Structural Adjustment and Public Deficit:

A Computable General Equilibrium Modelling Analysis for Greece

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Abstract

The paper presents a dynamic computable general equilibrium of the Greek economy and its use in the analysis of public deficit reduction policies under different market clearing regimes and financial system closures. The model is a large-scale econometrically estimated system that incorporates an IS-LM closure, allows for different market regimes and involves multiple sectors. Six public policy measures are analysed under three cases of structural adjustments, concerning the labour market and the exchange rate regimes. The measures are all found to contribute to the reduction of the deficits in both the public budget and the current account, while inducing positive growth effects and triggering a deflationary process. Rigid market clearing regimes weaken the effects and sometimes have adverse effects. The measures are found to differ in effectiveness, as well as in wealth distribution by economic agent.

1. Introduction

Within the empirical macroeconomic analysis field, the emerging stream is based on the computable general equilibrium (CGE) approach, which has significantly progressed in the last decade, mainly motivated by the World Bank. Despite this progress, the CGE approach has hardly be present in industrialised countries and especially in Europe and CGE models have been limited to developing

countries and academic. CGE modelling seems quite promising for the study of structural features and the normative analysis of government policy, issues currently emerging, as stated above.

To use the CGE approach in industrialised countries, one has to surmount a number of shortcomings in the current state-of-the-art. These include: (i) the static formulation of models; (ii) the dependency on the closure rule; (iii) the absence of a financial and monetary sector; (iv) the inability of these models to support forecasting, because both of the arbitrary fixing of one of the prices as the numeraire and the use of guess-estimated elasticities, instead of the use of econometric techniques.

The present paper proposes a CGE model for the Greek economy that incorporates all the above listed improvements. The model combines a traditional CGE formulation for the real side of the economy with a IS-LM mechanism that serves as a closure rule. This mechanism covers all aspects of the monetary/financial side of the economy and permits the determination of all equilibrium prices, the exchange and the interest rates. In addition, the model incorporates complex econometric behavioural equations and dynamic mechanisms similar to those usually found in econometric forecasting models.

The model framework allows for the representation of different market clearing regimes and other institutional characteristics. Each alternative regime corresponds to a special structural feature or institutional condition and refers to the commodity markets, the labour market, the exchange rate determination mechanism and several issues of the financial/monetary sector.

The advantages of general equilibrium models for policy analysis, compared with traditional macro-economic models, are now widely admitted. These models provide a non-optimising, but yet normative, view of policy implications, since they allow for consistent comparative analysis by ensuring that in all scenarios the economic system is in general equilibrium. Particularly valuable are the insights in distributional effects and in longer term structural mechanisms.

The paper reports on a set of policy analysis model simulations that concern the reduction of public deficit. Alternative policy measures are assessed, in relation with their implications to the economy

and the new equilibrium situation that they imply. The measures include tax rate increases and government spending savings. Structural features analysed refer to a fixed exchange rate regime compared to a totally flexible one, and a real wage rate rigidity regime compared to a competitive equilibrium situation in the labour market. The commodity markets (except energy) and the capital market are assumed to be perfectly competitive and adjust through prices.

The paper presents the general structure of the model and the analysis of policy simulations. Due to limited space, the paper does not report on the algebraic functional forms used in the model and the econometric estimations.

The interested reader may refer to earlier policy results, published in Capros, Karadeloglou and Mentzas (1989a to 1989d), regarding the combined use of model variants in the study of other structural changes.

2. The Computable General Equilibrium Model

2.1. Introduction

As it is known, a CGE model is a numerical representation of the basic relationships of the Walrasian general equilibrium system, as formulated within the Arrow-Debreu general equilibrium theorem. The grand ancestor of today's empirical research activities is the model by Johansen (1979). The CGE modelling field gained significant attention following the work supported by the World Bank. Descriptions of CGE models can be found in: Shoven and Whalley (1972) and (1984), Hudson and Jorgenson (1974 and 1977), Adelman and Robinson (1978), Deardorff and Stern (1982), Dervis, de Melo and Robinson (1982), Lysy (1983), Cordon et al. (1985), Blitzer and Eckaus (1986), Devarajan and Sierra (1986), Levy (1987), Pereira and Shoven (1988), Decaluwe and Martens (1987 and 1988) and De Melo (1988). Concerning the closure rule problems, which are of crucial importance for the appraisal of the CGE model properties, one may refer to Rattso (1982), Taylor and Lysy (1979) and Dewatripont and Michel (1987). Extensions of the traditional CGE model by linking a financial-

monetary sub-model may be found in Bourguignon et al. (1989), de Melo Marhta, Leduc and Razmara (1989) and P. Capros et al. (1991). Extensions dealing with foreign trade deficits may be found in Kharas and Shashido (1987) and Lewis and Urata (1984).

The CGE theoretical framework requires that all markets are clearing through prices. This procedure is usually called price-adjustment of the markets. The empirical applications of CGE models do not always assume market clearing through price mechanisms in all markets; on the contrary authors often incorporate non-neoclassical assumptions concerning market rigidities and imperfections in an attempt to capture the macro-economic forces that prevail in real-world cases; see Robinson (1986), Bourguignon et al. (1983 and 1989), Capros et al. (1990, 1991). In such cases some markets of the model may be cleared through price-adjustment, while some others include an endogenous determination of the price level (like the one traditionally found in macro-econometric models, assuming an excess supply market regime) which guarantees a quantity-adjusted equilibrium.

The following sets of equations illustrate the alternative mechanisms for representing market types:

			$D = f(p)$
	$D = f(p)$		$\bar{S} = g(p)$
Competitive Markets:	$S = g(p)$	Excess Supply Markets:	$S = D$
	$D = S$		$U = S / \bar{S}$
			$p = h(S, \bar{S})$

where D, S and p denote demand, supply and prices, respectively, bars indicate potential production and the absence of bars corresponds to effective supply and demand. U is then the rate of capacities utilisation or the rate of unemployment, depending on the nature of the market. The model accepts only one type of regime per market and per model variant.

The formulation found in the competitive market type is adopted for the market of goods and labour in most CGE models; see De Melo (1988). The excess supply market illustrates the formulation used for the labour market (or the foreign exchange market) when unemployment (and usually a trade deficit) prevails. This type of market is also the typical formulation of all markets represented in

neo-Keynesian macro-econometric models; see Capros et al. (1989a). In a multi-market CGE model, all three types of market-clearing formulations may co-exist, in the sense that some markets are perfectly competitive, while others are not.

The mechanisms that achieve consistency of transactions at the macro-economic level, called often macro-framework, is particularly important for appraising the model's properties, and this is independent of the way markets clear. The macro-framework mechanism may be represented by four simultaneous identities: the national income identity, the balance of payment, the public budget balance and the savings-investment identity. In traditional CGE models, the savings-investment identity is usually adopted as the "closure rule" and it is often used for evaluating investment. Such a restrictive assumption is necessary because in these models there is no financial-monetary sector. In traditional econometric models which formulate the IS-LM scheme, the savings-investment identity is implicitly induced by the flow-of-funds identity which equalises demand and supply of money.

The macro-framework, as it will be presented below in a simple manner, is used in our CGE model to integrate the real and the monetary/financial sectors of the economy and overcome the closure rule limitation. A similar approach is also followed by Bourguignon, Branson and de Melo (1989).

The national income identity may be written as:

$$C + I + G + (X - M) = Y + T \quad \text{while} \quad Y = C + S$$

where C, I, G, X, M, T and S denote, respectively, private consumption, investment, government expenditure, exports, imports, net tax receipts and savings. The balance of payment identity is written as:

$$X - M = E_X \, (\Delta A_f + \Delta B_R - \Delta B_f)$$

which represents the financing of deficits (or the allocation of surplus) by changes in net foreign assets A_f, bank reserves B_R and foreign borrowing B_f, depending on the exchange rate E_X. The

public budget identity also represents financing of deficit through bank borrowing B_g, private domestic borrowing P_g and foreign borrowing B_f, as follows:

$$G - T = \Delta B_g + \Delta P_g + E_X \Delta B_f$$

The strict equality of savings and investments, which is used in traditional CGE models, is expanded in a way that any difference between them is financed through changes in money supply M_S, private domestic borrowing of government, net foreign assets and private lending from banks B_p, as follows:

$$S - I = \Delta M_S + \Delta P_g + E_X \Delta A_f - \Delta B_p$$

The Walrasian closure, which may be further interpreted as flow-of-funds identity, is re-written as follows:

$$-(G - T) + (S - I) - (X - M) = 0$$

which implies:

$$-(\Delta B_g + \Delta P_g + E_X \Delta B_f) + (\Delta M_S + \Delta P_g + E_X \Delta A_f - \Delta B_p) - E_X (\Delta A_f + \Delta B_R - \Delta B_f) = 0$$

and :

$$\Delta M_S = \Delta B_p + \Delta B_g + E_X \Delta B_R$$

The last equation is the monetary identity and constitute the expansion of the "closure rule" when incorporating a financial sector into the CGE framework.

The above macro-framework, i.e. the set of accounting identities, is able to cover a large spectrum of financial market conditions and institutional characteristics. Alternative situations may be represented by choosing the appropriate set of endogenous variables to be solved by these identities.

The two following subsections present the real and the monetary sectors of the model, while section 3 gives the corresponding equations. In this presentation, we make abstraction of implementation details concerning both the accounting system and the particular formulation of econometric equations.

2.2. The Real Sector

The real sector of the economy, as represented by the modelling framework, comprises several sectors (indexed by k) and an equal number of commodities (indexed by i). We may represent several economic agents, although in the maquette, the equations of which are given below, we include four economic agents, namely producers (enterprises), consumers (households), government and the rest-of-the-world. Consumers supply labour force to producers who employ it as production factor together with capital, energy and materials. The commodities are traded, thus imported and exported. The real sector of the economy comprises then several markets: one market per commodity and one labour market. Government's behaviour is assumed exogenous.

Demand of commodities is formed by private consumption (index p), investment in dwellings (index R), government expenditure (index g) and investment (index G), private investment, stock variation (index S) and exports (index X). These demand elements are allocated over the set of commodities. Supply of commodities is ensured by domestic production (index F) and imports (index M).

