was small, so that the share of net investment in gross national product fell and on the other hand the installed technology was very capital intensive; the coincidence of both is one of the reasons for today's high unemployment.

Shifts in the demographic composition as well as installed production technology have influence on important parts of the economy:

* given volumes of productive factors, installed production technology determines the potential supply of goods;
* the relative size of population groups with different propensities to consume determines the avarage propensity to consume and thus the volume of the largest component of GNP;
* the number of installed working places is a main determinant of the level of social security contributions. Benefits to pensioners and unemployed from social security resources are affected correspondingly;
* balancing the social security system's account affects the public sector's deficit and thus the feasibility for stabilization policy.

Current stabilization policy of the Bundesregierung and the Deutsche Bundesbank renounces from active demand management and tries to give space for private sector activities; disequlibria are to be removed by market mechanisms. Policy actions are made in the intention to remove restraints from the market mechanisms or to shelter the economy from unwarranted external influences. One reason for this far-reaching renunciation from active stabilization policy is the repeatedly complaints that stabilization policy during the 1970s has failed. This so-called failure also has something to do with the theoretical framework of that time. The „consensus macroeconomic model, vintage 1970“ as TOBIN (1980) called it, was not suitable to deal wich the supply side shocks of the 1970s. These shocks required some fundamental rethinking and rebuilding.

Since then theoretical work has delivered models that help to analyse these problems adequately and give hints for active stabilization policy. The present paper incorporates these new theoretical approaches into an econometric model.

In the face of the multiple claims to stabilization policy as indicated by the facts listed above, it makes sense to introduce some terms that will help to ease the analysis. An investigation of the effects of demographic changes and low investment has to take into account the supply side of the economy. What we have to describe are the determinants of output supply and the choice of production technobogy, i.e. the process of factor substitution. The supply of goods will be determined using a concept that has it's roots in VOGT (1964), SOLOW/STIGLITZ (1968) and MALINVAUD (1980,1982). The process of factor substitution is modelled employing a vintage approach. Accepting ex-post fixed factor proportions and wage and price rigidities as adequate descriptions of reality, the supply of goods can be limited by three factors: expected demand as the quantitiy producers are willing to supply, productive capacity accounting for existing machines and productive capacity as determined by the available labour force.

On this base three paths of potential supply can be identified: the demand determined path (DDP) gives the output that has to be supplied to meet demand at given prices profitably, the capital determined path (CDP) giving the output that can be supplied at the given capital productivity under normal utilization of machines, and the labour determined path (LDP) giving the output that can be supplied at the given labour productivity under normal utilization of the potential labour force.

Given these three definitions, the state of the economy can be described by two indicators, the rate of capacity utilization, which is the ratio DDP/CDP, and the substitution requirement, which is the ratio LDP/CDP. The former indicates the deviation of demand from productive capacity and the latter the need for factor substitution to bring together LDP and CDP.

These definitions can be used to label two kinds of stabilization policy: demand policy which is primarily targeted to change the rate of capacity utilization so that DDP meets CDP and supply policy which is primarily targeted to influence factor prices and thus factor substitution so that LDP meets CDP.

This analytical distinction of the two kinds of stabilization policy was made according to the primary target („what is to be influenced"), not according to the result („what was influenced"); it is clear, that actions taken by the stabilising authorities effect both, demand and factor prices. Thus, a classification can only be made according to primary targets.

The definitions just introduced are helpful to put precise questions:

(1) In the mid 1980s we face normal utilization of productive capacity but a high substitution requirement. Is stabilization policy feasible to solve this problem?

(2) Which problems for stabilization policy stemming from demographic changes will arise during the last-one-and-a-half decades of this century?

(3) Is stabilization policy feasible to solve these new problems as well or will the attempt to solve the old problem amplify the new ones?

To answer these questions a consistent macroeconometric model for the Federal Republic of Germany that represents the supply side as well as the demand side will be introduced in the second section. Section 3 contains the results of a long-run forceast assuming „normal" performance of the world economy and fiscal and monetary policy that reacts to economic problems in an intuitive way. In section 4 we study two polar rules for stabilization policy (one non-activist and one activist) to anlyse how the way stabilization policy is pursued determines the results. In a last step the sensitivity of the outcome with respect to the external assumptions is checked (section 5)

2 The Model

The model which will be introduced in this section belongs to the family of SYSIFO models, developed at the University of Hamburg (1). This one was especially designed for quantitative analysis of medium term stabilization policy. One crucial point of modelling were long run properties; if exogenous variables behave as if they were on a steady state path, the endogenous variables will follow. Annother salient feature of the model is the introduction of three groups of households: self-employed, employees and pensioners. This allows to pick up the influences of demographic changes on private consumption. To describe policy measures the three paths of potential supply (demand-, capital-, and labour-determined) and two related indicators, the rate of capacity utilization (DDP/CDP) and the substitution requirement (LDP/CDP) are used. In order to classify supply and demand policies two further indicators are introduced: the „wedge", i.e. the difference between a firm's labour costs and the worker's net take home, and the deficit ratio, i.e. the ratio of public debt to nominal potential output.

