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Social Expenditures, Economic Growth and Poverty in Morocco: An Analysis in Computable General Equilibrium

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I. Introduction

Fiscal policy is a means available to the government to regulate the economy and conduct actions on economic cycles to achieve its economic and social objectives.

Sustained growth and sustainable improvement of the living conditions of the population are among the objectives of every state. Public finance managers have to find the best possible combination, between the various means of fiscal space, namely the levies, internal and external borrowing, donations for the poorest countries and income seigniorage.

The reduction of poverty begins with sustained economic growth, which itself results from the combination of several factors.

The supply of public goods and services (education, health, road, transport and tele-communication infrastructure) can play a particularly important role in preventing the poor from continuing to become poorer (Stiglitz. J, 2012). It is also a fundamental factor in accelerating growth (Brun. J. F et al., 2007). The logic that proves it is impressive: If the state increases its expenditures, the GDP increases by a multiple of this sum (the mechanism of the Keynesian multiplier), even if this mechanism has been much disputed.

Of course, public spending can has more effects if we spent it on high-productivity investments, such as those that facilitate the restructuring of the economy. Beyond their high direct returns, these investments have other benefits. The private investment returns increase and the deficit is reduced in the medium term, which should inspire confidence, and it is even possible that consumers, understanding that the future tax burden will be lower than expected, increase their consumption. Even private one is "invited" (Stiglitz. J, 2012).

Therefore, the quantitative analysis of the impacts is crucial to guide decision-making and optimize actions regarding state intervention. Indeed, any state interventionism should be analyzed and appreciated at its fair value compared to the costs incurred regarding income redistribution and wealth.

However, the quantitative analysis of redistribution issues requires the availability of appropriate tools and summary tables of national accounts, which can provide information on the effects of policies implemented in both macroeconomic and microeconomic terms.

The advances made regarding general equilibrium models, offer an analytical platform that responds to this type of problem. They make it possible to understand the interdependence and feedback effects of the behavior of economic agents in a context of general equilibrium, taking into account the structure of the economy as a whole and the interrelationships between different economic agents.

In this context, and based on a computable general equilibrium model developed by Decaluwé, Martens and Savard (2001), a new model, taking into account the specificity of our subject has been constituted. The link micro-macro is established through the reconciliation of microeconomic information from household surveys and macroeconomic data provided by national accounts summary tables. Its accounting framework is the social accounting matrix that summarizes Moroccan economic activity in 2007 and the 2007 National survey on living standards and household consumption.

This model enables to quantify the effects of social public expenditure policies. Thus, these effects can be apprehended at the macro level on economic growth, inflation, macroeconomic balances, the internal and external competitiveness of the national economy as well as the income and savings of economic agents. At the micro level, a set of indicators of living standards

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are apprehended, including the structure of consumption expenditure by household classes, the redistribution of incomes and the level of poverty.

The splitting of the household agent into quintiles (from the poorer Q1 to the richer Q5) makes it a powerful instrument to establish the link between the simulated (fiscal and social) policies and their impacts on the living standards of the different types of households.

Four shocks were simulated, and the results differed whether it was a single shock or a multiple shocks.

The article will be organized as follows: A first section is devoted to the theoretical part explaining the links between public spending, economic growth, and poverty. The second section will deal with the CEGM-Computable Economic General Equilibrium Model-(MEGC), the simulations and the analysis of the results obtained.

II. A Theoretical Framework for Public Expenditures, Economic Growth, and Poverty

Traditionally, fiscal policy debates as a macroeconomic policy instrument have focused on defining the desired level of government balance. From a Keynesian perspective (Mills. P and Quinet. A, 1992), balances can contribute to the smoothing of cyclical fluctuations: thus, in a downturn, an increase in public spending stimulates private expenditure; the net effect on the economy is activity depending on the foreclosure of the propensity to import and the possible rise in the real interest rate. Such a representation of the functioning of the economy, however, is based on simplifying assumptions: first, it assumes that the horizon of private agents is sufficiently limited, because of liquidity constraints or phenomena of tax illusion, for the consumption reacts significantly to fluctuations in current income. It also supposes that the formation of agents' expectations gives way to a monetary illusion. Contesting these two hypotheses, monetarists (Mills. P and Quinet. A, 1992) questioned the cyclical efficiency of fiscal policy. According to them, consumption, which is a function of permanent income, is not very sensitive in the medium term to variations of public expenditure. Moreover, in the absence of a lasting monetary illusion, expansive fiscal policy is not able to lower the unemployment rate below its "natural" level permanently.

