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"MACROECONOMIC BENEFITS OF GERMAN GUARANTEE BANKS"

Quantification of the macroeconomic effects of the activities of German Guarantee Banks

under the framework conditions of the global financial and economic crisis

Results of a model calculation using a macroeconomic model

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Trier, June 30 2010

INHALT

POINT OF DEPARTURE

- The financial and economic crisis presented a major portion of German companies with considerable difficulties as regards corporate financing in general and credit financing, more specifically. The upheavals on the financial and capital markets led to numerous financial institutions, who feared higher default rates,to develop restrictive lending policies than was observed in the wake of Basel II. The deterioration in financing conditions affects small and young companies acutely, especially in relation to the problem of constraints on credit. .

- Ito alleviate this problem the state facilitated the issuing of guarantees by the German Guarantee Banks. Above all, the federal government increased its share of counter guaranties by 10 percentage points.

QUESTION

- In this context the question arises whether the positive macro-economic effects confirmed by the Inmit Institute 2006 which are based on the activities of Guarantee Banks are still valid in terms of their effective direction and scale?. In the light of the high level of national debt and the tense situation in relation to public budgets, should the State financing be accorded a high priority and the question follows : have the positive stimuli triggered by the Guarantee Banks over compensated or for the expenses to be paid arising from the utilization of the counter-guarantees granted by it..

MODELLING

- On the one hand, the effects of the activities of the German Guarantee Banks have been modelled in the forecast model through the additional investments (guaranteed investment loans, guaranteed investments) that materialised as well as through the loss of companies' revenue which was avoided through guarantees for working capital loans. On the other hand, the State payments to be expected due to default were also included as a negative stimulus in the simulation calculation. The average default rates for a twelve year period which partially include the economically difficult years of 2002 and 2003 were applied as default rates.

- The following is included as input data in the macro-economic model: Data from the approval statistics of German Guarantee Banks (guarantee volumes, credit and investment volumes) as well as results of a survey which Inmit conducted among 1,200 companies. That survey was used to estimate the realistic share of

investments and revenue volumes which are attributable to the activities of German Guarantee Banks.

- Two scenarios were used in order to reproduce the range of the macro-economic effects of the German Guarantee Banks for the forecast period from 2009 to 2015: a realistic scenario based on the results of the company survey as well as a minimum scenario which is based on minimum values for additional investments and avoided lost revenue. Furthermore, the former scenario was calculated in two quantification variants: firstly, as an isolated examination of a single guarantee year (one-off stimulus); secondly as examination of the effects per annum as well as cumulated for the entire forecast period (permanent stimulus/permanent granting of guarantees). The minimum scenario has only been simulated in the quantification variant of permanent stimuli.

RESULTS

- After deduction of default-induced payments, the State financing balance amounts to an aggregated EUR 1.1 billion during the 2009-2015 period for the quantification variant of **the once-off stimulus in the realistic scenario**

- In the consideration of **permanent stimuli** net financial investments in the r**ealistic variant** amounts to EUR 6.8 billion on the whole in the period from 2009 to 2015 and about EUR 1 billion on average for the year.

- In this model constellation, the increase of the State financing balance exceeds the utilization of its counter-guarantee 7-fold. Even if the default payments assumed in the model calculation increase three-fold, the realistic scenario would still produce a positive financing balance from the State's viewpoint.

- Even in the worst variant, the **minimum scenario** in which only additional investments in the amount of the guarantee volume as well as revenue not forgone in the amount of only a third of the realistic scenario are included in the model as positive stimuli, and in which the forecast State default payments remain unchanged, the effects in the variant of the permanent stimulus are still positive providing an annual average of about EUR 600 million. In this model constellation the increase in the State financing balance exceeds the utilization of its counter-guarantee 4-fold. Even if the default payments assumed in the model calculation double, the minimum scenario would still produce a positive State financing balance.

- In all three model variants Gross Domestic Product increases, the number of employees increases and the number of unemployed falls. In the most realistic model variant (permanent stimulus, realistic scenario) Gross Domestic Product increases by an average of EUR 3.4 billion per annum, the number of employees increases by an average of 29,500 per annum and the number of unemployed falls by an average of 23,200 per annum.

The short study

By granting guarantees and investment guarantees, the German Guarantee Banks facilitate investments and revenue which would not have materialised without these guarantee instruments. Meanwhile, in an economy whose sectors are highly integrated, these have direct and indirect positive effects on other economic aggregates such as employment and tax revenue. On the other hand, the state bears at least a part of potential default payments as counter-guarantee which, in turn, has a negative impact on economic development. The pivotal question is whether the positive or the negative effects from the state vantage-point prevail in this system. The macroeconomic effects of the German Guarantee Banks have already been confirmed in 2006 in the retrospective examination as part of an Inmit study. In addition to this, this short study predicts the macroeconomic effects of German Guarantee Banks in the light of the international financial and economic crisis and the corresponding stringent conditions of SME financing on the basis of various economic values for the period from 2009 to 2015.