A basic behavioural equation determines the distribution of gross private income in consumption and gross savings. Equation (1) determines private consumption by referring to the Davidson, Hendry, Srba and Yeo (1978) approach, which applies an error correction mechanism on the difference between consumption and real income. Adjustment depends also on unemployment, inflation and the real interest rate.

Equation (2) allocates total private consumption over a set of consumption categories (food, housing, durables, etc., indexed by j). Among the various allocation systems that have been proposed in the

literature, equation (2) might implement one of the following approaches: the Houthakker-Taylor model, a linear expenditure system, a Rotterdam model or an indirect utility derived function (as by Jorgenson-Stoker). These link demands with the change in total consumption, some "state" variables and relative prices. Equation (2) corresponds to a system of econometric equations estimated simultaneously with constraints in the parameters. A transformation matrix is used in equation (3) to pass from consumption by category to consumption by commodity.

Investment in dwellings is modelled in equation (4) as a function of real income, inflation and real interest rate. Equations (5), (6) and (7) allocate government expenditure, public investment, investment in dwellings and private investment over the set of commodities (investment goods) by employing fixed technical coefficients. In particular equation (7) aggregates sectoral investment over an investment matrix. Private investment by sector is determined as derived factor demand, while government expenditure and public investment are both exogenous.

Equation (8) is the traditional Leontief Input/Output accounting scheme. It computes intermediate demand for commodities by sectors as being proportional to effective sectoral production of commodities. The proportionality factors (i.e. the technical coefficients are endogenous and are evaluated in equation (18) as derived demand for factors.

So, supply of commodities has to be represented in a way to determine intermediate consumption and factor demand by sector. Production possibilities frontiers, used for this purpose, must provide also for the evaluation of potential production by sector. The choice of the functional form is not represented here, however we admit that technology is following the putty-clay assumption, in which the mix of factors can change only in the latest capital vintage, while remaining invariant for old vintages.

Flexibility of production is assumed for the use of capital, labour, energy and materials as production factors. By defining a production function, we derive from profit maximisation the demand for capital, labour, energy and materials [equations (14) to (17)], as well as potential production

[equation (19)]. The derived demand for production factors depends on relative factor prices, which are determined in equations (10) to (13). The cost of labour depends on the wage rate determined in the labour market, while the cost of capital is evaluated by, for example, an Ando, Modigliani, Rasche, Turnofsky (1974) formula. Factor demand equations are simultaneously estimated for each sector by imposing constraints on the parameters. These equations determine the demand for factors in the latest vintage, thus evaluate investment and the change in demand for labour, energy and materials. Investment accumulation forms the capital stock, in equation (9), assuming that capital is settled at the beginning of the year and remains fixed during the year. Depending on the separability assumption, about the form of the production function, we provide, in equation (18) the further decomposition of aggregate factors into more detailed factor categories, which are used to evaluate the technical coefficients used in the Input/Output, equation (8).

Equation (20) relates potential production by sector with effective production and the rate of capacities utilisation. In the case of competitive equilibrium (first market type mentioned above), the rate of capacities utilisation is fixed at a pre-determined level and (20) is used to evaluate effective production, which in this case corresponds to supply behaviour. If the market is imperfectly competitive (of the excess supply market type), then equation (20), transformed as in (20A), serves to evaluate the rate of capacities utilisation and effective production, being demand-driven, is evaluated in equations (27).

Value added per sector is evaluated in equation (21) from Input/Output relations.

Trading sectors are assumed neither price takers nor price makers in exports, but price takers in imports. Prices of exports and imports are evaluated in equations (22) and (23) as functions of foreign prices (exogenous), the exchange rate and domestic prices. Demand functions are used to evaluate exports and imports of commodities [see equations (24) and (25)]. Exports depend on foreign demand (exogenous), competitiveness measured by relative prices, profitability factors and the rate of capacities utilisation. Imports depend on domestic demand and competitiveness. These formulations

implement the so-called Armington assumption, stating that domestic and foreign goods are imperfect substitutes.

All components of supply and demand of commodities being evaluated, equation (26) determines total demand per commodity.

As mentioned, if a commodity market is assumed to be perfectly competitive, then the rate of capacities utilisation is fixed and effective production is determined by (20), as equal to potential production, so it is supply-driven. In this case, equilibrium equation (27) corresponds to the determination of the commodity prices in domestic supply, i.e. p_i^F .

If a commodity market is not perfectly competitive, we assume that excess supply prevails. Then, equation (20A) is solved for the capacities utilisation rate and effective production is evaluated from equation (27), so it is demand-driven. Hence, we need one more equation (per sector) to evaluate commodity prices, i.e. p_i^F . In excess supply situations and imperfect markets, it is natural to assume cost-driven mark-up pricing, as it is usually done in traditional econometric models (which because of this assumption are often called neo-Keynesian models). Such a price equation is represented by (27A), which is eliminated from the model in the case of perfectly competitive markets (and it is not used in the CGE model variant we are using for policy analysis in this paper).

Notice that it is quite possible to mix market clearing situations across commodities. That is, one commodity may be formulated in a way that its price is determined by the equilibrium of demand and supply, equation (27), while another may employ equation (27A) for cost-based pricing.

Equations (28) to (30) concern the labour market. Labour supply depends on exogenous population and expected real wages, in equation (28). The corresponding function is derived simultaneously with the consumption function (1) from utility maximisation under budget constraint. Labour demand, in equation (29), is the sum of sectoral labour demands, derived from production functions, and exogenous public sector employees.

The labour market can clear under two alternative regimes. The perfectly competitive case is represented by equation (30) which serves to evaluate the average wage rate w. In this case the rate of unemployment is fixed to zero (or at an exogenous predetermined level, the natural unemployment level).

In the imperfectly competitive case, excess labour supply is assumed to prevail, and the rate of unemployment is determined by (30A), while the wage rate is evaluated by some price indexation mechanism. Equation (30B) proposes a Philips curve formulation extended with the incorporation of productivity effects. Notice, again, that equations (23A) and (23B) are not used in the full CGE variant of the model.

Sectoral wage rates are indexed to the average wage rate, in equation (31). If data are available and if separate labour markets seem to prevail, one can formulate the labour market separately for each labour category and even mix market clearing regimes.

Derived prices, equations (32) to (40), depend on commodity prices in domestic supply, i.e. p_i^F and the prices of imported goods. The corresponding equations weight these prices by means of shares of domestic production and imports. Exogenous tax rates are applied on the formation of these derived prices.

Equations (33) and (34) determine revenues from indirect taxes and from tariffs, respectively.

Equations (43) to (48) are accounting identities that determine income and savings. In fact, these equations distribute the value added among the economic agents, establish the transfer of flows between them and compute available income which influences consumption.

The residuals from this income distribution are the net savings (positive in case of surplus, negative in case of deficit) of the economic agents, namely for the private sector, the government and the rest-of-the-world, as shown in the maquette. These are determined by equations (46) to (48) and constitute the starting point of the financial/monetary sector of the model.

Notice that, by construction, $S_p + S_g + S_w = 0$ which is an expression of the Walras law. In fact, all model constructs, within the real sector, may be grouped within the framework of a Social Accounting Matrix - SAM (see table), which ensures consistency and equilibrium of flows from production to the agents and back to consumption. The construction of the SAM is the starting point of the model building work. The definition of the set of prices, ensures the consistency of the SAM, also in current currency, a fact which finally is reflected in the above condition, which states that the algebraic sum of net savings over the set of agents is, by construction, equal to zero.

2.3. The Financial/Monetary Sector

The financial behaviour of economic agents is based on a portfolio model which is derived by maximising expected utility. The model allocates financial wealth among various assets. The allocation is made on the basis of expected yields and other determining factors [see van Erp et alii (1989), van der Beken and van der Putten (1989)]. Such an approach avoids reduced-form models of financial mechanisms and uses relative interest rates as explanatory variables. Depending on whether liberalised capital markets are represented in the model, these interest rates together with the exchange rate can be derived from the equilibrium of financial supply and demand flows.

The structure of our financial/monetary model is based on the above approach. Regarding its accounting structure, the model is based on a matrix of flows of funds, involving, in the maquette, four economic agents, namely the private, government, banking[1] and foreign sectors.

A simplified form of the flow-of-funds matrix is given below, together with the equations of the financial/monetary model. In our model we do not use a full-scale matrix of flows of funds, which is

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[1] The banking system, as defined in this model comprises, beside the central bank, all commercial banks and specialised credit institutions.

not necessary for the model design In fact, we adopt a hybrid approach where the flow of funds approach is mixed with a "deficit financing approach". More specifically, the foreign and public sectors are represented only with respect to the financing of their surpluses, while the banking and private sectors are represented following an "assets-liabilities balance" approach. However, we fully guarantee stock-flow consistency for all transactions.

The equations presented below correspond to a variant of the model which is simple for tutorial reasons. It is easy to see that any different institutional characteristics, which might prevail in the financial markets and policy, can be incorporated without altering the main model mechanism.

On the assets side of the private sector, total wealth (W) is evaluated, dynamically, by private net savings, a variable coming from the real part of the model; see equation (49).

The allocation of total wealth of the private sector is described as "risk averse investment behaviour". Private agents are assumed to maximise the utility of the return from a portfolio. In this respect future returns are uncertain and the risk aversion is formalised as diminishing marginal utility. It is also assumed that changes in the composition of the portfolio in relation to the starting point entail costs. This portfolio model is based on Parkin (1970) and used in the Freia-Kompas model of the Dutch economy and has also been applied to Belgium [see Van Erp et alii (1989) and Van de Beken and Van der Putten (1989)].

The basic model, expanded with a number of sector-specific variables, determines the optimum portfolio composition, in terms of cash, time deposits, saving deposits, government bonds, bank bonds and treasury bills; see equation (50). The allocation mainly depends on the relative rates of return (assimilated to interest rates) from the above assets. The corresponding equations are simultaneously estimated and a set of restrictions on parameters are imposed. Restrictions include symmetry and additivity conditions, the latter implying that one of the equations is redundant. Also, adjustment costs and dynamic behaviour are incorporated in these equations. Equations (51) determine the changes (flows) of assets allocation.