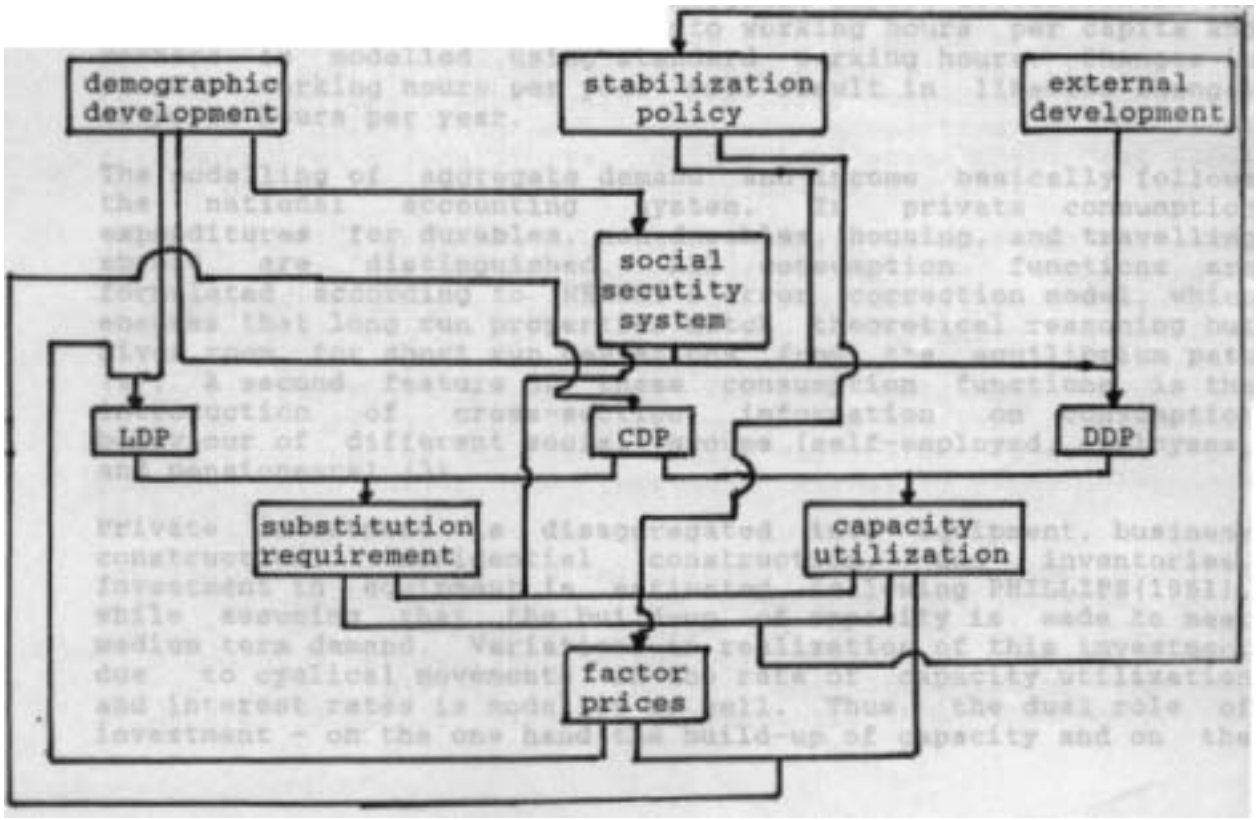
The model explicitly deals with three domestic production sectors: public, house-renting and the private sector excluding house-renting. House-renting is excluded, because the factor proportions

differ extremely: in house-renting there is a large capital stock but little labour employed. This, as well as a variety of public influences, is atypical to the rest of the private sector.

The public sector is subdivided into government and the social security system. Here the branches pensions and unemployment insurance are explicitly modelled. This allows for analysis of the consequences of both, the demographic shift and economic performance, on the balances of these branches of the social security system and the government.

An overview of the model is presented in Figure 1. The economic process is driven by the exogenous demography, the external development and by stabilization policy. The demographic part of the model contains the description of the evolution of the population structure and the labour supply. The external sector consists of world market quantities and prices, including exchange rates. The stabilization policy part consists of instruments like government expenditure, tax rates, and short term interest rates. The social security system is seperated from the government, because we want to analyse this part in more detail.

Figure 1: Sketch of the Model



Demographic development, via size and structure of the population, stabilization policy, via expenditure, taxes and interest rates, external developments, via exports, and the social security system, via contributions and payments, determine the demand for goods. The rate of capacity utilization is one influence on factor prices. Other influences are stabilization policy (tax rates and interest rates), the social security system (contribution rates) and the substitution requirement, i.e. the measure for unemployment due to capital shortage. Factor prices and capacity utilization determine investment and thus current demand and future supply of goods.

The supply side of the economy is described by the process of capital accumulation and factor substitution assuming putty-clay technology. Production technology is seperated into two levels:

on the first level there is substitution between domestic factors of production (labour and capital) and imported inputs. On the second level there is substitution between labour and capital. Factor proportions result from a neoclassical cost minimization, where user costs include taxation, the structure of financing and social security contributions.

The demand for factors of production is derived from production technology. The volume of labour demanded follows from installed capacity and its utilization, newly installed machines are ruled by the optimal marginal capital productivity and imported inputs are determined by the average import coefficient, which is a weighed average of past optimal marginal import coefficients. The subdivision of labour-volume into working hours per capita and workers is modelled using standard working hours. Changes in standard working hours per year will result in likewise changes of payed hours per year.