The Institute for Small and Medium-Sized Enterprises at the University of Trier (Inmit) [www.inmit.de]

The Institute for Small and Medium-Sized Enterprises at the University of Trier (founded in 1995) is an Institute of the University of Trier and one of the top Small and Medium-Sized Enterprise research institutes in Germany. As an economic research and consultancy institute, Inmit concentrates on the core issue of medium-sized economics/SME. Prof. Axel G. Schmidt, Professor of Small and Medium-Sized Enterprises at the University of Trier is the founder and director of Inmit; Martina Josten and Marco van Elkan are the Managing Directors. In its work Inmit positions itself as a bridge between research and business and implements this by narrowly focusing on an applied approach and transferring knowledge and research in economic and corporate practice in its various forms for 14 years now for clients at federal and regional level.

Initial quantification as part of the 2006 Inmit study confirms positive macro-economic effect of German Guarantee Banks

By taking on credit default guarantees and investment guarantees, Guarantee Banks make additional investments possible, the financing of which would not have come about without these guarantee instruments. Furthermore, the Bank's activities relating to the collateralisation of working capital credit contribute to the generation of revenue which otherwise wouldn't have been realised. Meanwhile, in an economy, with strongly integrated sectors, investments and revenue have direct and indirect effects on other economic values over the longer period. Accordingly, an investment now, for example, will have an effect on macro-economic aggregates over the future years until the effect of that investment "blows out". These consequential effects of additional investments which may not have been transacted, or may not have been transacted to this degree, without default sureties or investment guarantees, are quantified within the framework of the report for various economic aggregates (e.g. for Gross Domestic Product, State financing, employment, unemployment,…).

Inmit first quantified the macro-economic benefits of the German Guarantee Banks using a macro-economic model[1] in 2006 (Schmidt, van Elkan 2006). The effects on the State financing in the years under individual investigation were of particular interest here. In view of the State financing balance, a quantitative improvement through a higher level of tax revenue, for example, as well as a reduction of monetary payments by the state (e.g. due to lower costs for individuals affected by unemployment) is to be reckoned with. On the other hand, it may be assumed that the payments resulting from the utilization of the counter-guarantee have a negative impact on the State financing balance (increased expenditure). According to this, the calculated State financing balance already represents the net effect from the perspective of the state and comes to an aggregated EUR 570 million in the case of the quantification variant of a once-off stimulus (effect calculation of a single approval year separately investigated over the first year and the six subsequent years) and calculated at an annual average of EUR 670 million in the realistic quantification variant of permanent stimuli (effect calculation for guarantee issuance under continuous investigation).

[1] On the basis of data input prepared by Inmit (surety and guarantee volume, credit and investment volume, investment volume, sales volume), simulation calculations were carried out by the Gesellschaft für Wirtschaftliche Strukturforschung mbH (gws) using the INFORGE macroeconomic forecast model developed by gws.

Financial and economic crisis results in changed framework conditions for SME financing

The international financial and economic crisis caused considerable financing constraints for many German companies including those that were considered healthy. On the one hand, slumps in demand reduced the ability of companies to generate cash flow from the sale of products and services. On the other hand, the upheavals on the financial and capital markets have led to numerous financial institutions developing an even more restrictive lending policy than observed in some cases in the wake of Basle II for fear of higher default rates in a difficult economic environment (Bauer, Zimmermann 2010, p. 3f.; KfW Bankengruppe 2009, p. 7 et seq.). Besides increased credit-worthiness requirements and the disclosure of business data, the request for additional collateral as well as an even more cautious evaluation of already submitted collateral plays an important part in the risk policy of financial institutions (Schmidt, Selbherr 2009, p. 51). To that extent the financial and economic crisis has led, either directly or indirectly, to a considerable deterioration in the financing conditions of companies. It is true that this deterioration concerns companies of all sizes but affects small and young companies to an acute degree, especially with regard to the problem of obtaining a loan at all (KfW Bankengruppe 2009, p. 3f.; Bauer, Zimmermann 2010, p. 4f.).

In this context the existence and scope of a credit crunch was and continues to be discussed in public (Weber 2009, p.10, Häring 2009, Schiltz 2009) both for large companies (Sinn 2009a, p.1., Sinn 2009b, p.1) and for medium-sized companies in particular (KfW Bankengruppe 2010, Reize 2010). Regardless of whether a credit crunch now exists or not[2], it should be stated that the financial and economic crisis has confronted a significant proportion of German companies with considerable difficulties as regards corporate financing in general and credit financing in particular.

[2] The contradictory nature of the statements on the existence of a credit crunch may be attributable to the fact that the term „credit crunch“ is not uniformly defined in international literature (cf. stv. Bernanke, Lown 1991; Ownes, Schreft 1993). There is also the divided opinion as to whether and to what extent a credit rationing as defined by Stiglitz, Weiss (1981) is a necessary element of a credit crunch (Bernanke, Lown 1991, p. 207 and 230) or not (Friedman 1991,p. 242).

In such a situation, it should be assumed that the activities of the German Guarantee Banks are to be accorded a greater importance in connection with the access to finance of medium-sized enterprises than was the case in the period prior to the financial and economic crisis. This insight may have led the federal government to modify the framework conditions for the Guarantee Banks guarantee activity in significant facets:

- The he guarantee liabilities of the Guarantee Banks were reduced by 10 percentage points in each case, initially limited to commitments until 31.12.2010 while the federal government increased its corresponding counter-guarantee share by 10 percentage points.
- The maximum guarantee amount per company was increased from €1 million to €2 million.
- The maximum guarantee coverage rate was increased from 80 to 90%.
- The target upper limit for the working capital share in the total guarantee commitment of a Guarantee Bank was increased from 35 to 50%.