Foreign exchange deposits, in equation (52), are explained by the evolution of the exchange rate, the foreign to domestic interest rate differential and the capital and transfer inflow which enters the country.

The demand of credit by the private sector, equation (53), bears the influence of the real interest rate, the profit rate and the volume of total investments of the sector. This demand behaviour is important, since it enters the equilibrium condition (64).

The "assets-liabilities" balance of the private sector, equation (54), is used to determine the change in saving deposits, as a residual, which is left out from equations (50) and (51), so as to respect additivity condition.

The approach to modelling the public sector behaviour is drawn by the concern of financing the public deficit. Although in many respects the financing of the public sector is often a matter of political decision, some behavioural equations are introduced in the specification of the model to mimic such decisions.

The financing of the public sector's deficit can be effected by borrowing from the domestic sectors (from the private sector and the commercial banks), the foreign sector, and from the central bank.. The share of public deficit covered by foreign loans depends mainly on the interest rates differential and on the PSBR as a % of GDP; see equation (56). The amount of total foreign debt could be considered as an additional explanatory variable. Similarly, the share of public deficit covered by borrowing from the central bank is a function of PSBR as a % of GDP, the interest rates differential; see equation (57). These two equations are used just to mimic current policies, and could be replaced by simpler forms involving exogenous rates, so as to represent other institutional regimes.

Domestic borrowing of government is divided into two parts: the treasury bills and the government bonds. Both can be acquired by the private sector and by commercial banks. Concerning the private sector, investment in these two assets emanates from portfolio allocation. For the banking sector, we retain a formulation, see equations (60) and (61), which explicitly reflects one possible institutional

regime, in which commercial banks are obliged to buy treasury bills and government bonds at a rate proportional to their total liabilities. By substituting equation (55), which determines total domestic borrowing, into equation (59), we derive the demand/supply equilibrium in financing public deficits. This equilibrium serves to determine the rate of interest of government lending, i.e. r_g, which further leads the interest rates of bonds and treasury bills in equations (68).

Equations (62) and (63) represent the assets-liabilities balance in the banking sector. In our model, this serves to evaluate the capacity of banks to lend the private sector, i.e. variable ΔB_p , which is a supply behaviour. This formulation also is in accordance with that institutional regime in which prevails a leakage in capital supply to the private sector induced by the imperative financing of public deficit.

So equation (64) represents demand/supply equilibrium of the capital flows addressed to the private sector. This serves to determine the private lending interest rate, i.e. r_l, which is used in both the real and the monetary sectors of the model, and further leads the interest rates of assets; see equation (67).

Modelling of the foreign sector is oriented towards determining the ways for covering the current account deficit. Foreign capital inflow is an independent variable and is a function of relative profitability of investment assets, in equation (65). Equation (66), corresponds to the financing of current account deficit. In the maquette, we assume that changes in bank reserves are maintained at some predetermined level. Thus, the balance in equation (66) is achieved through movements of the nominal exchange rate., so (66) is an equilibrium condition.

Equation (69) evaluates, dynamically, total public debt by accumulating deficits. Public debt further influences interests and annuities which enter the equation (47), which determines net savings of the public sector (mechanism not shown in the maquette).

In summary, the present model variant, of the financial/monetary sector, determines endogenously three equilibrium prices: (i) the private sector lending interest rate, (ii) the government lending interest rate and the (iii) exchange rate.

The above specification does not excludes, however, the possibility to include different structural or institutional changes that may occur in the economy. This may be effected by some other selection of endogenous and exogenous variables. For example, it is possible is to consider that the exchange rate is exogenously determined by the authorities. In this case foreign exchange reserves should be endogenous and be estimated as a residual variable. Furthermore, if the lending interest rate is fixed by the central bank, a credit rationing regime would occur. In this case, demand for credits will be rationed by supply and equation (64), which determines credit demand, must be eliminated from the model.

The Social Accounting Matrix (real sector)

Receipts	Expenditures: Sectors	Products	Factors	Enterprises	Households	Government	Cap[ital acct.	World	TOTAL
Sectors		domestic sales sum of C_i^k by i				export subsidies t^X		exports X_i	sales
Products	intermediate demand C_i^k				consumption C^P and investment I^R	government consumption C^g and investment I^G	private investment I_k		demand
Factors	factor payments Q_k^V								value added
Enterprises			gross profits $p_kQ_k^V-w_kN_k-$ tax						enterpr. income
Households			wages w_kN_k	distributed profits				foreign transfers R_f	househ. income
Government	indirect taxes (part of T)	tariffs t^M	factor taxes	enterprise taxes t_k	direct taxes t_w				governm. receipts
Capital acc.				enterprise savings part of S_p (+ or -)	household savings part of S_p	Government savings S_g (+ or -)		net capital inflow S_w	total saving (=0)
Rest of the World		imports Mi							imports
TOTAL	total payments	total absorption	Value Added	Enterpr. expend.	Househ. expend.	Governm. expend.	Investm.	foreign exchange	

The Real Sector

Demand and Supply of commodities

(1) $C^P = \Phi^c\left[\, Y_h / p_c,\, U_R, \Delta p_c, r_\ell - \Delta p_c, W / p_C \right]$

(2) $\Delta C_j^C = \Phi_j^c\left[\Delta C^P, \Delta(p_j^c / p_c), \ldots\right] \qquad \forall j$

(3) $C_i^P = \sum_j \underline{tc}_{ij}^c C_j^C \qquad \forall i$

(4) $I^R = \Phi^R\left[Y_h / p_I^R, \Delta p_I^R, r_\ell - \Delta p_I^R\right]$

(5) $C_i^g = \underline{tc}_i^g \underline{C}^g \qquad \forall i$

(6) $C_i^\lambda = \underline{tc}_i^\lambda I^\lambda \qquad \forall i, \qquad \lambda = R, G \;\; (\underline{I}^G \text{ exogenous})$

(7) $C_i^I = \sum_k \underline{tc}_{ik}^I I_k \qquad \forall i$

(8) $C_i^k = tc_i^k Q_k^F \qquad \forall i, \forall k$

(9) $K_k = (1 - \underline{d}_k) K_{k,(-1)} + I_{k,(-1)} \qquad \forall k$

(10) $p_k^w = \Phi_k^w\left[D(w_{k,t}), \underline{h}_k, \ldots\right] \qquad \forall k$

(11) $p_k^K = p_k^I (1 + \underline{d}_k + \Delta w_k - r_\ell) \qquad \forall k$

(12) $p_k^e = \Phi_k^E\left[D(p_{k,t}^E), \ldots\right] \qquad \forall k$

(13) $p_k^m = \Phi_k^M\left[D(p_{k,t}^M), \ldots\right] \qquad \forall k$

(14) $I_k \;/\; K_k = \Phi'_k\left[-g'_k(t), p_k^w \;/\; p_k^K, \ldots, Q_k^P\right] \qquad \forall k$

(15) $\Delta N_k \;/\; N_{k,(-1)} = \Phi'_k\left[-g'_k(t), p_k^w \;/\; p_k^K, \ldots, Q_k^P\right] \qquad \forall k$

(16) $\Delta E_k \;/\; E_{k,(-1)} = \Phi'_k\left[-g'_k(t), p_k^e \;/\; p_k^K, \ldots, Q_k^P\right] \quad \forall k$

(17) $\Delta M_k \;/\; M_{k,(-1)} = \Phi'_k\left[-g'_k(t), p_k^m \;/\; p_k^K, \ldots, Q_k^P\right] \qquad \forall k$

(18) $tc_k^i = \Phi_k^i\left[(E_k \;/\; Q_k^P) \;|\; (M_k \;/\; Q_k^p), p_k^{i1} \;/\; p_k^{i2}, \ldots\right] \qquad \forall k$

(19) $Q_k^P = \Phi_k^P\left[g(t), K_k, N_k, E_k, M_k\right] \qquad \forall k$

(20) $Q_k^F = \underline{U}_k^c Q_k^P \qquad \forall k$

(20*A*) $U_k^c = Q_k^F \;/\; Q_k^P \qquad \forall k$

(21) $Q_k^V = Q_k^F - \sum_i C_i^k \qquad \forall k$

Foreign Trade

(22) $p_i^X = (1 - \underline{t}_i^X)\Phi_i^{p_X}\left[E_X \underline{p}_i^*, p_i^F\right] \qquad \forall i$

(23) $p_i^M = (1 + \underline{t}_i^M)\Phi_i^{p_M}\left[E_X \underline{p}_i^*\right] \qquad \forall i$

(24) $X_i = \Phi_i^X\left[\underline{D}_i^*, (E_X \underline{p}_i^*) \;/\; p_i^X, p_i^X \;/\; p_i^F, U_i^c\right] \qquad \forall i$

(25) $M_i = \Phi_i^M\left[D_i, p_i^M \;/\; p_i^F, U_i^c, \ldots\right] \qquad \forall i$

Demand - Supply Equilibrium

(26) $D_i = \sum_k C_i^k + C_i^P + C_i^R + C_i^g + C_i^G + C_i^I + \underline{C}_i^S + X_i \qquad \forall i$

(27) $Q_i^F = D_i - M_i - T_i \qquad \forall i$

Prices of domestic goods in the case of excess supply commodity markets

(27*A*) $p_i^F = \Phi_i^F\left(p_i^w \frac{N_i}{Q_i^F}\right)^{\mu_i}\left(p_i^K \frac{K_i}{Q_i^F}\right)^{\nu_i}\prod_k\left(p_i^k \frac{C_i^k}{Q_i^F}\right)^{\lambda_i^k}\left(U_i^c\right)^{\tau_i}, \qquad \forall i$

Labour Market Equilibrium

(28) $N^s = \Phi^N\left[\underline{POP}, w_i / p_c, \ldots\right]$

(29) $N^d = \sum_k N_k + \underline{N}_G$

(30) $N^d = (1-\underline{U}_R)N^s$

Wage rates in the case of excess supply labour markets

(30A) $U_R = \dfrac{N^s - N^d}{N^s}$

(30B) $\Delta w / w_{(-1)} = \Phi_w\left[\Delta p_c / p_{c,(-1)}, U_R, \Delta(Q/N)\right]$