The modelling of aggregate demand and income basically follows the national accounting system. In private consumption expenditures for durables, non-durables, housing, and travelling abroad are distinguished. All consumption functions are formulated according to HENDRY's error correction model, which ensures that long run properties match theoretical reasoning but gives room for short run deviations from the equilibrium path (2). A second feature of these consumption functions is the introduction of cross-section information on consumption behaviour of different social groups (self-employed, employees, and pensioneers) (3).

Private investment is disaggregated into equipment, business construction, residential construction, and inventories. Investment in equipment is estimated following PHILLIPS (1961), while assuming that the build-up of capacity is made to meet medium term demand. Variations in realization of this investment due to cyclical movements in the rate of capacity utilization and interest rates is modelled as well. Thus, the dual role of investment - on the one hand the build-up of capacity and on the other hand part of demand with a highly cyclical performance - is incorporated. Investment in business construction follows equipment. The basic assumption is that buildings are not a factor of production of their own but the frame in which production takes place.

Residential construction serves to raise and preserve a demanded stock of residences, which in turn follows real disposible income and population. Interest rates are introduced as an important cost factor as well.

Modelling inventory investment we assume that on a quarterly basis there are hardly unplanned inventories. The highest change in inventories in history amounted to less than five percent of a quarter's production and only one third of one additional shifts' output. Thus, inventory investment is determined by expected sales and storing costs.

Government expenditure is disaggregated into consumption and investment. Consumption mainly consists of wages and salaries. Public employment and investment are policy variables.

Exports and imports consist of goods and services. Imported goods are inputs for production (determined by domestic production technology) and finished goods.

The wage-price-part of the model takes into account the hierarchical structure of price formation. Starting with standard prices, which are derived from production technology as the shadow-price of output (4), we turn to producer prices which are additionally influenced by demand and prices of competing foreign suppliers. Here again, the error correction formulation was used to assure long run equilibrium properties and to allow for short run disequilibria. On the last stage there are final demand prices, which follow producer prices and indirect taxes.

While modelling standard wage rates, again we employed the error correction formulation to assure that in the long run wages equal the marginal product of labour. Labour market disequilibria were taken into account by incorporating the substitution requirement. Standard wage rate, employment, and capacity utilization as a proxy for cyclical movements of the wage drift give wages and salaries. This two-step formulation models institutional factors of the FRG: on the one hand standard wage rates negotiated on a regional level and on the other hand effective wages determined on firm level.

Institutional factors are taken into account in modelling the financial sector as well. The dominance of universal banks implies that the banking system is engaged in almost all relationships between lenders and borrowers. Thus, interest rates in the single markets can differ only because of the term structure of their assets. Consequently, in the model the interest structure is determined. Demand functions for monetary aggregates are modelled according to the ANDO/SHELL (1975) version of the portfolio determination.

In the model adaptive expectations are assumed, which allow for learning. The use of rational expectations does not seem to be useful, because the assumptions underlying this hypotheses (full information to everybody, costless processing of information, and perfectly flexible wages and prices) sound too unrealistic.

3 The Basic Forecast

3.1 Assumptions

The macroeconometric model presented in section 2 was used to make a forecast of the development of West Germany's economic performance until 2000. The story we are going to tell is one that might happen; however, we do not insist that it will happen. Probably there will be unexpected exogenous shocks. Thus, the story we tell is our best guess for the future. In order to do this , assumptions for the exogenous variables of the model are needed. They are presented in this section. Section 3.2 contains the forecast results. The problems for stabilization policy implied in these results are discussed in section 3.3.

The exogenous variables of the model can be divided up into five groups:

(a) foreign variables
(b) demographic variables
(c) instruments for stabilization policy
(d) instruments for social security policy
(e) labour market policy.

This classification allows for a destinct presentation of each group.

Assumptions for such a long space of time we want to look at, will be wrong for any single data with high probability. In spite of that, this task has to be undertaken, because otherwise medium run analysis of this kind were not possible. If you do not focus on single data but on the general direction, then the task is a little bit easier; to predict the general development over 15 years is easier than to give the exact performance of a single variable.

(a) The world economy will move along some smooth paths. Prices and quantities will have no strange cyclical movements but steady developments; on average this will not be too wrong.

A key variable for the development of the world econorny is the value of the Dollar. While short run movements of this variable are hardly to be predicted correctly, because non-economic facts play an important role, we presume that in the long run the value follows purchasing power parities (PPP). Thus, it was assumed that the US$-DM exchange rate follows PPP over the forecast period.

Real growth of the world economy, relevant for German exports, will be some three percent. Short as well as long run interest rates in the US will stay quite constant; historically these levels are normal.

(b) Assumptions about demographic developments have been taken from two sources: Firstly they stem from a model-calculation carried out by the „Statistisches Bundesamt“ for population and secondly from a model-calculation for labour forces by the „Institut für Arbeitsmarkt- und Berufsforschung“.

In each case the medium paths have been chosen. This means, that residing population falls from 61 million people (1986) to 59 million (2000). The labour force rises from 29 million (1986) to 29.5 million (1990/1991) and falls to 28.3 million (2000) . The nurnber of pensions rises from 12 million (1986) to 13,8 million (2000)

(c) The values for governrnent policy instruments were set during the forecasting process according to the following principles:

- The rate of capacity utilization cannot diverge substantially more from the normal level than it did in the past.
- The number of registered unemployed persons cannot rise too high.
- The relation of taxes to gross income and government expenditures to potential output should be lowered whenever possible.