In the light of all these changes which have taken place since the time of the completion of the first Inmit study in 2006, the question arises whether the positive effects calculated by Inmit at the time, which stem from the activities of the German Guarantee Banks and relate to pivotal macroeconomic aggregates, are still valid in this form and scale. In light of the high level of national debt and the tense situation concerning public budgets, the State financing balance should be accorded a high priority; therefore the question arises whether the positive stimuli triggered by the Guarantee Banks in respect of investment and employment for instance increase public revenue such that they (over)compensate or not for the expenses to be paid arising from the utilization of the counter-guarantees granted by the state (increased).

At first glance there is much, particularly more restrictive bank lending, to suggest that these effects will be even more positive than three years ago: For instance, due to the possibility that the share in investments which might not have been realised in absence of the Guarantee Banks amounts in the current crisis to more than the 75% established at the time through the Inmit company survey and also due to the fact that in 2009, there has been an increase in demand for guarantees, which could almost be described as volatile.

Nevertheless, adverse developments could also be brought to bear. For instance, defaults could increase in the wake of a sharp increase in the number of corporate insolvencies. This might ceteris paribus have negative effects on the State financing balance which would be accentuated by the fact that the federal government has increased its counter-guarantee share from March 2009 on. The fact that the structure of credits covered by guarantees has changed considerably may also reduce the positive macroeconomic effects: While in 2008 investment loans accounted for some three quarters of guaranteed loans and working capital loans for about a quarter, the share of guaranteed working capital credit increased to 36% in 2009. Ceteris paribus it could be assumed that the working capital loans made possible by

Guarantee Banks engender a lesser positive macroeconomic effect than investment loans (for instance, with regard to multiplier effects). Nevertheless, this ceteris paribus clause would not be fulfilled if the working capital loans result in maintaining production activity, otherwise foregone revenue is generated and the laying-off of employees is prevented.

In order to quantify the macroeconomic effects of the German Guarantee Banks under current framework conditions, the Association of German Guarantee Banks has commissioned Inmit with carrying out an updated study. The results are presented below.

1. Modelling as a forecast model

In order to examine the macroeconomic effects of German Guarantee Banks under the framework conditions of the financial and economic crisis, this study carried out a forecast of the future effects for the forecast period 2009 to 2015 -- in contrast with the study carried out in 2006 (historical simulation calculation for the period from 1996-2002). Only such a forecast allows showing the medium and long term effects of the activities of German Guarantee Banks in the context of the financial and economic crisis.

The effect modelling takes place by taking into consideration firstly investments which would not have materialised without the Guarantee Banks (positive stimulus), secondly the revenue which would not have been generated without the Guarantee Banks (positive stimulus) and, thirdly, the default payments of the state arising from the counter-guarantees (negative stimulus).

2. Quantification variants

In view of the quantification of the macroeconomic effects of the activities of Guarantee Banks, two calculation variants are selected analogous to the 2006 Inmit study.

- **Once-off stimulus:** This variant involves an isolated examination of the effects of a single guarantee year for macroeconomic values in the same as well as in the six subsequent years (2009 to 2015).
- **Permanent stimuli** (permanent granting): This variant describes the positive and negative effects arising in a year from current as well as preceding years net per year. This variant is the closest reflection of the mindset of public institutions (“budgetary approach”). For the forecast period 2009 to 2015, this answers the question as to what the activities of Guarantee Banks cost the state in a year and what quantified benefits thereby accrued to the state, namely cumulated both per annum and over time.

3. Model assumptions

In order to complete forecasting for the period 2009 to 2015, assumptions had to be made relating to both structural and development components.

3.1 Development of stimulated investments or investments attributable to Guarantee Banks

The volume of investment stimulated by guarantees for 2009 is already known from Guarantee Bank statistics. The share which would not have materialised without the activities of the Guarantee Banks was determined from Inmit's company survey – according to specific economic sectors. As a result the investment volume attributable to the Guarantee Banks was calculated for 2009 according to sector.

For the period from 2010 to 2015 it has been assumed for investments stimulated by the Guarantee Banks that these investments behave analogous to the forecast development of equipment investments by the economy (growth rates for equipment investments in the INFORGE model).

3.2 Structure and development of revenue attributable to Guarantee Banks

The revenue attributable to the activities of the Guarantee Banks ("avoided revenue losses") has been estimated using a combination of information items provided in the context of the Inmit company survey by the beneficiaries of working capital loan guarantees as well as information items from Guarantee Bank statistics:

- Annual turnover of working capital borrowers,
- Foregone share of turnover in absence of granted guarantee,
- Allocation of the company to a particular sector.

The estimated revenue losses avoided in this way has been interpreted as follows within the framework of the INFORGE model:

- Half of the lost revenue in the Manufacturing Industry was interpreted as lost equipment investment of other sectors and the other half as lost export of the Manufacturing Industry.
- Revenue lost in retail was interpreted as lost consumption.
- The lost revenue of the construction industry was interpreted as lost investment in construction in Germany.

Furthermore, it has been assumed that the volatile rise in volume of working capital loans almost doubling from 2008 to 2009 is crisis-led, the amount of guarantees for working capital loans in 2010 and 2010 continues to remain at the level of 2009 and from 2012 declines to the pre-2009 level due to an improved economic situation (in the previous nine years there

was a relatively low fluctuation of a mean value of EUR 315 million, standard deviation EUR 26 million).