Derived Prices

(31) $w_k = \underline{tc}_k^w w \qquad \forall k$

(32) $p_j^c = \propto (\sum_i \underline{tc}_{ij}^c p_i^c) \qquad \forall j$

(33) $p_i^c = \propto (1+\underline{t}_i^c)(\dfrac{Q_i^F}{Q_i^F + M_i} p_i^F + \dfrac{M_i}{Q_i^F + M_i} p_i^M), \quad \forall i$

(34) $p_c = \sum_i (C_i^P p_i^c) / C^P$

(35) $p_i^\lambda = \propto_\lambda (1+\underline{t}_i^\lambda)(\dfrac{Q_i^F}{Q_i^F + M_i} p_i^F + \dfrac{M_i}{Q_i^F + M_i} p_i^M), \qquad \forall i, \qquad \forall \lambda = g, I, R, G$

(36) $p_k^I = \sum_i \underline{tc}_{ik}^I p_{ik}^I \qquad \forall k$

(37) $p_k^i = \propto (1+\underline{t}_k^i)(\dfrac{Q_i^F}{Q_i^F + M_i} p_i^F + \dfrac{M_i}{Q_i^F + M_i} p_i^M), \quad \forall i, \forall k$

(38) $p_k^E = \sum_{i \in E} C_k^i p_k^i / \sum_{i \in E} C_k^i \qquad \forall k$

(39) $p_k^M = \sum_{i \in M} C_k^i p_k^i / \sum_{i \in M} C_k^i \qquad \forall k$

(40) $p_k^V = (p_k^F Q_k^F - \sum_i p_k^i C_k^i) / Q_k^V \quad \forall k$

Revenues from Indirect Taxes

(41) $$T = \sum_i \underline{t}_i^c \, p_i^c C_i^P + \sum_i \underline{t}_i^R \, p_i^R C_i^R + \sum_i \underline{t}_i^I \, p_i^I C_i^I + \sum_i \underline{t}_i^g \, p_i^g C_i^g + \sum_i \underline{t}_i^G \, p_i^G C_i^G + \sum_k \sum_i \underline{t}_i^k \, p_i^k C_i^k$$

(42) $$T_i = (\sum_i \underline{t}_i^X \, p_i^X X_i - \sum_i \underline{t}_i^M \, p_i^M M_i) / p_i^F \qquad \forall i$$

Income and Savings

(43) $$R_w = (1 - \underline{t}_\omega) \sum_k w_k N_k + w\underline{N}_G + \underline{R}_f$$

(44) $$R_k = (1 - \underline{t}_\kappa) \sum_k (p_k^V Q_k^V - w_k N_k)$$

(45) $$Y_h = R_w + (R_k - \sum_i p_i^I C_i^I)$$

(46) $$S_p = R_w + R_k - p_c C^P - T - \sum_i p_i^I C_i^I - \sum_i p_i^F \, \underline{C}_i^S - \sum_i p_i^R C_i^R$$

(47) $$S_g = T + \underline{t}_\omega \sum_k w_k N_k + \underline{t}_\kappa \sum_k (p_k^V Q_k^V - w_k N_k) + \sum_i \underline{t}_i^M \, p_i^M M_i$$
$$- w\underline{N}_G - \sum_i (p_i^g C_i^g + p_i^G C_i^G) - \sum_i \underline{t}_i^X \, p_i^X X_i$$

(48) $$S_w = \sum_i (p_i^M M_i - p_i^X X_i) - \underline{R}_f$$

The Financial/Monetary Sector

The Matrix of Flow-of-Funds

Private Sector (P)	**Government (G)**	**Banks (B)**	**Foreign Sector (F)**
Cash $ÄA_{cs}$		Private Loans ÄBp	Foreign Capital Inflow $ÄA_f$
Saving Deposits $ÄA_{sd}$		Central Bank Loans $ÄB_g$	Foreign exchange loans $ÄB_f$
Time Deposits $ÄA_{td}$		Treasury Bills $ÄB_{tb}$	Other Transfers O_g
Bank Bonds $ÄA_{bb}$		Government Bonds $ÄB_{gb}$	Bank Reserves $ÄB_R$
Government Bonds ÄAgb			
Treasury Bills $ÄA_{tb}$			
Foreign Exch. Deposits $ÄA_f^p$			
Total Assets $ÄAs_p$		Total Assets $ÄAs_b$	
Credits $ÄL_p$	Foreign Exchange Loans $ÄB_f$	Cash $ÄA_{cs}$	
Foreign Capital Inflow $ÄA_f$	Domestic Borrowing $ÄB_p^g$	Saving Deposits $ÄA_{sd}$	
	Central Bank Loans $ÄB_g$	Time Deposits $ÄA_{td}$	
	Other Transfers O_g	Bank Bonds $ÄA_{bb}$	
		Foreign Exch. Deposits $ÄA_f^p$	
		Bank Reserves $ÄB_R$	
Net Savings S_p	Net Savings S_g		Net Savings S_w
Total Liab. $ÄLi_p$		Total Liab. $ÄLi_b$	

Private Sector

(49) $W = W_{(-1)} + S_p$

(50) $\frac{A_\mu}{W} = \alpha_\mu + \sum_{\nu \neq \mu \in \mathrm{M}} \beta_{\mu\nu}\phi_{\mu\nu}(r_\mu - r_\nu) + \sum_\lambda \gamma_{\mu\lambda}\frac{\chi_\lambda}{W} \qquad \forall \mu \in \mathrm{M}$

(51) $\Delta A_\mu = A_\mu - A_{\mu,(-1)} \qquad \forall \mu$

(52) $\Delta A_f^p = \Phi\left[\underline{r}^* - r_l, E_X \Delta A_f, E_X - p_c / p_{c,(-1)}, \ldots\right]$

(53) $\Delta L_p = \Phi(\sum_k p_k^K I_k, r_l - w / w_{(-1)}, R_k / \sum_k p_k Q_k^F, \ldots)$

(54) $\Delta L_p + E_X \Delta A_f + S_p = \sum_\mu \Delta A_\mu + \Delta A_f^p$

Government Sector

(55) $\Delta B_p^g = \Delta A_{gb} + \Delta A_{tb} + \Delta B_{gb} + \Delta B_{tb}$

(56) $\Delta B_f^g = \Phi(S_g, \underline{r}^* - r_l, r_g - r_l, p_c / p_{c,(-1)} - E_X, \ldots)$

(57) $\Delta B_g = \Phi(S_g, S_p, \underline{r}^* - r_l, r_g - r_l, p_c / p_{c,(-1)} - E_X, \ldots)$

(58) $\Delta B_f = \Delta B_f^g / E_X$

(59) $\Delta B_f^g + \Delta B_p^g + \Delta B_g + E_X \underline{O}_g + S_g = 0$

Banks

(60) $\Delta B_{tb} = \rho_{tb} \Delta L i_b$

(61) $\Delta B_{gb} = \rho_{gb} \Delta L i_b$

(62) $\Delta L i_b = \Delta A_{cs} + \Delta A_{sd} + \Delta A_{td} + \Delta A_{bb} + \Delta A_f^p + E_X \Delta B_R$

(63) $\Delta B_p + \Delta B_{tb} + \Delta B_{gb} + \Delta B_g = \Delta L i_b$

(64) $\Delta L_p = \Delta B_p$

Foreign sector

(65) $\Delta A_f = \Phi(\underline{r}^* - r_l, p_c / p_{c,(-1)} - E_X, \ldots)$

(66) $\Delta A_f + \Delta B_f + \underline{\Delta B}_R + \underline{O}_g = S_w / E_X$

Derived Interest Rates

(67) $r_\mu = \phi_\mu(r_l), \ \mu = cs, bb, td, sd$

(68) $r_\mu = \phi_\mu(r_g), \ \mu = gb, tb$

Public Debt

(69) $B^g = B_{(-1)}^g + \Delta B_p^g + \Delta B_f^g$

3. Policy Analysis

The model was used in policy analysis, in particular to analyse alternative measures aiming at reducing public deficit. The candidate measures are classified in two categories, depending on their primary effect: those increasing government revenues and those decreasing government expenditures.

In the model, revenues may increase through direct income taxation, indirect taxation or the contribution of private sector to social security funding. Expenditures may decrease through economies in government spending or by reducing the public sector wage bill (for example by reducing the number of public sector employees).

Rather than analysing combined policies, which are more realistic, the present paper reports on model runs involving a single type of measure. This allows for the comparative appraisal of measures and in the same time is a benchmark for model behaviour.

All scenarios were constructed by changing the value of some exogenous parameters (e.g. a tax rate). Changes were considered to be permanent (not a shock) and anticipated. Runs were made dynamically, over a period of 9 years. The simulation period corresponds to the past, for which full model calibration was performed. This implies that the results may be influenced by the values of the calibration adjustments, although such an influence is estimated to be low.

The tables, at the end of this section, present a summary of results for the first, the second and the last simulation years.

The same model runs were made for three variants of the model. These variants correspond to different assumptions about the prevailing clearing regime in the labour market and the flexibility of the exchange rate regime (in other terms the type of IS-LM closure). These variants are as follows:

- *A full equilibrium variant*: price adjustment in competitive markets for goods and labour; an exogenous rate corresponds to natural unemployment; the exchange rate is fully flexible so to render unchanged the Central Bank reserves.

- *A fixed exchange rate case*: all markets remain competitive; the Central Bank reserves are adjusting, while the exchange rate remains fixed.

- *Price indexed wages and fixed exchange rate*: in addition to the assumption about the exchange rate regime, this model variant assumes a rigid labour market, corresponding to an exogenous real wage rate (where the price indexation rate is equal to one); in this case, unemployment may arise (as an endogenous result).

The comparison of results for the model variants allows for the appraisal of structural features in analysing the government policy. Structural features include market clearing regimes in the real sector or institutional regimes in the financial sector, as mentioned before. A policy measure may have different, and in some cases contrasting, effects, depending on the market regime or the institutional context within which the measure operates.