These three principles imply, that doing the forecast government variables have to be changed; thus, the outcome surely is determined by the author's intuition. Nethertheless, I do not know a better way to make a reasonable forcast.

For monetary policy it was assumed, that the Bundesbank keeps the money market rate constant. The level in 1986 was quite normal on historical standards and will be preserved unless inflation or external shocks demand for higher rates.

(d) For the social security system we assumed average payment per registered unemployed and per pensioneer to stay in a constant relation to income per capita. This means that the attained standards of the social security payments will be preserved. Given these supposition, contribution rates are assumed to adjust in an way that the budget of each single branch will be in a moderate surplus of one billion DM per quarter. This allows to pile up funds that will help in the even more difficult times to come after 2000.

(e) On the labour market the only exogenous variable (apart from potential labour supply) is standard hours per year. In the second half of the 80s reductions of hours were decided on in tedious negotiations. Starting with some 1670 hours per year (net, i.e. holidays, part-time-effects etc. deducted) it is reduced to 1600 hours per year until 1990; this is equivalent to a reduction of standard hours per week by 1.35 hours.

3.2 Results

The results presented in this section show the general line of development. As stated above, any single data computed will be wrong with high probability; but the rough direction need not. So we give numbers averaged over five year periods (1986 to 1990, 1991 to 1995 and 1996 to 2000). Before going into more detail we describe the cyclical movement of the economy. Hereby we use our two indicators, the rate of capacity utilization and the substitution requirement.

Overview

Simulations start in 1986, a year that was coined by two external developments: a fall in prices for crude oil and a strong devaluation of the US-$. Both lowered import costs for german producers and led to reduced inflation rates (Table 1). But the medium term consequences of the depreciation are a loss in germany's competitiveness and thus a drop in exports during 1987 and 1988. This loss in demand causes a decline in the rate of capacity utilization (Figure 2) which will be overcome because of expansive effects of an already decided on tax-cut in 1988. While wages keep on growing moderately in the second half of the 1980's the profit rate rises and leads to an investment boom at the beginning of the 1990's, so that there will be a cyclical high in 1991/1992. Rising capacity due to this investment performance results in sinking utilization rates of capacity as soon as the boom runs out: the demand effects vanish while the capacity effects stay. Low capacity utilization is a disincentive to investment, exports grow with a moderate rate and so does private consumption. Thus, demand has to be supported by fiscal action; otherwise capacity utilization would fall even deeper.

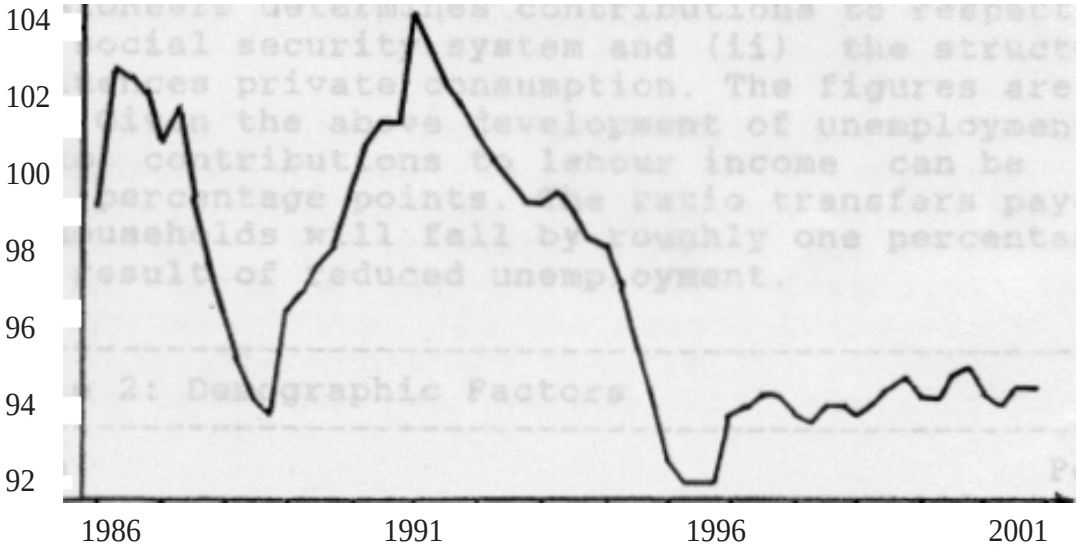
Impulses from fiscal expenditure action provide for a capacity utilization, which is only a little below normal. During the last quinquennium fiscal policy cannot stay that expansive, but has to take into account the budget situation. Thus, expenditure growth is reduced. With private investment still slack, private consumption and exports growing moderately, demand will not be sufficient to reach normal capacity utilization.

Our second indicator, the substitution requirement (Figure 3) shows a less cyclical movement than the rate of capacity utilization. From 1986 to 1992 the substitution requirement stays at roughly 121 (the normal being 100). Neither recessions nor booms change it a lot, because the number of working places depends on productive capacity. Only a sharp drop in labour productivity could reduce the indicator as long as the labour force is still rising. Indeed, during 1986 to 1990 labour productivity rises by four percent, 1991 to 1995 by 3.5 percent and 1996 to 2000 by 4.3 percent. With a still growing labour force this reduction in labour-productivity growth in the second quinquennium is by far not high enough to bower the substitution requirement.