As macroeconomic development components, the change rates for the value-based production volume forecast in the INFORGE model are included as change rates in turnover in individual sectors.

3.3 Default development of the 2009 approval year (one-off stimulus) as well as the approval years 2009 to 2015 (permanent stimuli)

Once-off stimulus

The known value for the approved guarantee volume can be used to estimate the evolution of defaults for the 2009 approval year. It is necessary to estimate the default rates for the period from 2010 to 2015. The average default rates identified in the course of the 2006 study for the years 1992 to 2003 (with different economic cycles) were applied to that end. The revised regulation (increased share of counter-guarantees) was taken into consideration in the case of the level of default payments which the state assumes through counter-guarantees.

Permanent stimulus

In order to estimate the evolution of defaults for the period from 2009 to 2015, the actual and forecast year-specific approval amounts as well as the default rates identified in the course of the 2006 study for the years 1992 to 2003 were applied. This period includes different economic cycles, especially the economic crisis in the years 2002/2003. This is significant for the plausibility of future default rates thus estimated inasmuch as the financing conditions at the beginning of 2010 are regarded as continually tense by the companies and are deemed to have deteriorated compared to previous years, although the current financing situation is not regarded as critical, as was the case in 2002 and 2003 (Bauer, Zimmermann 2010, p. 3). In the end this led to the average annual default rate calculated for the period 1992 to 2003 exceeding the default rate of 2009 by 0.5% points.. The increased share of counter-guarantees was taken into consideration in the case of the default payments which the state assumes through counter-guarantees.

In this connection it was assumed that on account of the economic situation the counter-guarantee regulation of 2009 would also persist into 2010 and 2011 and the “old” regulation would once again be applied from 2012 onwards.

4. Input data

According to this, the following data is introduced into the macroeconomic model:

- Sector-specific information items on the guarantee volume for 2009, forecast for 2010 to 2015 according to the above assumptions
- Sector-specific information items on the number of guarantee beneficiaries
- Sector-specific information items on the credit and investment volume for 2009, forecast for 2010 to 2015 according to the above assumptions
- Sector-specific information items on the investment volume for 2009, which is attributable to the activities of the German Guarantee Banks; forecast for 2010 to 2015 according to the above assumptions
- Sector-specific information items on turnover which companies would have lost without the activities of the German Guarantee Banks; forecast for 2015 to according to the above assumptions
- Year-specific default data of 2009, forecast for 2010 to 2015 according to the above assumptions
- Structural data from the written company survey conducted by Inmit in which 1,200 companies participated. The data collected included the unit value of the additional investments attributable to the activities of German Guarantee Banks; the unit value of the turnover generated attributable to the activities of the German Guarantee Banks; the average annual turnover per beneficiary of a working capital loan guarantee

An company overview of the beneficiaries of guarantees in the approval year 2009

The recipients of guarantees from the approval year 2009 were questioned as part of the company survey.

The aim of the nationwide survey was to determine unit values for the additional investments attributable to the activities of German Guarantee Banks as well as the unit value of turnover generated by the activities of the German Guarantee Banks. The survey was conducted from March to April 2010.

- Questionnaires sent by the Guarantee Banks: 3,050
- Useable return rate: 1,201
  (1,042 surety recipients and 159 recipients of investment guarantees)
- Return rate: 39,4%
- Distribution according to sector: Manufacturing Industry 35%, Construction Industry 11%, Retail 22%, Services 23%, Miscellaneous 9%.

Through the company survey it was possible to identify that 71% of the additionally stimulated investment is attributable to the granting of guarantees for investment loans and working capital loans. By granting guarantees for working capital loans, otherwise lost revenue volumes of an average of 31% of annual turnover were generated according to the companies. Both of these unit values are used as data input in the realistic scenario.

The data gathered by Inmit support the data on the stimulated investment volume contained in the Guarantee Banks statistics (2009). The stimulated investment volumes, both by granting sureties and through investment guarantees are reported by the Guarantee Bank statistics at about € 2.9 billion in 2009. The forecast of the relevant investment volumes from the Inmit company survey on the basis of the total of investment guarantees as well as guarantee promises amount to about € 3.15 billion. According to this, the investment figures used should be regarded as very robust. Further plausibility tests confirm the high degree of resilience of the data gathered via the company survey.

5. Scenarios

With regard to the extent of the macroeconomic effects of Guarantee Banks, determining the share of stimulated investments and otherwise lost revenue attributable to the activities of the Guarantee Banks is of major importance. With regard to the investments attributable to the Guarantee Banks, the decisive question is what would happen to the entire investment project if a decisive financing component were dispensed with, in other words the surety or the guarantee and with it the secured loan or the guaranteed investment. With regard to the revenue volumes attributable to the activities of the German Guarantee Banks, what is of relevance is the influence that the non-granting of a surety for working capital credit and therefore the non-granting of working capital credit would have had on the revenue volume.

In order to make informed statements in respect of the level of investments and revenue volumes attributable to the activities of the Guarantee Banks, the results of the short Inmit survey of about 1,200 “customer companies” of Guarantee Banks was used as the empirical basis for estimating those investment and revenue volumes which might not have been realised if a loan guarantee had not been offered (see model assumptions/input data).