The monetarist proposals have contributed to reconsider the cyclical approach of the public finances: without necessarily calling into question the very effectiveness of the budgetary policy, economists agree today on the harmful effects of systematic use of these public finances for cyclical regulation. Reasoning in the context of the state's intertemporal budget constraint, Barro (1974; Mills. P and Quinet. A, 1992) went further by challenging any economic efficiency in fiscal policy: reformulating the Ricardian hypothesis of equivalence between debt and tax. He estimates that any change in the public balance is offset by a similar variation in private savings. If the validity conditions of this proposal are rarely met (a perfect forecasts, an absence of liquidity constraints, a flat-rate taxes) (Boskin, 1987; Mills. P and Quinet. A, 1992), it has nonetheless contributed to a renewed focus on the medium-term effects of fiscal policy. Increased attention has been paid to the impact of tax rates, the volume and the composition of public spending on private behavior. A lot of authors putted the evidence of the distortions in labor supply and savings caused by high marginal tax rates. Regarding this public spending, Barro (1981; Mills. P and Quinet. A, 1992) emphasizes the differentiated impact of a temporary or permanent change in the level of public expenditure on activity. If private agents reason, in the long term, by forming rational expectations, causing a permanent change, leading to future increases of taxes, which will depress the income: the increase in public spending is then fully offset by the decline in private consumption. However, a temporary change- since it does not imply a future tax increase- has a stimulating effect on activity less than the Keynesian multiplier to the extent that public expenditure partially replaces private spending.

Aschauer (1989) for his part argues that the increase in public investment expenditure would have, by boosting the profitability of private capital, an impact on production higher than an equivalent change in public consumption. At the same time, he finds a favorable effect of the capital stock on the overall productivity of factors of production. His latest work has broadened the scope for thinking about the medium-term impact of public finances. In particular, they encourage a more in-depth assessment of this effect on the utility function of consumers and the production function of entrepreneurs.

Thus, the impact of investment expenditure and public capital stock on productivity and return on capital is potentially significant for fiscal policy. It means that the government has, alongside with the budget balance and tax burden rates, another macroeconomic instrument to boost private sector productivity. This issue is of particular importance to any economy. A positive contribution of public finances to the improvement of the productive supply can consist of an increase in savings and a corresponding reduction of the pressure of the State on private savings flows. The control of the balance must, therefore, be a priority objective. Given the high level of mandatory levy and the number of distortions that can be generated by taxation, the satisfaction of a pay-as-you-go objective is above all a matter of controlling expenditure.

In addition to its role as an instrument of macroeconomic policy, public spending can also

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influence the distribution of income in the short term (through subsidies and transfers) and the long one (through health services and education). Transfers to households (food subsidies or unemployment allowances) directly affect the income and consumption of the beneficiaries, while supports and transfers to businesses have a more indirect impact on their income and consumption. Education and health services improve the productive capacity of advantageous (IMF, 1996). These well-targeted expenditures are a powerful instrument for boosting economic activity and reducing, either directly or indirectly, the levels of poverty (Touhami. A, 2005).

Lasting improvement in the living conditions of the population undoubtedly depends on greater access to education and health services (Djindil. N et al., 2005). It is especially true for the poor as their important asset is generally human capital. Any reform aimed at promoting the accumulation of this capital is likely to reach the poor. For sustainable development, more focus must, therefore, be placed on access to these services. And because of market failures, state intervention is seen as the most effective way to ensure fairness and efficiency in the provision of these services.