Table 1: Global Indicators

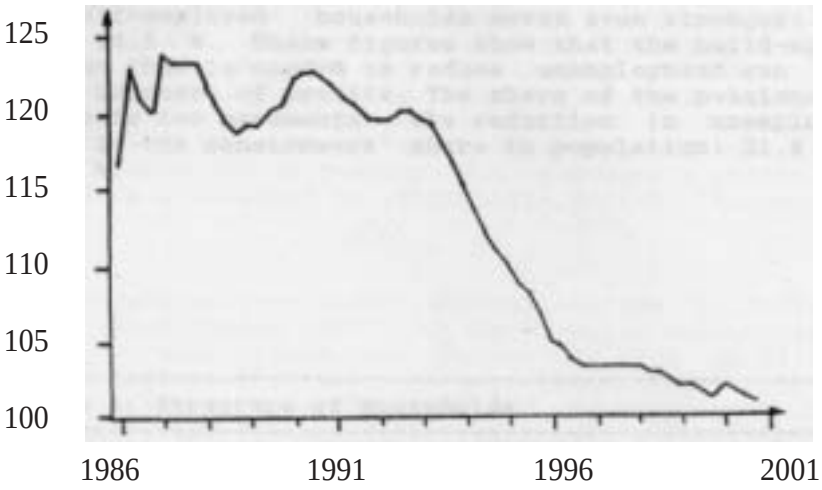
Item		**Period**	
	1986 - 1990	**1991 - 1995**	**1996 - 2000**
Potential output growth (%)	3,4	5,6	4,5
Capacity utilization (%)	98,0	97,4	94,1
Substitution requirement	121,1	116,0	102,8
Unemployment rate (%)	9,5	7,2	1,1
Inflation rate (%)	2,9	5,2	6,2
Current account/potential output (%)	3,9	2,1	-0,6

Figure 2: The Rate of Capacity Utilization



The investment boom in 1991/1992 increases the number of working places and thus reduces the indicator from 1993 onwards. The low investment performance after 1993 will not raise the substitution requirement, because the existing productive capacity is rather labour intensive and at the same time the labour force starts shrinking. So, from 1993 onwards the indicator falls to around 103 in 2000.

Figure 3: The Substitution Requirement



Demographic Factors

The demographic development affects the economic system through two channels: (i) the number of labour force participants and pensioneers determines contributions to respectively payments of the social security system and (ii) the structure of households influences private consumption. The figures are as follows (Table 2). Given the above development of unemployment and income, the ratio contributions to labour income can be lowered by roughly 2.5 percentage points. The ratio transfers payed to total income of households will fall by roughly one percentage point; this is the result of reduced unemployment.

Table 2: Demographic Factors			
Item		**Period**	
	1986 - 1990	**1991 - 1995**	**1996 - 2000**
Labour force/population (%)	46,2	47,1	47,9
Pensioneers/population (%)	20,4	21,4	22,7
Contributions/labour income (%)	30,6	29,8	27,9
Transfers/total income (%)	12,6	11,9	11,9

The structure of private households' disposible income changes considerably (Table 3): the share of employers' households income falls from 50,8 % to 49,5 % and rises to 52,2 %. The share of self-employed' households moves even stronger: 27,4 %, 29.4 % and 25,5 %. These figures show that the build-up of potential output that is needed to reduce unemployment can be achieved by an increase of profits. The share of the pensioners' households reflects two movements: the reduction in unemployment and the rise in the pensioners' share in population: 21,8 % , 21,1 % and 22,6 %.

Table 3: Structure of Households			
Share of household-groop		Period	
in disposible income (%)	1986 - 1990	1991 - 1995	1996 - 2000
Employees	50,8	49,5	52,2
Self employed	27,4	29,4	25,2
Pensioneers	21,8	21,1	22,6
Consumption/potential output (%)	55,6	56,4	51,5

This shift in the household structure effects the composition of consumption. The rising share of employees' households results in less expenditure on durables and travelling abroad but more on non-durables and housing. Expenditures on durables and travelling abroad have a higher income elasticity than the other two categories. Thus, in the second quinquennium with large profits the share the consumers require in potential output is high and in the last five-year-period with slack capacity utilization is low.

Stabilization Policy and Factor Substitution

Now look at stabilization policy and what it has affected. During the whole simulation period monetary policy stays in the range of neutrality: neither being really expansive nor being contractive on historical standards. Towards the end of the century inflation may become a problem, but at the same time capacity utilization is too low to allow for rising interest rates. The external development does not require policy action.

Active policy will be made only by the fiscal authorities. The main problem starting in 1986 is high unemployment, which is not cyclical: the rate of capacity utilization is close to normal, but the substitution requirement is enormous. Thus, fiscal policy has to try to promote factor substitution by reducing labour costs. This is done by the tax-cut in 1988 and - as far as possible - a reduction in contribution rates. In 1988 the average tax-rate is reduced from some 24 % to some 23 %, which means about 20 billion DM per year. On average of the quinquennium this is a reduction of roughly 0.5 percentage points, which will be completely devoured by progression during the next years (Table 4).