These questions cannot be answered with sufficient reliability on the basis of a single number in each case. Consequently, several scenarios were used in quantifying the macroeconomic effects (Realistic Scenario; Minimum Scenario) in order to reproduce the possible range of results:

- **Minimum Scenario:** This scenario is used to define the “lowest back-up line” with regard to the investments and lost revenue additionally triggered which are attributable to the activities of Guarantee Banks. Consequently, only the guaranteed share of credits and investments for the volume of investments additionally triggered is recognised in this scenario. The revenue losses avoided due to working capital loan guarantees are only included in this scenario with a third of the value derived from the company survey (31% of annual turnover for 2009), in other words with about 10% of turnover for 2009.
- **Realistic Scenario:** The shares of additionally triggered investments of 71% and the revenue volumes of 31% otherwise lost, taken from the company survey, are included in this scenario.

In all scenarios the year-specific default data (only the State’s counter-guarantee share) in integrated as additional input data in the macroeconomic model. This means that all quantified values are already net values, even from the State’s vantage-point.

1. Select indicators of macroeconomic effects of German Guarantee Banks

INFORGE makes numerous economic parameters available as indicators for measuring the macroeconomic effect of the activities of the German Guarantee Banks,. These are GDP components, values of the national budget, data on price development and data on the labour market and employment.

In analogy to the Inmit study of 2006, the following parameters were selected:

- State financing balance
- Gross domestic product (GDP)
- Number of employees
- Number of unemployed
- Exports
- Taxes on products / income and property taxes
- Social insurance contributions by the corporate sector

The State financing balance describes the difference between overall state income and expenditure. Decisions made by the state with a financial effect are reflected in this balance. Taxes are the main source of income.Expenses, for instance, arise through state benefits (e.g. social insurance) or public consumption. The balance reflects both the expenses of the state stemming from his function as counter-guarantor for the guarantees of the Guarantee Banks that are claimed (negative effect) and the additional income from taxes or social insurance contributions as a consequence of stimulated investment or facilitated revenue resulting from the granting of guarantees.

2. Interpretation of the results

The quantitative values for the select parameters from INFORGE are available as absolute deviations from the forecast "IST values" for the years 2009 – 2015 in € billion, in other words the IST actual forecast values are compared under identical assumptions and forecasts with the simulated scenario, in which no sureties and guarantees are granted by the German Guarantee Banks. The deviations estimate in each case the effect of the activities of the Guarantee Banks on these macroeconomic indicators.

Positive values signify in the case of

• **GDP**	**Positive effect on total economic output**
• **State financing balance**	Higher difference between income and expenditure of the state
• **Employees**	Rising number of employees
• **Unemployed**	Rising number of unemployed
• **Exports**	Rising export volume (value-based)
• **Taxes on products / income and property taxes**	Rising tax revenue
• **Social insurance contributions by the corporate sector**	Increased social insurance contributions by the corporate sector

Negative values signify in the case of

• **GDP**	**Negative effect on total economic output**
• **Net lending/borrowing of the state**	lower difference between income and expenditure of the state
• **Employees**	decreasing number of employees
• **Unemployed**	decreasing number of unemployed
• **Exports**	decreasing export volume (value-based)
• **Taxes on products / income and property taxes**	declining tax revenue
• **Social insurance contributions by the corporate sector**	low social insurance contributions by the corporate sector

3. Results according to duration of stimulus and scenarios

The results for the three calculated stimulus scenario combinations are explained below. In the hypothetical case of the isolated examination of the individual approval year 2009, the realistic scenario supported by results from the company survey is presented. Two scenarios are calculated for the quantification variant of the permanent granting (permanent stimulus) which most approximates the economic reality. The minimum scenario on the one hand, the realistic scenario on the other hand.

In all three cases under examination, even in the minimum scenario, the model identifies a positive effect of the investments financed with the help of Guarantee Banks on the economy as a whole (GDP) and on the State financing balance. Even the effect on the labour market (employees and unemployed) can generally be described as positive.

3.1 Hypothetical effects of a one-off granting of sureties and guarantees in 2009 - realistic scenario -

In examining the effects of a single guarantee year (here 2009) in isolation, a positive effect of investments financed with the help of the Guarantee Banks on Gross Domestic Product (GDP) and on the State financing balance can generally be confirmed. Even the effect on the labour market (employed and unemployed) is positive. The positive effect of investments and revenue generated by sureties and guarantees is strongest in the year of investment. Negative effects on GDP can already be seen in the second year as well as on employment and financing in the third year. Nevertheless, the amount of the positive effect in the year of the stimulus in this scenario is so high that it offsets by far the cumulated value of subsequent negative effects in the period under review. The financing balance cumulated over the entire period under review has a value of about EUR 1.1 billion. In the case of this value, default-related payments have already been deducted.

Compared to a scenario where Guarantee Banks did not exist, …

…the gross domestic product results EUR 1.7 billion higher over the entire period from 2009 to 2015 due to the activities of the Guarantee Banks.

…exports in the German economy increase by a total of EUR 700 million.

… the number of employed increase by 24,100 over the entire period from 2009 to 2015.

… the number of unemployed falls by 21,200 over the entire period from 2009 to 2015.