3.1. Increase of Income Tax Rate by 1 point

The aim of this policy is to reduce public deficit by increasing direct income tax rate by 1 percent point. The primary impact o such a policy measure is a transfer of wealth from households to the public sector, inducing changes in total demand.

The reduction of public sector deficit and its funding, relaxes loan demand constraints in the capital market and liberates funds which are made available to finance the private sector. The new equilibrium point corresponds, then, to lower interest rates which cause several second order effects.

The most important second order effect is the reduction of the cost of capital and the triggering of the substitution mechanism between capital and labour. The demand for capital is increased and labour

demand is reduced, inducing a downwards re-adjustment of the wage rate to maintain full equilibrium (in the full equilibrium variant of the model).

On the other hand, increased income taxation implies a reduction of disposable income, hence of private consumption. Demand in the commodity markets is then shifted downwards and supply is re-adjusted. The new equilibrium corresponds, in general, to declining commodity prices.

The effects through wage rates, interest rates and commodity prices contribute to a deflationary process, which improves competitiveness in foreign markets and increases demand of commodities through augmenting exports, lower imports and higher investment. This fails to fully compensate the decrease in private consumption, in the short run, but leads to positive GDP changes in the long run. The long-run mechanism depends on the relaxation of commodity supply constraints, due to accumulating capital, since investment grows.

The improvement of competitiveness implies gains in the balance of payment which induces a further re-adjustment of the exchange rate (in the full equilibrium variant of the model). The exchange rate is re-evaluated, so foreign capital inflow increases and foreign loans are further decreased.

In the model variant involving a fixed exchange rate regime, the main differences in the results are due to the influence of the exchange rate on the general level of prices. In fact, a fixed exchange rate regime seems to weaken the deflationary process, as described above. This regime has negative implications on general economic activity, but diminishes the balance of trade deficit. The distributional mechanism of public deficit reduction seems to act to the detriment of the households gross surplus.

The results are similar in the case when the wage rate is defined through a price indexation equation (third variant of the model). However, since wages are rigid, a lower reduction of the wage rate reduces the capital-labour substitution and slows-down economic activity. The overall income distribution effects remain unchanged.

3.2. Increase of Indirect Tax Rate by 1 point

This policy measure also achieves a reduction of public deficit. As in the previous scenario, the interest rate declines because of increased credit availability in the economy. Of course, the first order effects of higher indirect taxation is the creation of inflationary pressures in the economy, which have depressionary effects on activity. Consumption is decreased, as consumer prices increase. However, the declining interest rates trigger a substitution in production to the detriment of labour, which induces a fall in real wage rates of equilibrium. Competitiveness and investment compensate, in the long run, the negative effects of private consumption on GDP.

The wage rate, which shifts downwards to balance labour substitution pressures, effects changes in income distribution: the gross surpluses of both households and firms are reduced, in favour of the gross surplus of government and the current account.

The reduction in the interest rate, combined with inflationary expectations, have implications for the allocation of households portfolio. The share of time and saving deposits, as well as bonds, is reduced while households increase their assets in cash and share holding.

The results obtained from the other two variants of the model are similar in the short run. The differences come from the significant re-evaluation of the exchange rate in the long run, a regime corresponding only to the full equilibrium model variant. In the absence of such a re-evaluation, there is a weakened deflationary process and a higher reduction of the real interest rate (model variant with fixed exchange rate regime). This reduction has important impacts on private investment and investment in dwellings and improves the gross surplus of firms. In the third model variant, which in addition to a fixed exchange rate regime assumes wage rate rigidity, the reduction of the wage rate is small which does not permit a recovery of private consumption that remains declining in the long run. Only the full equilibrium regime permitted positive changes in private consumption after increasing indirect taxation. Any regime rigidities have distributional effects that act to the detriment of households and in favour of firms.

3.3. Reduction of Public Sector Employees by 2%

This policy scenario aims at reducing public expenditures and, thus, decreasing public deficit. It is interesting to analyse the consequences on the wage rate and the equilibrium in the labour market, given that within a non-equilibrium model framework one might expect substantial increases in unemployment.

The reduction of public sector employees decreases total demand for labour, so wage rates are re-adjusted downwards to achieve full employment. As in previous scenarios, the reduction of public deficit induces a release of capital supply and decreases interest rates substantially. The resulting decrease of the cost of capital, is however, lower than that of the wage rate, so substitution occurs in favour of labour. It is easy to show that such a result is a general one for a wide range of slopes of the corresponding curves.

The deflationary process which is launched by the decrease of supply costs, is strengthened by the re-evaluation of the exchange rate. The latter has negative effects on exports mainly through the supply profitability effect and secondarily because of reduced competitiveness. Supply is, then, re-oriented towards the domestic market, which creates activity, labour demand and consumption. Thus, globally, the measure acts as if labour released by the public sector is re-allocated at the private sector.

The reduction of public sector employees contributes to the achievement of the objective, consisting in reducing public deficit. The measure has positive effects to the current account, the domestic activity and the profitability of firms. However, the positive results on activity depend heavily on the structural features of the labour market regime, and secondarily on the exchange rate regime.

In case of rigid regimes in the labour market and/or the exchange rate, the corresponding model variants demonstrate lower deflation implications of the policy measure. In fact, the rigidity of the exchange rate does not allow for a shift towards the domestic market, which contributes to maintain activity. On the other hand, this influences positively foreign trade and the current account. If rigidity prevails in the labour market, then the main re-adjustment mechanism, effected through the wage

rate, cannot act, so that economic activity and consumption cannot recover, even in the long run, and the households bear the consequences.

3.4. Increase of the Rate of Social Security Contribution by 1 - 1.5 points

The objective is to reduce the important deficits of the Social Security system by increasing the rate of contribution of employers by 1.5 percent point and that of employees by 1 point.

This policy measure reduces households disposable income and increases unit labour costs paid by firms. The former has negative impacts on private consumption, while the latter deteriorates the firms gross surplus. This increases the demand for credit, which, in spite of the release of capital induced by the reduction of public deficit, results in a slightly higher interest rate, in the first year.

The increase of unit labour cost has further effects on factor substitution in production, since the relative cost of capital becomes lower. The substitution in favour of capital decreases the demand for labour, so wages rates have to re-adjust downwards to maintain full employment. Households bear the effects of this policy, since their disposable income is reduced, so does private consumption and investment in dwellings. The demand shifts trigger a deflation process, in the long run, which allows for a recovery of economic activity. In the short run (the first year), the significant negative implications are due to the higher interest rate and the consequent reduction of firms' profitability. In the short run, a devaluation of the currency is needed to maintain Bank reserves, a change that implies a shift towards exports.

The distributional effects in the economy operate to the detriment of both households and firms and have positive influence on the current account and on the public sector.

The results are different when rigidities prevail in the exchange rate regime and the labour market, as simulated in the other two variants of the model. When the exchange rate is held constant and the wage rate is indexed to prices, a relaxation of public sector borrowing requirements effects a reduction of interest rates, even in the short run, but however, the deflation mechanisms are generally

weakened, both in the short and the long run. The reduced adjustment capabilities of wage rates lead to a more important substitution in favour of capital. This further allows for a positive net effect on firms gross surplus, in the long run, so that only households bear the consequences of public deficit reduction.

3.5. Decrease of Public Expenditures by 1 MDrs

This policy scenario is a typical example of a non accommodating policy with inverse crowding out effects. The reduction of public expenditures decreases the interest rate and the cost of capital. The equilibrium in the labour market is again obtained through a reduction of the real wage rate. A re-evaluation of the currency has positive effects on the current account but reduces exports.

The decline of total demand induces a deflation process which is higher in the long run than the wage rate reduction. The direct impact of this evolution is the improvement of households disposable income and the growth of private consumption, which has positive implications for activity and GDP. Concerning distributional effects, the households bear the consequences of this policy, while firms maintain profitability.

These results are noticeable since they are in contrast with similar cases evaluated by traditional econometric models, which indicate losses in real GDP when decreasing public expenditures.

The rigidity in the exchange rate and the labour market regimes influence only the dynamism but not the nature of the above described process. In particular, the inability to re-evaluate the exchange rate weakens the deflation process.