On the expenditure side additional action is taken to prevent a deep recession in 1992/1993. Real public expenditure will have to rise by some six percent during the 1991 to 1995 quinquennium. Nethertheless the relation government expenditure to potential output stays between 21.5 and 22.0 percent all the time. Therefore the deficit ratio will be quite high in the first quinquennium and smaller in the following ones. However this public deficit rises the share of interest payments in government expenditure from 13.4 % in 1986 to 22.5 % in 2000. This development is amplyfied by increased long term interest rates due to expectation on inflation. The rate of return on long-term funds rises from some six percent in 1986 to close to eight percent in 2000.

Table 4: Stabilization Policy

Item	Period		
	1986 - 1990	1991 - 1995	1996 - 2000
Avarage tax-rate (%)	23,9	24,5	24,5
Government expenditure/potential output (%)	21,9	21,6	21,8
Deficit ratio (%)	4,7	4,1	3,2
Money market rate (%)	4,5	4,5	4,5
Goverment expenditure growth (%)	3,1	6,1	3,8

What is the stabilization policy's impact on factor substitution? In a putty clay world factor substitution is a very slow process. Once installed, factor proportions of any vintage of capacity cannot be changed; changes only take place with new equipment. The average life-span of machines is nearly 15 years. To modify factor proportions, strong and long-lasting shifts in factor prices are needed. This can be supported by fiscal action, i.e. by changing the wedge. But even then it takes time to effect.

The wedge is reduced from some 41 % at the end of 1985 to some 38 % on average in the first quinquennium (Table 5). This is possible because of rising employment and less unemployment as an effect of the 1988 tax-cut. After 1990 the wedge rises up to the previous level until 2000. The growth of the factor price relation labour/equipment is reduced form 4.7 % to 3.3 % in the first and second five-year-period. Thus factor substitution accelerates mainly in the second period where the

reduction of the substitution requirement and unemployment starts. This results in a slower rise in labour productivity.

Table 5: Factor Substitution			
Item		**Period**	
Growth of ...	**1986 - 1990**	**1991 - 1995**	**1996 - 2000**
Factor price relation (%)	4,7	3,3	5,8
Potential output (%)	3,4	5,6	4,5
Labour productivity (%)	4,1	3,5	4,3
Substitution requirement	121,1	116,0	102,8
Wedge (%)	38,2	39,6	40,7

In the last quinquennium full employment is reached and no further need for substitution from capital to labour is seen. During these years wages rise faster, production is more capital intensive and labour productivity growth is higher.

To sum up, the reduction of labour costs by narrowing the wedge during the end of the 1980‘s and beginning 1990‘s accelerates the process of factor substitution in favour of labour. At the same time policy-induced expansion brings about an investment boom so that some large and very labour intensive vintages are installed. On this road and by sinking labour supply from the mid-1990‘s on the substitution requirement is reduced and we end up with full employment.

The key mechanism in this process is the interaction of a policy induced investment boom that rises employment and levels up revenues for the social security system. Thus it is possible to lower contribution rates and to pursue a policy amplified narrowing of the wedge which makes the new capacity more labour intensive. This shows that even in difficult situations active stabilization policy is feasible and efficient as a combination of demand and supply policy. It takes quite a lot of time to show results, but it works.

3.3 Problems

At the starting point of or simulations there is one big problem: unemployment due to capital shortage. This problem is solved in our basic forecast by a distinctive stabilization policy. Thus the development as it is pictured above looks kind if we concentrate on the employment situation. But each coin has two sides. On the back-side of our coin we have to pile up quite a lot of problems. The list starts with low capacity utilization, goes on with inflation in the six-percent-range and ends with high interest payments to serve public debt. According to our hopes history will not end in 2000, so we have to consider what this means for the time after that. Is it an acceptable starting point or is it a handicap?

As far as we know, the main economic problems of the years after 2000 will stem from demographic shifts that start around 1995 and will accelerate behind our simulation horizon. Thus, this is the light we want to consider the problems in. During the 15 years evaluated above, stabilization policy was feasible and worked. Rising inflation in the last quinquennium demands for restrictive monetary policy. For fiscal policy on the one hand expansive measures are neccesary to raise demand and capacity utilization, on the other hand higher tax rates or less expenditure is needed to lower public debt. High interest payments compress the disposible part of the budget. But while there is full employment, there will be a serious shortage of labour if capacity utilization is driven up from the demand side. Again, only a long-run strategy to reduce capacity growth can help.

On behalf of the social security system the situation looks better. The wedge is within a historically reasonable range and there is still space for increasing contribution rates (which fits into the need for

factor substitution in times of a high capital stock and only little labour supply). As unemployment does not pose a problem, all social security funds can be used to finance pensions.

Reviewing the forecast 1986 to 2000 in the light of these problems, the future does look neither excellent nor desastrous. Stabilization policy as assumed above is feasible and effecitve, but the results are not indisputedly positive. So it seems natural to consider other performances for stabilization policy and see whether they bring about less problems in 2000.

4 Two Other Strategies for Stabilization Policy

4.1 A Non-Activist Rule

In the previous section we have seen that active stabilization policy will be feasible and effective during the next 15 years. But it ended up with a serious pile of problems. So it is on hand to check a non-activist strategy. By the term „non-activist" we think of a strategy that ties policy instruments to potential output, i.e. behaves as on a steady state path. The already decided-on policy-actions as the 1988 tax-cut and reductions in standard hours have not been neglected.