… the social insurance contributions of the corporate sector remain constant over the entire period from 2009 to 2015.

… goods taxes increase by EUR 400 million over the entire period from 2009 to 2015 and income and property taxes by EUR 500 million.

… net financial balance of the state increased by EUR 1.1 billion over the entire period from 2009 to 2015.

Table 1: Once-off stimulus in 2009, Realistic Scenario (the investment volume and revenue volume allocated to the Guarantee Banks represents the shares calculated from the company survey (Investment volume: 71%, revenue volume: 31%)

	2009	2010	2011	2012	2013	2014	2015	Total
Components of the gross domestic product (constant prices in billions of Euro, absolute deviations)								
Gross domestic product	4,1	-0,9	0,0	-0,5	-0,3	-0,4	-0,3	1,7
Consumption of private households and companies	1,6	0,1	-0,1	-0,1	-0,2	-0,2	-0,2	1,0
Public consumption expenditure	0,1	-0,2	0,1	-0,1	0,0	0,0	0,0	-0,2
Social assistance benefits in kind	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0
Other public consumption expenditure	0,0	-0,1	0,0	-0,1	0,0	0,0	0,0	-0,2
Equipment investment	3,6	-0,2	-0,1	-0,2	-0,2	-0,2	-0,1	2,7
Construction investment	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,4
Exports	0,9	0,0	0,0	-0,1	0,0	0,0	0,0	0,7
Imports	2,5	0,5	-0,2	0,0	-0,1	0,0	0,0	2,7
Sales trend (in relevant prices in billions of Euro, absolute deviations)								
Macroeconomic gross production	7,5	0,2	-0,1	0,1	0,0	0,1	0,0	7,9
Budget (in relevant prices in billions of Euro, absolute deviations)								
State financing	1,6	0,3	-0,4	-0,1	-0,1	-0,1	-0,1	1,1
Monetary benefits	-0,1	0,1	-0,1	0,0	0,0	0,0	0,0	0,0
Tax on goods	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,4
Income and wealth tax	0,6	0,0	0,0	0,0	0,0	0,0	0,0	0,5
Labour market and Redistribution (absolute deviation)								
Social security contributions	0,5	0,3	-0,5	-0,1	-0,1	0,0	0,0	0,0
Employed person per 1000	35,0	-8,9	4,1	-1,7	-0,9	-1,7	-1,7	24,1
Unemployed person per 1000	-23,5	6,0	-6,5	1,1	-0,1	1,0	0,9	-21,2

Source: Calculations gws on the basis of Inmit data input

Explanation of results:

From a cumulative viewpoint, GDP was 1.7 billion Euro higher due to Guarantee Banks' activities than it would have been had they not existed. The public net financial balance from which default payments have already been deducted improved by 1.1 billion Euro. Employment rose by 24,100, the number of jobless fell by 21,200.

3.2 Effects of a permanent granting of sureties and guarantees in the period from 2009 to 2015

Two scenarios have been calculated for the quantification variant of permanent granting which reflect economic reality as closely as possible – the realistic scenario as well as a hedging of the forecast result by means of a minimum scenario.

3.2.1 Realistic scenario

An investigation was carried out in this simulation calculation as to how the sureties and guarantees granted during the years 2009 to 2010 impact the German economy during the same period. The shares of additionally triggered investments taken from the company survey were estimated at 71% and the revenue otherwise lost annual turnover estimated at 31%.

Compared to a scenario where Guarantee Banks did not exist, …

…the gross domestic product increases by an average of EUR 3.4 billion per annum.

… the number of employed grows by an average of 29,500 per annum.

… the number of unemployed falls by an average of 23,200 per annum.

…social insurance contributions by the corporate sector are an average of EUR 100 million lower in the longer term (for example, social insurance contributions may be reduced due to positive labour market developments).

… tax on goods increases by an average of EUR 500 million and income and wealth tax by an average of 500 EUR million.

…The State financing balance, in other words the difference between collective state revenue and expenditure, increases by an annual average of about EUR 1 billion, increases cumulatively by 6.8 billion euro during the period from 2009 to 2015

In this model constellation the increase in the State financing balance exceeds its pay-out of counter-sureties 7-fold. Even if the default payments assumed in the model calculation increase three-fold, the realistic scenario would still produce positive financing balance from the State's viewpoint.

Table 2: **Permanent stimulus (permanent granting of sureties and guarantees) during the years 2009 – 2015, Realistic Scenario (the investment volume and sales volume allocated to the Guarantee Banks represents the shares calculated from the company survey (Investment volume: , sales volume:) *71%, sales volume: 31%))***