Hence the need to simulate, through our computable general equilibrium model, the impact of a change in public spending, especially of a social nature, on the macro and microeconomic aggregates of the country.

III. Computable General Equilibrium Analysis in Morocco

a) Interest of the CGEM (Computable General Equilibrium Model)

The theoretical framework of computable general equilibrium models is offered by the competitive general equilibrium model. Its original structure was developed during the second half of the nineteenth century by the neoclassical or marginalist economists (Decaluwé. B et al, 2001). In particular, the German Gossen (1854), the Englishman Jevons (1871), the Austrian Menger (1871) and the Frenchman Walras (1874-1877). However, it is widely accepted that it is the latter who contributed the most to the conceptualization of the model, hence its alternative name of general Walras system. In the twentieth century, more modern formulations, because they made use of an advanced mathematical language, came into being with the works, mainly, of Arrow and Debreu (1954) and McKenzie (1954-1981).

These models, based on the Walrasian theory, are concerned, in this theoretical framework, with the determination and estimation of the consequences of possible economic policies. These are models in which prices and quantities are determined by optimizing the agent's behaviors. Price flexibility will guarantee the adjustments and will lead to balance.

They include different types of households, with different budgetary constraints, in which welfare plays a fundamental role since the effect of economic policies on the redistribution of income are quantified while judging efficiency.

The methodological approach adapted to these objectives requires modeling that simulates a structural shock and captures the effects on all components of the economy. It is the reason why it opted for computable general equilibrium modeling.

In this work, our modeling is based on the simulation of shocks related to social (expenditure) policies.

In this respect, the Social Accounting Matrix (SAM), serving as a database of our CGEM, is the one developed by the National Accounting Department in 2007. The population was split into five quintiles (from the poorer 20% to the richer 20%). The base of this classification is the data from the Household Living Standards Survey conducted by the HCP in 2007, which distinguishes in household income between the remuneration of factors of production, in particular labor and capital, and transfers they receive from other economic agents, including the government. Labor and capital incomes are mainly attributed to households and businesses. In this perspective, the labor factor is disaggregated into three categories according to the level of education and the degree held by the individuals in the household. Three levels of qualification of the workforce are distinguished according to whether it is low, medium or highly qualified. Government revenue comes from direct and indirect taxes.

b) Closing the Model

The model is a system with simultaneous equations. In order to have a single solution, the number of these equations must equal the number of variables. For this purpose, some variables will be kept fixed about the type of macroeconomic closure chosen for the model, which is likely to make the system of equations determined.

However, the choice of macroeconomic closures goes beyond the simple lifting of the under-determination of the equations system and is an in-depth reflection on the theoretical transfer mechanisms of the simulated chocks effects and on the factors that generate them.

Closing a model, therefore, comes down to identifying the arguments in favor of a particular functioning of the economy that can reflect as accurately as possible its realities and characteristics and to better understand the impact of simulated policies, as reported by the results of simulations performed by the model.

In response to the shocks to be simulated, the various variables of the model react according to schemes strongly conditioned by the nature of the macroeconomic closure chosen.

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This loopback modification, depending on the objective pursued, gives the computable general equilibrium models great flexibility and enriches them in comparison with other types of models, thanks to the possibility of simulating the effects of a variety of measurements and to nuance them according to the privileged mode of the behavior of the variables.

Nevertheless, it is not always easy to pinpoint all the implications of one loopback over another as the expected impact is often influenced by other elements such as structural effects or microeconomic specifications of the model.

Given the structure of the Moroccan economy, especially the government behavior, and the static nature of the model, a closure consisting in considering that state expenditures are exogenous and that the investment adjusts to savings has been retained. The base of this closure is the Walras law, which states that prices are flexible and the investment is residual and automatically equates to saving. This type of closure appears to be appropriate for the study of economic policies that lead, mainly, to a reallocation of resources between activities. These resources are assumed to be fully employed at the level of the economy as a whole.