For monetary policy this assumption implies a growth rate of money supply that is identical with that of potential output. If the former rises faster, it's growth has to be restrained by rising the money market rate, which is assumed to be the Bundesbank's instrument. For fiscal policy the main point is to keep the government claims on potential output constant. On the revenue side constant tax rates were assumed. The most important results of this strategy are summed up in Table 6. We compare them with the results attained in the section above which will be referred to as „baseline".

Table 6: The Non-Activist Rule

Item		**Period**	
	1986 - 1990	**1991 - 1995**	**1996 - 2000**
Potential output growth (%)	3,1	3,7	3,3
Capacity utilization (%)	96,4	94,8	96,9
Substitution requirement	122,0	123,8	120,5
Unemployment rate (%)	9,9	10,7	9,2
Inflation rate (%)	2,7	4,3	6,7
Wedge (%)	41,3	42,0	42,6
Deficit ratio (%)	2,6	3,7	1,8
Government expenditure growth (%)	3,3	3,7	3,4

One important difference between fiscal policy in the two simulations is the growth of government expenditure during the second quinquennium. In the baseline it was about six percent and in the nonactivist case it is less than four percent. As a result of a high transaction demand for money, the money supply tends to rise quickly and thus according to the rule the monetary authority has to rise interest rates.

The outcome of this strategy differs substantially form the base-line. In the non-activist case the growth of potential output is considerably lower with a higher utilization rate in the last quinquennium but lower ones before. The rate of unemployment does not fall until the mid-1990s and then it is slightly reduced to still above nine percent. Inflation is lower during the first ten years, but higher in the last five. The wedge rises over the whole interval and ends up two percentage points above that ot the basic forecast. Last but not least the deficit ratio is much lower than in baseline.

What does this mean? The process of factor substitution is not accelerated by stabilization policy. Therefore substitution needs more time and will not be strong enough to reduce unemployment. The decline in unemployment during the last five-year-period stems completely from demographic factors.

The main reason for less growth in potential output and higher unemployment is a rise in interest rates brought about by the central bank‘s effort to reduce money supply expansion. The money market rate has to be risen moderately but permanently and ends up in the ten percent range.

This result shows clearely: the key to reduce unemployment is the interaction of supply policy that narrows the wedge and expansive demand policy that induces the installment of large labour intensive vintages of production capacity for some years. In the nonactivist case these prior conditions are not given. The process of factor substitution is left to the market; but due to rigidities in the wage and price formation, the market works only very slowly.

In 2000 this rule brings about: capacity utilization a bit below normal, high unemployment and substitution requirement, high inflation because of a high wedge, but little public debt. In the light of the demographic development comming after 2000, this result is quite gloomy. Even the public debt situation does not look brightly; because of high interest rates the interest payments for the comparatively small debt reach sorne 20 % of governnent expenditure in 2000. Thus, the space for active policy is hardly wider than in the baseline and pursuing the non-activist rule will not solve the unemployment problem within short time and together with the pensions‘ problem it will make the public debt problem even more urgent.

4.2 An Activist Rule

In the basic forecast stabilization policy instruments were set according to the author‘s intuition. Thus, it is to question, to what extend the results are subject to individual knowledge of the model. To check this, we ran a third simulation in which policy instruments are set according to certain rules.

As in the baseline some kind of neutrality was assumed for monetary policy: the money market rate will not be changed. For fiscal policy two instruments are chosen: one on the demand side (government expenditure) and one on the supply side (rate for direct taxes on individuals). The rules are as follows: as long as the substitution requirement is higher than under- or over-utilisation of capacity, supply policy is chosen, i.e. the tax rate is lowered. Expenditures for public investment remain constant, unless deficits become too large, which is presumed to be the case if the deficit is more than three percent of potential output. As long as the deficit is too large, expenditure is cut by 0.5 billion DM per quarter. In the reverse case (substitution requirement less than capacity under- or over-utilization), demand policy is chosen and tax rates are adjusted only in order to keep public deficits within range by raising tax rates one percentage point per quarter.

These rules do not ensure that the deficit ratio remains below the three percent margin; this margin serves as an indicator that actions to improve the budget situation have to be pursued. But changes in expenditure or in tax rates cannot be made without bounds; thus, lower and upper limits for both were introduced.

The results of this strategy are summed up in Table 7. Compared with baseline the activist rule shows a more cautious change in instruments: in the first quinquennium government expenditure rises by 2.3 % compared with 3.1 % in baseline. The deficit ratio is 3.0 % versus 4.7 %. The figures for the second five year period are 4.6 % to 6.1 % (expenditure) and 4.7 % to 4.1 % (deficit ratio) . Here an important difference in the choice of instruments is apparent: while in the baseline supply and demand policy was used, under the activist rule only supply policy is used during the first decade. In the last quinquennium policy switches to demand management, because the substitution requirement is reduced and the under-utilization of capacity is larger.

These differences in policy lead to distinct developments of the economy. Factor substitution is nearly identical in both cases; but due to the lack of demand policy under the activist rule investment does not boom as much as in the baseline. Thus, less working places are created and the substitution requirement and unemployment decline only more slowly. Their decline over the last five years is due to two factors: the demographic change and expansionary demand policy as soon as the switch takes place.