	2009	2010	2011	2012	2013	2014	2015	Total 2009 - 2015	Aver-age
Components of the gross domestic product (constant prices in billions of Euro, absolute deviations)									
Gross domestic product	3,9	3,2	3,9	3,5	3,3	3,1	3,0	23,9	3,4
Consumption of private house-holds and companies	1,6	1,7	2,1	2,1	1,9	1,7	1,6	12,7	1,8
Public consumption expenditure	-0,1	-0,3	-0,1	-0,2	-0,2	-0,2	-0,2	-1,3	-0,2
Social assistance benefits in kind	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	-0,1	0,0
Other public consumption ex-penditure	-0,1	-0,2	-0,1	-0,2	-0,2	-0,2	-0,2	-1,2	-0,2
Equipment investment	3,6	3,6	3,7	3,6	3,7	3,7	3,9	25,8	3,7
Construction investment	0,4	0,4	0,4	0,2	0,2	0,2	0,2	2	0,3
Exports	0,9	0,9	0,9	0,8	0,8	0,7	0,7	5,7	0,8
Imports	2,5	3,1	3,0	3,1	3,0	3,0	3,1	20,8	3,0
Sales trend (in relevant prices in billions of Euro, absolute deviations)									
Macroeconomic gross produc-tion	7,2	7,3	7,6	7,5	7,4	7,4	7,5	51,9	7,4
Budget (in relevant prices in billions of Euro, absolute deviations)									
State financing	1,6	1,8	0,9	0,7	0,6	0,6	0,6	6,8	1,0
Monetary benefits	-0,1	0,0	-0,1	-0,1	-0,1	-0,1	0,0	-0,5	-0,1
Tax on goods	0,4	0,4	0,5	0,5	0,5	0,4	0,4	3,1	0,5
Income and wealth tax	0,6	0,6	0,5	0,5	0,4	0,4	0,3	3,3	0,5
Labour market and distribution (absolute deviation)									
Social security contributions	0,4	0,7	-0,4	-0,5	-0,5	-0,4	-0,3	-1	-0,1
Employed person per 1000	31,1	23,1	35,4	32,4	30,7	28,2	25,9	206,8	29,5
Unemployed person per 1000	-21,1	-15,6	-27,6	-25,6	-25,5	-24,0	-22,7	-162,1	-23,2

Source: Calculations gws on the basis of Inmit data input

3.2.2 Minimum scenario

Even in the most unfavourable scenario, only annual positive macroeconomic effects attributable to the activities of the Guarantee Banks are reflected both with regard to the GDP and net financing balance during the period under review.

Compared to a situation where Guarantee Banks did not exist, …

…the gross domestic product increases by an average of EUR 1.7 billion per annum.

… the number of employed grows by an average of 14,000 per annum.

… the number of unemployed falls by an average of 11,300 per annum.

…social insurance contributions by the corporate sector are an average of EUR 100 million lower in the longer term (for example, social insurance contributions may be reduced due to positive labour market developments).

… tax on goods increases by an average of EUR 200 million and income and wealth tax by an average of 200 EUR million.

…The State financing balance, in other words the difference between collective state revenue and expenditure, increases by an annual average of about EUR 600 million.

In this model constellation the increase in the State financing balance exceeds its pay-out of the counter-sureties 4-fold. Even if the default payments assumed in the model calculation double, the minimum scenario would still produce positive State financing balance.

Table 3: Permanent stimulus (permanent granting of sureties and guarantees) during the years 2009 – 2015, Minimum Scenario (the investment volume and revenue volume allocated to the Guarantee Banks only represents the surety and guarantee volume, the revenue volume only a third of the share calculated from the company survey)

	2009	2010	2011	2012	2013	2014	2015	Total 2009 - 2015	Aver-age
Components of the gross domestic product (constant prices in billions of Euro, absolute deviations)									
Gross domestic product	2,0	1,6	2,0	1,8	1,7	1,6	1,5	12,2	1,7
Consumption of private households and companies	0,8	0,9	1,0	1,0	0,9	0,8	0,8	6,2	0,9
Public consumption expenditure	-0,1	-0,2	-0,1	-0,2	-0,1	-0,2	-0,2	-1,1	-0,2
Social assistance benefits in kind	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Other public consumption expenditure	-0,1	-0,2	-0,1	-0,1	-0,1	-0,1	-0,2	-0,9	-0,1
Equipment investment	2,0	2,0	2,0	2,0	2,0	2,1	2,2	14,3	2,0
Construction investment	0,2	0,2	0,2	0,1	0,1	0,1	0,1	1,0	0,1
Exports	0,5	0,5	0,5	0,4	0,4	0,4	0,3	3,0	0,4
Imports	1,3	1,6	1,6	1,6	1,6	1,6	1,6	10,9	1,6
Sales trend (in relevant prices in billion billions of Euro, absolute deviations)									
Macroeconomic gross production	3,7	3,8	3,9	3,8	3,8	3,8	3,9	26,7	3,8
Budget (in relevant prices in billions of Euro, absolute deviations)									
State financing	0,9	1,0	0,5	0,4	0,4	0,4	0,4	4,0	0,6
Monetary benefits	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	-0,1	0,0
Tax on goods	0,2	0,2	0,2	0,2	0,2	0,2	0,2	1,4	0,2
Income and wealth tax	0,3	0,3	0,3	0,2	0,2	0,2	0,2	1,7	0,2
Labour market and Redistribution (absolute deviation)									
Social security contributions	0,2	0,4	-0,2	-0,2	-0,2	-0,2	-0,2	-0,4	-0,1
Employed person per 1000	14,7	10,8	16,9	15,6	14,6	13,3	12,1	98	14,0
Unemployed person per 1000	-10,1	-7,5	-13,5	-12,7	-12,6	-11,8	-11,2	-79,4	-11,3

Source: Calculations gws on the basis of Inmit data input

On the whole, these robust [3] calculation results also prove in their effective direction the substantial and positive macroeconomic effects that are generated by the granting of sureties and guarantees by the German Guarantee Banks.