NTUA, ICGE Model : Scenario : Increase of income tax rate by 1 percent unit

	Full Equilibrium			Fixed Exchange Rate			Price indexed Wages fixed exchange rate		
Years	1	2	9	1	2	9	1	2	9
ECON. ACTIVITY (volumes) (in % change from baseline)									
GDP in factor prices	-0.07	-0.06	0.22	-0.06	-0.07	-0.05	-0.14	-0.18	-0.05
Private Consumption	-0.52	-0.37	2.74	-0.54	-0.71	-1.24	-0.64	-0.75	-1.46
Private Investment	0.59	0.28	1.22	0.50	0.39	3.58	1.30	1.20	0.81
Investment in Dwellings	4.52	4.59	6.25	5.17	2.90	15.95	0.10	0.21	6.11
Exports	0.73	0.10	-4.75	0.86	1.24	0.67	0.91	1.02	2.13
Imports	-0.19	-0.10	5.23	-0.26	-0.59	-2.68	-0.19	-0.45	-2.39
Production Manufacturing	-0.07	-0.06	0.13	-0.05	-0.07	-0.14	-0.17	-0.20	-0.03
Production Services	-0.09	-0.08	0.26	-0.08	-0.08	-0.02	-0.16	-0.20	-0.05
Production Agriculture	-0.03	-0.03	0.21	-0.03	-0.03	-0.06	-0.05	-0.08	-0.07
Sectoral Employment	-0.10	-0.12	0.49	-0.08	-0.11	0.00	-0.20	-0.31	-0.08
PRICES (in % change from baseline)									
GDP deflator (factor prices)	-0.44	-1.26	-5.89	-0.43	-1.29	-7.76	0.15	-0.42	-6.97
Consumer Price Index	-0.46	-1.34	-9.86	-0.37	-0.95	-6.18	-0.01	-0.38	-5.36
Wage Rate	-1.79	-2.49	-13.17	-1.98	-1.18	-12.96	-0.01	-0.19	-6.15
Capital cost (manufact.)	-3.60	-3.47	-15.80	-3.42	-2.64	-20.52	-4.59	-4.22	-8.15
Price of Manuf. output	-2.00	-3.00	-2.96	-1.75	-2.98	-1.66	-1.81	-2.42	-4.62
Price of Serv. output	0.32	-0.26	-8.52	0.20	-0.41	-10.37	1.09	0.57	-7.86
Price of Agric. output	-0.68	-2.78	-14.40	-0.25	-0.35	-0.32	-0.38	-0.36	-0.31
Import prices (manuf.)	-0.29	-1.66	-17.87	0.00	0.00	0.00	0.00	0.00	0.00
Export prices (manuf.)	-1.04	-2.33	-10.28	-0.84	-1.78	-2.71	-0.87	-1.50	-3.33
Exchange rate (deval. if >0)	-0.46	-2.47	-14.12	-	-	-	-	-	-
ACCOUNTS OF AGENTS (in abs. diff. from baseline)									
Gross Surplus Households	-7784	-10813	-28777	-8054	-10149	-77214	-5621	-7922	-64293
Gross Surplus Firms	968	2564	-17617	1023	2154	25261	-377	696	24910
Gross Surplus Government	7607	9515	64806	7820	9410	80708	6770	8486	65116
Current Account	791	1267	18412	788	1415	28755	773	1260	25732
ASSET ALLOC. by PRIVATE SEC. (in abs. diff. from baseline, in %)									
% in Cash	0.202	0.508	3.791	0.248	0.278	4.074	-0.034	0.247	1.089
% in Time deposits	-1.298	-1.693	-4.667	-1.385	-0.808	-6.069	-0.540	-0.773	-1.523
% in Saving deposits	-0.979	-1.065	-2.293	-1.054	-0.280	-2.714	-0.408	-0.441	-1.039
% in Bonds	-0.108	-0.213	-0.978	-0.121	-0.044	-0.319	0.018	-0.036	-0.352
% in Shares	2.182	2.463	4.148	2.313	0.854	5.028	0.965	1.004	1.826
FLOWS (in % change from baseline)									
Foreign exchange deposits	-35.52	-42.65	-10.03	-32.95	-24.76	-11.40	-13.13	-15.29	-8.18
Demand for Credits and Loans	-0.97	-1.58	-14.69	-1.15	0.12	-6.30	0.46	0.07	-4.52
GOVERNMENT (in abs. diff. from baseline)									
Foreign Loans	-2074	-2350	-39797	-2338	-2786	-26163	-1709	-2621	-19614
National Loans	-1599	-2897	7985	-1361	-4180	-19970	-2526	-2508	-25567
BANKS (in % change from baseline)									
Total liabilities	-3.31	-5.29	-13.77	-3.47	-4.07	-11.75	-2.09	-3.73	-9.23
Gov. loans and securities	-2.72	-6.60	-6.73	-2.31	-8.10	-11.67	-4.28	-7.36	-10.78
Private loans	-1.21	-1.64	-15.61	-1.22	-0.08	-10.60	0.41	0.12	-4.52
Gov. bonds and treasury bills	-3.31	-5.29	-13.77	-3.47	-4.07	-11.75	-2.09	-3.73	-9.23
FOREIGN SECTOR (in % change from baseline)									
Foreign capital inflow	1.47	0.06	22.81	2.24	2.42	-9.51	0.35	0.94	-5.25
Foreign loans	-0.91	0.57	-2.56	-1.53	-1.29	-4.02	-1.12	-1.22	-3.01
Interest Rate (in abs. diff. from baseline, in %)	-1.670	-1.216	-6.763	-1.796	-0.192	-9.232	-0.718	-0.530	-1.658
DEFICIT IND. (improved if positive) (abs. diff. from baseline, in %)									
Public deficit /GDP	1.33	1.36	1.99	1.37	1.35	2.47	1.20	1.24	1.88
Current Account deficit / GDP	0.13	0.14	0.48	0.13	0.16	0.82	0.14	0.16	0.72

NTUA, ICGE Model : Scenario : Increase of Indirect taxation by 1 percent unit

	Full Equilibrium			Fixed Exchange Rate			Price indexed Wages fixed exchange rate		
Years	1	2	9	1	2	9	1	2	9
ECON. ACTIVITY (volumes) (in % change from baseline)									
GDP in factor prices	-0.05	-0.05	0.28	-0.05	-0.06	0.17	-0.09	-0.14	0.38
Private Consumption	-0.62	-0.63	1.30	-0.46	-0.56	-1.35	-0.50	-0.62	-1.06
Private Investment	0.44	0.22	-0.38	0.44	0.36	2.40	0.84	1.14	-0.08
Investment in Dwellings	0.68	3.24	2.92	1.97	1.98	15.31	-0.22	-0.40	11.76
Exports	1.40	1.26	-1.64	0.92	1.03	1.62	0.83	0.90	2.34
Imports	-0.67	-0.97	2.38	-0.46	-0.66	-3.12	-0.40	-0.53	-2.88
Production Manufacturing	-0.06	-0.04	0.28	-0.05	-0.06	0.16	-0.11	-0.17	0.46
Production Services	-0.06	-0.06	0.31	-0.06	-0.07	0.21	-0.10	-0.16	0.42
Production Agriculture	-0.02	-0.03	0.21	-0.02	-0.03	0.07	-0.03	-0.06	0.16
Sectoral Employment	-0.07	-0.09	0.57	-0.07	-0.10	0.43	-0.13	-0.24	0.76
PRICES (in % change from baseline)									
GDP deflator (factor prices)	-1.09	-1.95	-6.99	-1.07	-1.60	-9.94	-0.70	-0.88	-10.44
Consumer Price Index	0.32	-0.28	-7.95	0.16	-0.19	-6.82	0.40	0.28	-7.04
Wage Rate	-0.07	-1.89	-8.06	-0.71	-0.94	-11.75	0.21	0.36	-8.25
Capital cost (manufact.)	-1.63	-2.46	-6.48	-2.16	-2.15	-16.02	-2.83	-3.42	-6.46
Price of Manuf. output	-1.66	-2.43	-5.08	-1.88	-2.52	-3.72	-1.67	-2.14	-5.10
Price of Serv. output	-0.94	-1.56	-8.60	-0.65	-1.09	-12.33	-0.21	-0.22	-12.19
Price of Agric. output	1.27	0.03	-9.48	-0.26	-0.26	-0.52	-0.28	-0.31	-0.53
Import prices (manuf.)	0.74	0.59	-12.07	0.00	0.00	0.00	0.00	0.00	0.00
Export prices (manuf.)	-0.58	-1.31	-8.78	-0.90	-1.56	-4.01	-0.80	-1.33	-3.88
Exchange rate (deval. if >0)	1.19	0.59	-9.23	-	-	-	-	-	-
ACCOUNTS OF AGENTS (in abs. diff. from baseline)									
Gross Surplus Households	-4048	-8156	-19951	-4490	-6819	-65551	-3335	-4829	-71889
Gross Surplus Firms	-2503	-1904	-24306	-2004	-2861	9162	-2811	-4178	11470
Gross Surplus Government	7559	11536	62428	7418	11031	84978	7002	10205	84565
Current Account	1009	1476	18171	924	1350	28589	856	1199	24147
ASSET ALLOC. by PRIVATE SEC. (in abs. diff. from baseline, in %)									
% in Cash	0.206	0.936	3.095	0.354	0.822	4.058	0.263	0.760	2.304
% in Time deposits	-0.336	-1.605	-2.377	-0.801	-1.146	-5.655	-0.468	-0.846	-2.201
% in Saving deposits	-0.138	-0.980	-0.618	-0.462	-0.425	-2.490	-0.189	-0.185	-0.967
% in Bonds	-0.054	-0.367	-1.659	-0.153	-0.314	-0.390	-0.102	-0.277	-0.963
% in Shares	0.322	2.017	1.559	1.061	1.063	4.477	0.496	0.549	1.828
FLOWS (in % change from baseline)									
Foreign exchange deposits	0.55	-18.54	-2.75	-14.28	-16.03	-2.82	-5.90	-6.75	-4.28
Demand for Credits and Loans	1.42	-0.49	-9.83	0.55	0.56	-6.03	1.24	1.17	-5.70
GOVERNMENT (in abs. diff. from baseline)									
Foreign Loans	-2164	-3433	-30561	-1875	-3223	-27026	-1616	-2903	-25015
National Loans	-2765	-1791	-5121	-2188	-3170	-24254	-2658	-2908	-31422
BANKS (in % change from baseline)									
Total liabilities	-1.57	-4.96	-11.31	-2.14	-4.12	-11.94	-1.57	-3.46	-11.58
Gov. loans and securities	-4.70	-6.69	-8.41	-3.71	-7.84	-12.54	-4.51	-8.14	-12.80
Private loans	1.06	-0.50	-9.91	0.34	0.37	-10.21	1.18	1.20	-5.71
Gov. bonds and treasury bills	-1.57	-4.96	-11.31	-2.14	-4.12	-11.94	-1.57	-3.46	-11.58
FOREIGN SECTOR (in % change from baseline)									
Foreign capital inflow	0.27	-0.15	7.13	-0.86	-0.56	-16.96	-1.85	-1.91	-11.14
Foreign loans	-2.54	-1.98	-2.34	-1.23	-1.50	-4.15	-1.06	-1.35	-3.84
Interest Rate (in abs. diff. from baseline, in %)	-0.292	-1.413	-3.056	-0.793	-0.536	-8.694	-0.339	-0.253	-2.288
DEFICIT IND. (improved if positive) (abs. diff. from baseline, in %)									
Public deficit /GDP	1.35	1.71	1.95	1.33	1.64	2.62	1.27	1.54	2.58
Current Account deficit / GDP	0.19	0.21	0.50	0.17	0.20	0.80	0.17	0.20	0.61