As long as demand policy does not initiate job creations, contributions to unemployment insurance have to be raised. This counteracts the cut in tax rates and as a result the wedge in the activist case

is higher than in the baseline. But starting with lower tax rates in the mid 1990s the wedge can be reduced with contribution rates and it ends in 2000 roughly 1.7 percentage points below that of the baseline.

This performance of stabilization policy rises inflation only a little less than in the baseline. Altogether, this means that the share of the government budget needed for interest payments will be 27 %, which is 4.5 percentage points higher than in the baseline. The reason for higher interest payments lies in the timing of making debts. In the baseline the bulk of the debt is made during the first half of

Table 7: The Activist Rule			
Item		**Period**	
	1986 - 1990	**1991 - 1995**	**1996 - 2000**
Potential output growth (%)	3,2	5,6	4,9
Capacity utilization (%)	96,8	97,4	94,0
Substitution requirement	121,9	120,7	108,2
Unemployment rate (%)	9,8	9,3	3,7
Inflation rate (%)	2,6	5,0	6,0
Wedge (%)	40,6	39,3	39,0
Deficit ratio (%)	3,0	4,7	3,6
Government expenditure growth (%)	2,3	4,6	2,2

the simulation period when interest rates are relatively low, while under the activist rule most of the debt is made during the last half of the simulation period when interest rates are higher.

To sum up, the results under the activist rule are closer to those of the baseline than to those under the non-activist rule. The renunciation from demand policy during the first half of the simulation period results in less job creation so that the substitution requirement and unemployment do not sink as they do in baseline. In 2000 capacity utilization does not differ significantly, unemployment is about 2.5 percentage points higher, and inflation differs only a litte. The main differences are seen in public debt services and the wedge. While the first is substantially higher, the latter is 1.7 percentage points lower. Thus, there is room for raising the wedge but this space can be used only for one out of two purpuses: reducing government debt by raising tax rates or financing pensions by higher contribution rates.

5 The External Constraint

In section 3.1 we discussed our assumptions, some of which referred to the external sector. We assumed that the world economy will follow smooth paths and that the Deutschmark effective exchange rate will follow purchasing power parities (PPP) . To analyse what these assumptions mean for the simulation results, we have to check the sensitivity with respect to these assumptions. The most critical one is the exchange rate. Thus, we ran one last simulation in which we assumed a kind of worst case for the exchange rate: not to follow PPP but to stay as low as it was in the first quarter of 1987, i. e. a rate of 1.80 DM/$.

The results of this simulation run show, that the conclusions have not to be changed substantially. Less export demand due to the worse competitiveness of german and higher inflationary pressure do harm but do not reverse the outcomes. Thus, a steady development of the world economy has no decisive impact; but to be sure, heavy and abrupt changes such as the Dollar depreciation in 1986 do have. According to what will happen, they may as well be favourable as e.g. an appreciation of the Dollar (which nobody would expect as long as the twin deficit - government budget and current account - in the U.S. persists).

6 Summary

This paper analyses the problems stemming from demographic changes and the feasibility of stabilization policy to solve them during the last one-and-a-half decades of this century within a consistent macroeconometric framework. The problems are twofold: firstly in the mid 1980s we face a situation with high unemployment due to capital shortage. Secondly the demographic composition changes substantially: the relation pensioneers to labour force will rise from 1:2.5 (1986) to 1:2.0 (2000). This poses problems not only for the allocation of productive resources, but also for financing the social security system.

To analyse these items we use a macroeconometric model for the Federal Republic of Germany, which is consistent in taking into account stock-flow relations and which thus is a proper instrument for medium term analysis. We first ran a forecast of the FRG's economy until 2000 by assuming that the world economy follows smooth paths and exchange rates follow PPP. The attained level of social security is preserved and contribution rates are changed to reach minor budget surpluses of each branch of the social security system. Instruments for stabilization policy are set to certain common sense principles. To qualify the results three other simulations were run. The first two analyze the sensitivity with respect to policy assumptions, the third with respect to our exchange rate assumption.

The most important result is that stabilization policy during the first half of the 1990s plays the key role. Market mechanisms and supply policy (tax cuts) since the mid 1980s change the factor price relation in a way that brings about factor substitution in favour of labour. In this situation determined demand policy has the feasibility to induce a job creation that is large enough to result in full employment until 2000. If this demand action is not taken or if it is taken too cautious, the costs of reducing unemployment in the future will be higher. Under a non-activist rule unemployment will shrink only moderately due to demographic changes. A more cautious activist rule will end up with higher public debt Services.

The external development does not call in question the conclusions, but qualifies them. Assuming an exchange rate of 1.80 DM/$ all the time results in a worse performance of the german economy because of less exports and more inflation.

Using our consistent framework, we come to the conclusion, that stabilization policy is feasible to solve the most important problem of today, unemployment, and, according to when unemployment will be removed, diminish other problems which will arise: the financing of public debt and the pensions' System.

Notes

(1) A complete description of the model is available from the author upon request.

(2) See e.g. DAVIDSON / HENDRY / SRBA / YEO (1978).

(3) The informations were taken from EULER (1986)

(4) See RATHJENS (1988) , pp. 92-94

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