[3] This has been shown using calculations for a minimum-scenario

INFORGE model description

The IAB/INFORGE model (INterindustry FORecasting GErmany) is a sectorally deeply structured forecast and simulation model for Germany which has been regularly updated since the beginning of the 90s and has been used in many applications (cf. e.g. Helmrich & Zika 2010, Ahlert et al. 2009, Meyer et al. 2007; Ahlert 2005; Distelkamp et al. 2003; Lutz et al. 2002; Wolter 2002; Meyer & Ewerhart 2001; Meyer & Ahlert 2000; Blau et al. 1999; Elixmann, Keuter & Meyer 1997; Meyer & Ewerhart 1997; Lichtblau, Meyer & Ewerhart 1996).

In studies for various ministries INFORGE was also used to expand the direct economic significance of individual economic cross-section activities (sport, traffic, tourism amongst others) identified within accounting satellite systems with subject-specific impact analyses and political simulations (Ahlert 2000, 2001, 2006a, 2008; Ahlert, Grossmann & Lutz 2006 amongst others).

Similarly, the INFORGE model is the economic core of the PANTA RHEI model. This environmental addition which reproduces interdependencies between economy and ecology can already look back at a long-standing tradition and a variety of applications in political consultancy (Lutz et al. 2007; Lutz et al. 2005; Meyer, Distelkamp & Wolter 2007; Staiß et al. 2006; Lehr et al. 2008; Lutz & Meyer 2008). Since 2005 INFORGE has been associated with the socio-economic model DEMOS which, above all, reproduces in detail the demographic interrelationships, the development of labour supply and the consumer decision of private households (Drosdowski & Wolter 2010, Wolter 2005, 2006; Meyer & Wolter 2007). Furthermore, INFORGE forms the basis for analysing regional economic questions and projections for subsections of the economy as a whole (Meyer, Ewerhart & Siebe 1999; Ahlert, Meyer & Wolter 2003; Ahlert 2006b; Ulrich & Wolter 2007; Distelkamp et al. 2008, 2010).

Last but not least, it has been possible to transfer the content-related design of the INFORGE model to the e3.at model for the Austrian economy (Stocker et al. 2007; Großmann et al. 2008).

INFORGE is classified as an integrated model by Holub & Schnabl (1994, p. 328 et seq.). Similarly, together with other modern Macroeconomic Models, it is seen as an important application for disaggregated input-output data records (Eurostat 2008, p. 527 et seq.). When a comparison of models was undertaken, the simulation capability of the PANTA RHEI model also confirmed detailed scenarios (BMU 2002, p. 104).

The latest version is based on the “General classification of sectors in the European Communities” (NACE classification, WZ 2003) of the National Accounts of the Federal Bureau of Statistics. An adoption of the new WZ 2008 classification was completed in subsections.

The special effectiveness of the INFORGE model is based on the INFORUM philosophy (Almon 1991). It is characterised by the design principles bottom-up and full integration. The bottom-up design principle means that each of the 59 sectors of the economy is modelled in great detail and the macroeconomic variables are formed through explicit aggregation in model context. The full integration design principle includes complex and simultaneous mod-

elling which described inter-industrial integration as well as the creation and distribution of incomes, the redistribution activities of the state as well as the use of income by Private Households for various goods and services. The disaggregated structure of the INFORGE model is embedded in the fully endogenised accounts system of the National Accounts. As a result, the distribution of incomes by the state is reproduced endogenously.

INFORGE is an econometric input-output model. Decision routines which are not explicitly deduced from the optimisation behaviour of the agents, but whose background is that of limited rationality, are modelled in the behavioural equations. The production prices are the result of mark-up pricing by the companies. The time is historic and irreversible in the model. The capital stock continuation generates path dependency.

The input-output approach is generally assigned demand-oriented modelling. However, this does not apply to INFORGE. Indeed, it is true that demand in INFORGE determines production but all goods and factor demand variables partly depend on relative prices, with the prices in turn being determined by the companies' average cost in the form of a price setting hypothesis. The difference between the general equilibrium models in which a competitive market is modelled lies in this point in the assumed market form not in the emphasis placed on one or other market side. It can also be expressed as follows: Companies select their revenue price based on their cost situation and the prices of competing imports. Consumers respond to their decision which then determines the production level. In other words supply and demand elements exist in equal measure.

The model has a very high level of endongenisation. Tax rates, labour supply and demographic development are mainly specified exogenously. The structure of the INFORGE model is highly interdependent. Besides the usual circuit interdependencies, the quantity price interdependencies and the salary price interdependency are reproduced.

Besides the level of the input-output calculation deeply classified in 59 production or economic divisions, the model includes the accounts system of the National Accounts of the Federal Republic of Germany in order to calculate macroeconomic variables with its institutional transactors state, private households and private organisations without an acquisition purpose, financial corporations, non-financial corporations as well as other world and functional transactors, Primary Income Distribution, Secondary Income Distribution, Income Use, Changes in Assets and Formation of Tangible Assets. This system includes the entire income distribution including social insurance and taxation between state, private households and companies and in this way allows Disposable Income which, in turn, is key determinants of end demand, to be calculated. Net financial investments of institutional transactors are also specified. As a result, the government budget restriction is included in the model. Consequently, the entire fiscal policy is embedded endogenously within this system.

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