NTUA, ICGE Model : Scenario : -2% of public sector employees

	Full Equilibrium			Fixed Exchange Rate			Price indexed Wages fixed exchange rate		
Years	1	2	9	1	2	9	1	2	9
ECON. ACTIVITY (volumes) (in % change from baseline)									
GDP in factor prices	0.03	0.04	0.06	0.03	0.03	0.01	-0.02	-0.02	-0.03
Private Consumption	0.20	0.25	0.52	-0.01	-0.05	0.03	-0.06	-0.04	-0.03
Private Investment	-0.30	-0.29	0.08	-0.34	-0.18	0.40	0.19	0.09	0.16
Investment in Dwellings	6.27	4.16	-1.49	5.14	3.02	3.98	2.23	2.11	2.78
Exports	-0.85	-0.62	-0.46	0.06	0.19	-0.01	-0.02	0.08	0.08
Imports	0.04	0.24	0.51	-0.31	-0.31	-0.63	-0.24	-0.24	-0.56
Production Manufacturing	0.06	0.06	0.07	0.06	0.05	0.01	-0.02	-0.02	-0.02
Production Services	0.02	0.04	0.07	0.03	0.03	0.01	-0.03	-0.03	-0.03
Production Agriculture	0.00	0.01	0.03	0.00	0.01	-0.03	-0.01	-0.02	-0.05
Sectoral Employment	0.04	0.06	0.13	0.04	0.06	0.02	-0.03	-0.04	-0.06
PRICES (in % change from baseline)									
GDP deflator (factor prices)	-1.09	-0.89	-2.95	-1.12	-1.11	-2.25	-0.66	-0.73	-1.85
Consumer Price Index	-0.94	-0.91	-3.30	-0.70	-0.73	-1.78	-0.40	-0.47	-1.47
Wage Rate	-1.91	-1.18	-0.97	-1.40	-0.63	-2.64	-0.21	-0.45	-1.66
Capital cost (manufact.)	-0.46	-0.25	-0.98	0.13	-0.03	-3.55	-0.77	-0.68	-2.09
Price of Manuf. output	-0.33	-0.27	-3.06	-0.15	-0.50	-0.06	0.05	-0.21	-0.26
Price of Serv. output	-1.34	-1.17	-2.94	-1.56	-1.37	-3.17	-0.99	-0.97	-2.53
Price of Agric. output	-1.64	-1.63	-3.86	0.04	0.00	0.08	0.00	0.02	0.12
Import prices (manuf.)	-1.16	-1.40	-3.92	0.00	0.00	0.00	0.00	0.00	0.00
Export prices (manuf.)	-0.50	-0.60	-3.04	-0.07	-0.28	-0.18	0.02	-0.10	-0.26
Exchange rate (deval. if >0)	-1.85	-1.67	-3.95	-	-	-	-	-	-
ACCOUNTS OF AGENTS (in abs. diff. from baseline)									
Gross Surplus Households	-3422	-3021	-8843	-3170	-3004	-18873	-1690	-2209	-14922
Gross Surplus Firms	1666	1189	2731	1450	1311	5986	477	841	4934
Gross Surplus Government	2032	2364	12268	2176	2322	19873	1603	1948	16505
Current Account	277	532	6155	456	629	6986	390	581	6516
ASSET ALLOC. by PRIVATE SEC. (in abs. diff. from baseline, in %)									
% in Cash	0.268	0.218	0.015	0.129	0.040	0.634	0.005	0.084	0.324
% in Time deposits	-1.026	-0.554	0.802	-0.586	-0.088	-0.779	-0.149	-0.259	-0.460
% in Saving deposits	-0.767	-0.179	0.896	-0.496	0.041	-0.455	-0.138	-0.207	-0.341
% in Bonds	-0.175	-0.129	-0.001	-0.071	-0.001	-0.269	-0.005	-0.028	-0.142
% in Shares	1.700	0.644	-1.712	1.024	0.008	0.869	0.286	0.411	0.619
FLOWS (in % change from baseline)									
Foreign exchange deposits	-34.41	-20.68	-2.09	-15.40	-8.54	-3.86	-4.50	-6.18	-2.70
Demand for Credits and Loans	-1.66	-0.52	-1.58	-0.93	0.19	-1.61	-0.05	-0.22	-1.08
GOVERNMENT (in abs. diff. from baseline)									
Foreign Loans	-210	-787	-4469	-777	-636	-6063	-433	-660	-4927
National Loans	424	-1340	-8610	111	-1687	-6356	-498	-440	-6306
BANKS (in % change from baseline)									
Total liabilities	-1.87	-1.37	-1.76	-1.33	-0.86	-2.92	-0.56	-0.96	-2.23
Gov. loans and securities	0.72	-1.34	-2.77	0.19	-2.30	-2.96	-0.84	-1.37	-2.53
Private loans	-1.88	-0.50	-2.25	-1.15	0.02	-1.68	-0.10	-0.22	-1.08
Gov. bonds and treasury bills	-1.87	-1.37	-1.76	-1.33	-0.86	-2.92	-0.56	-0.96	-2.23
FOREIGN SECTOR (in % change from baseline)									
Foreign capital inflow	-0.84	-0.12	-1.57	1.52	0.18	-2.00	0.28	-0.23	-2.03
Foreign loans	1.70	0.76	0.42	-0.51	-0.30	-0.93	-0.28	-0.31	-0.76
Interest Rate (in abs. diff. from baseline, in %)	-1.254	-0.074	1.097	-0.835	0.149	-0.946	-0.245	-0.265	-0.479
DEFICIT IND. (improved if positive) (abs. diff. from baseline, in %)									
Public deficit /GDP	0.32	0.31	0.17	0.34	0.30	0.54	0.26	0.26	0.45
Current Account deficit / GDP	0.02	0.05	0.11	0.05	0.06	0.17	0.05	0.06	0.17

NTUA, ICGE Model : Scenario : Increase of social security rate by 1 - 1.5 percent units

	Full Equilibrium			Fixed Exchange Rate			Price indexed Wages fixed exchange rate		
Years	1	2	9	1	2	9	1	2	9
ECON. ACTIVITY (volumes) (in % change from baseline)									
GDP in factor prices	-0.02	-0.03	0.24	-0.03	-0.03	0.07	-0.06	-0.06	0.26
Private Consumption	-0.33	-0.31	-0.16	-0.10	-0.15	-0.93	-0.12	-0.17	-0.50
Private Investment	0.18	0.15	-1.82	0.26	0.13	0.24	0.50	0.42	-0.65
Investment in Dwellings	-0.16	1.11	-5.34	0.66	0.67	0.56	-0.19	-0.27	6.02
Exports	1.04	0.61	0.55	0.15	0.26	2.14	0.10	0.17	1.39
Imports	-0.36	-0.51	0.16	0.02	-0.09	-1.48	0.05	-0.02	-1.56
Production Manufacturing	-0.02	-0.02	0.28	-0.03	-0.03	0.09	-0.07	-0.08	0.31
Production Services	-0.02	-0.03	0.25	-0.03	-0.03	0.08	-0.06	-0.07	0.29
Production Agriculture	-0.01	-0.01	0.15	-0.01	-0.01	0.04	-0.02	-0.03	0.12
Sectoral Employment	-0.03	-0.04	0.42	-0.04	-0.05	0.16	-0.08	-0.11	0.50
PRICES (in % change from baseline)									
GDP deflator (factor prices)	0.14	-0.42	-6.43	0.18	-0.12	-4.59	0.37	0.24	-5.73
Consumer Price Index	0.38	-0.09	-6.51	0.09	-0.11	-3.40	0.21	0.13	-4.33
Wage Rate	0.20	-0.73	-0.46	-0.29	-0.36	-2.00	0.11	0.18	-4.79
Capital cost (manufact.)	-0.45	-1.13	4.79	-1.19	-0.83	-2.21	-1.70	-1.30	-2.21
Price of Manuf. output	0.13	-0.69	-8.14	-0.30	-0.64	-4.56	-0.18	-0.40	-3.07
Price of Serv. output	0.01	-0.19	-5.65	0.40	0.14	-4.40	0.62	0.54	-6.55
Price of Agric. output	2.02	0.51	-6.48	-0.09	-0.07	-0.39	-0.11	-0.08	-0.31
Import prices (manuf.)	1.30	0.88	-6.38	0.00	0.00	0.00	0.00	0.00	0.00
Export prices (manuf.)	0.44	-0.08	-6.83	-0.14	-0.37	-2.91	-0.09	-0.23	-2.21
Exchange rate (deval. if >0)	2.09	0.79	-6.69	-	-	-	-	-	-
ACCOUNTS OF AGENTS (in abs. diff. from baseline)									
Gross Surplus Households	-1260	-3385	-17990	-1396	-2460	-28683	-923	-1599	-44574
Gross Surplus Firms	-2213	-1193	-2415	-1880	-1890	3531	-2203	-2497	5821
Gross Surplus Government	3717	4910	34021	3363	4627	39190	3175	4282	51332
Current Account	244	332	13616	87	277	14038	49	187	12579
ASSET ALLOC. by PRIVATE SEC. (in abs. diff. from baseline, in %)									
% in Cash	0.111	0.441	-0.696	0.227	0.424	0.939	0.203	0.414	1.305
% in Time deposits	0.003	-0.662	1.614	-0.428	-0.533	-0.269	-0.320	-0.433	-1.255
% in Saving deposits	0.047	-0.429	1.226	-0.238	-0.163	0.319	-0.143	-0.072	-0.567
% in Bonds	0.000	-0.149	0.014	-0.098	-0.165	-0.324	-0.084	-0.158	-0.566
% in Shares	-0.161	0.798	-2.157	0.537	0.438	-0.665	0.343	0.248	1.082
FLOWS (in % change from baseline)									
Foreign exchange deposits	10.91	-5.76	2.06	-7.33	-7.47	0.28	-4.42	-4.06	-2.69
Demand for Credits and Loans	0.88	-0.34	-3.32	0.11	0.06	-1.77	0.34	0.28	-4.18
GOVERNMENT (in abs. diff. from baseline)									
Foreign Loans	-1571	-1109	-10160	-866	-1366	-11569	-767	-1234	-15141
National Loans	-1105	-830	-19528	-802	-1252	-17132	-933	-1145	-18842
BANKS (in % change from baseline)									
Total liabilities	-0.56	-2.30	-4.83	-1.06	-1.90	-5.13	-0.85	-1.64	-7.30
Gov. loans and securities	-1.88	-2.84	-6.59	-1.36	-3.00	-6.91	-1.58	-3.04	-7.21
Private loans	0.76	-0.37	-4.73	-0.04	-0.07	-2.40	0.36	0.28	-3.99
Gov. bonds and treasury bills	-0.56	-2.30	-4.83	-1.06	-1.90	-5.13	-0.85	-1.64	-7.30
FOREIGN SECTOR (in % change from baseline)									
Foreign capital inflow	2.93	0.37	-5.55	0.23	0.75	-4.86	-0.21	0.19	-2.94
Foreign loans	-3.00	-1.04	0.31	-0.57	-0.63	-1.78	-0.50	-0.57	-2.32
Interest Rate (in abs. diff. from baseline, in %)	0.012	-0.645	3.064	-0.402	-0.201	-0.144	-0.244	-0.090	-1.148
DEFICIT IND. (improved if positive) (abs. diff. from baseline, in %)									
Public deficit /GDP	0.66	0.71	0.69	0.60	0.68	1.07	0.58	0.64	1.47
Current Account deficit / GDP	0.05	0.03	0.26	0.02	0.04	0.35	0.02	0.03	0.25

NTUA, ICGE Model : Scenario : Decrease of Public Expend. by 1 Mdrs (constant drs.)

	Full Equilibrium			Fixed Exchange Rate			Price indexed Wages fixed exchange rate		
Years	1	2	9	1	2	9	1	2	9
ECON. ACTIVITY (volumes) (in % change from baseline)									
GDP in factor prices	-0.03	-0.01	0.06	-0.02	-0.01	-0.01	-0.05	-0.04	-0.02
Private Consumption	0.24	0.31	0.39	-0.01	-0.02	-0.08	-0.02	-0.01	0.02
Private Investment	0.20	-0.16	-0.33	0.16	-0.04	0.14	0.39	0.14	0.00
Investment in Dwellings	4.74	4.04	-0.26	3.31	3.00	0.48	2.37	2.51	1.66
Exports	-0.82	-0.62	-0.17	0.30	0.25	0.63	0.20	0.17	0.26
Imports	0.11	0.25	0.23	-0.33	-0.37	-0.56	-0.28	-0.32	-0.48
Production Manufacturing	-0.01	0.01	0.07	-0.01	0.00	0.00	-0.05	-0.03	-0.01
Production Services	-0.04	-0.01	0.06	-0.03	-0.02	-0.01	-0.05	-0.05	-0.02
Production Agriculture	-0.01	-0.01	0.02	-0.01	-0.01	-0.03	-0.02	-0.03	-0.04
Sectoral Employment	-0.04	-0.02	0.10	-0.03	-0.03	-0.02	-0.06	-0.08	-0.04
PRICES (in % change from baseline)									
GDP deflator (factor prices)	-0.90	-0.88	-1.98	-0.95	-1.16	-1.82	-0.70	-0.91	-1.56
Consumer Price Index	-0.92	-0.95	-2.11	-0.63	-0.77	-1.37	-0.46	-0.60	-1.21
Wage Rate	-1.32	-1.21	-1.29	-0.67	-0.78	-0.90	-0.24	-0.55	-1.36
Capital cost (manufact.)	-1.78	-0.73	-0.37	-1.07	-0.60	-1.26	-1.52	-0.98	-1.42
Price of Manuf. output	-0.86	-0.42	-1.77	-0.65	-0.67	-1.45	-0.43	-0.46	-0.65
Price of Serv. output	-0.81	-1.10	-2.11	-1.08	-1.37	-1.93	-0.83	-1.11	-1.92
Price of Agric. output	-2.02	-1.70	-2.02	-0.01	0.04	0.03	0.00	0.05	0.11
Import prices (manuf.)	-1.41	-1.56	-2.27	0.00	0.00	0.00	0.00	0.00	0.00
Export prices (manuf.)	-0.82	-0.80	-1.87	-0.31	-0.43	-0.85	-0.21	-0.29	-0.47
Exchange rate (deval. if >0)	-2.24	-1.80	-2.09	-	-	-	-	-	-
ACCOUNTS OF AGENTS (in abs. diff. from baseline)									
Gross Surplus Households	-2643	-2896	-6477	-2337	-3064	-9695	-1765	-2578	-10806
Gross Surplus Firms	1069	1082	863	831	1344	5002	383	1010	4205
Gross Surplus Government	1866	2352	8944	2031	2365	9812	1838	2152	10913
Current Account	293	538	3331	526	644	5119	457	585	4312
ASSET ALLOC. by PRIVATE SEC. (in abs. diff. from baseline, in %)									
% in Cash	0.234	0.254	0.153	0.060	0.083	0.047	0.043	0.112	0.235
% in Time deposits	-0.902	-0.717	0.150	-0.354	-0.299	0.132	-0.243	-0.339	-0.281
% in Saving deposits	-0.656	-0.367	0.218	-0.312	-0.221	0.100	-0.209	-0.262	-0.201
% in Bonds	-0.163	-0.157	-0.083	-0.035	-0.028	0.002	-0.024	-0.044	-0.098
% in Shares	1.487	0.987	-0.438	0.641	0.466	-0.281	0.432	0.532	0.345
FLOWS (in % change from baseline)									
Foreign exchange deposits	-32.55	-21.88	-1.68	-9.88	-9.76	-1.60	-6.69	-8.49	-2.22
Demand for Credits and Loans	-1.36	-0.91	-1.92	-0.44	-0.31	-0.56	-0.19	-0.38	-1.05
GOVERNMENT (in abs. diff. from baseline)									
Foreign Loans	46	-983	-3548	-633	-783	-2986	-527	-749	-3323
National Loans	119	-649	-3520	-286	-846	-5452	-417	-481	-4148
BANKS (in % change from baseline)									
Total liabilities	-1.63	-1.60	-1.78	-0.96	-1.19	-1.31	-0.73	-1.16	-1.67
Gov. loans and securities	0.20	-0.78	-1.66	-0.49	-1.66	-2.18	-0.71	-1.31	-1.87
Private loans	-1.53	-0.88	-1.99	-0.63	-0.47	-0.77	-0.20	-0.38	-1.04
Gov. bonds and treasury bills	-1.63	-1.60	-1.78	-0.96	-1.19	-1.31	-0.73	-1.16	-1.67
FOREIGN SECTOR (in % change from baseline)									
Foreign capital inflow	-1.66	0.35	0.19	1.21	0.54	-1.76	0.69	0.30	-1.20
Foreign loans	2.27	0.76	0.03	-0.41	-0.36	-0.46	-0.34	-0.35	-0.51
Interest Rate (in abs. diff. from baseline, in %)	-1.060	-0.348	0.268	-0.534	-0.252	0.206	-0.362	-0.329	-0.296
DEFICIT IND. (improved if positive) (abs. diff. from baseline, in %)									
Public deficit /GDP	0.29	0.31	0.14	0.32	0.30	0.19	0.29	0.28	0.26
Current Account deficit / GDP	0.03	0.05	0.04	0.07	0.05	0.12	0.06	0.05	0.10

4. Conclusions

The paper described a Computable General Equilibrium model for the Greek Economy and its application to the analysis of policy measures aiming at reducing public deficit.

The model exhibits innovative features by incorporating an IS-LM closure mechanism which allows for the clearing of capital and foreign exchange markets simultaneously with commodity and labour markets. The model simulates dynamic evolution and involves econometrically estimated behavioural equations. Finally, the model framework permits policy analysis under different market clearing regimes, which might represent different structural features of the economy.

The results concerning public deficit reduction were obtained by running the full equilibrium model and two model variants incorporating rigidities in the exchange rate and the labour market regimes. The following table summarises the findings:

Full Equilibrium Model (long-run results)	**in % diff.** from baseline		**Gross Surplus** in abs. diff. from baseline (*)				**Change (*) in Public deficit and Current Account as % of GDP**	
	GDP	**CPI**	**Househ.**	**Firms**	**Govern.**	**Foreign**	**Deficit**	**Account**
Income Tax Rate + 1 point	0.22	-9.86	-28.7	-17.6	64.8	18.4	1.99	0.48
Indirect Tax Rate + 1 point	0.28	-7.95	-19.9	-24.3	62.4	18.2	1.95	0.50
Public Sector Employees -2%	0.06	-3.30	-8.8	2.7	12.2	6.2	0.17	0.11
Soc. Sec. Rate +1 , +1.5 points	0.24	-6.51	-18.0	-2.4	34.0	13.6	0.69	0.26
Public Expendit. - 1 MDrs	0.06	-2.11	-6.5	0.8	8.9	3.3	0.14	0.04

(*) : A positive sign indicates improvement.

The analysis of results is summarised in the following:

- All policy measures achieve the objective of reducing public deficit, both in absolute terms and as a percentage of GDP. In the same time they all reduce the current account deficit, also both in absolute terms and as a percentage of GDP. This result is confirmed for all model variants and, thus, is valid even in the case of a rigid regime in the labour market and the exchange rate. The degree of deficit reduction, however, differs across scenarios; nevertheless they are not directly comparable, since the measures do not correspond to equal yield.

- All policy scenarios increase GDP, at least in the long run, and have deflationary impacts.

- The transfer of income is effected from households towards government and the foreign sector. Firms are gaining in the cases of expenditure oriented policies (public sector employees and expenditures reduction), but they are loosing in the cases of revenue oriented measures,

- The more the deficit is reduced, the more the GDP is increased in the long run. The increase in the rate of social security contribution by employers has adverse effects on the interest rate, in the short run.

- The exchange rate rigidity weakens the deflationary process and reduces the positive influence on GDP. However, it increases the reduction of public deficit, to the detriment of households.

- The role of rigidities in the real wage rate seems generally less significant. Generally, such a rigidity deteriorates the surplus of households since it delays their adjustment in the labour market. The consequences are more significant in the case of the reduction of public sector employees.

- Therefore, concerning the role of structural features, the exchange rate regime is clearly more important.

Although the model is complex to solve as well as to interpret the results, it seems well-behaving and robust. It provides useful information both from single-model simulations or from alternative model variants. In the latter case, results reflect different structural features of the markets.

The nature of results is clearly normative and they are appropriate for policy assessment. They differ from those obtained from traditional econometric forecasting models, which are able to provide only short-run and descriptive insights.

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