The capital stock is assumed to be specific to each of the sectors, which means that the return on the investment is not captured during the current period and the results deduced to have a short-term interpretation in this context of static CGEM s. This same hypothesis implies that there are as many capital factor remunerations as there are branches of activity in the model.

Still based on the static criterion of the model, the total supply of the labor factor of the different skills is assumed to be exogenous as well. The labor market is in full employment. Only the reallocation of this offer between the branches of activity is possible.

According to the "small country" hypothesis, world prices for imported and exported goods are also assumed to be exogenous to the model, since the small open economy cannot influence these international prices.

Similarly, the current account balance is considered exogenous and, it is the real exchange rate that adjusts to rebalance the balance of payments. As a result, RM saving (= - CAB) is also fixed.

And to keep the equilibrium of the model, it was necessary to fix another variable. To do this, we proposed to consider the change in stock as exogenous, because it is not an economic policy variable.

c) Proposed Simulations

Despite the standard structure of the constructed model, it can be used to simulate the impacts of several interesting economic policies (public expenditures in our case) on economic growth and poverty.

With this in mind, we first start with total expenditures, then education expenditures, and health expenditures. Finally, we will try to evaluate the changes observed by combining the two last policies (education and health).

The evolution of public expenditure (table-1), in Morocco, shows that their average growth rate over the period 2000-2015 is 6.6%, their share in GDP rose from 22.1% in 2000 to 28.4% in 2015 (6.3 points more). Hence, there is a need for effective control of expenditure. A better allocation of spending can contribute to growth, as the theory of endogenous growth teaches. When spending is both reduced and redeveloped, growth and social indicators are not necessarily threatened (IMF, 2006).

Table 1: Evolution of public expenditure (in billions of DHS) and their share in the GDP (in %) over the period 2000-2015

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
PE	101	111	109	115	123	144	146	159	192	195	205	241	264	255	260	256
Growth PE(%)	6,7	10	-2	5,4	7,2	17	1,2	9,3	20	1,9	5	17	9,7	-3,3	2	-1,5
PE/GDP	22	23	22	21	22	25	23	25	28	27	28	31	33	30	30	28

Source: Calculated from data from the Ministry of Economy and Finance (DEPF)

Spending on education and health influences heavily the social indicators. Higher education and better health are the most effective ways to boost productivity, and thereby create added value in all economic sectors. This improvement is one of the surest ways to make growth sustainable, to ensure a better sharing of its fruits and thus to combat poverty.

Spending on education in Morocco is characterized by the predominance of operating expenditures, as shown in Table 2. The latter represents, on average, between 2000 and 2015, 93% against 7% for investment expenditures. The average share of education operating expenditures in the total Moroccan operating expenditures is 28%. As for investment expenditures, they are only 8%, on average, in total investment expenditures. In total, education spending absorbs, on average, 6% of GDP and 21% of total expenditure. This share (1/5 of 11 ministries) is important but the results are not. The education system is, therefore, ineffective because the budget is spent in

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an unequal way, without taking into account the population socio-economic situation and the spatial disparities. This situation makes the system a source of inequality (Khellaf. A, 2015).

Table 2: Evolution of educational expenditure (in billions of DHS and %) between 2000 and 2015

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EE	11	25	25	29	29	38	35	37	39	44	45	42	48	51	54	55
OEE	90,6	91,9	91,7	92,7	93,8	95,2	93,4	92,9	93,1	87,8	89	98,1	96,6	94,1	94,3	94,1
IEE	9,4	8,1	8,3	7,3	6,2	4,8	6,6	7,1	6,9	12,2	11	1,9	3,4	5,9	5,7	5,9
EE / GDP	2,4	5,1	5	5,3	5,2	6,6	5,6	5,7	5,6	6,2	6,1	5,4	6	6	6,4	6,1
EE/ TE	10,6	22,3	23,1	25	23,8	26,7	24,2	23,2	20,1	22,7	22,2	17,5	18,3	19,9	21,1	21,6
OEE/OTE	29,8	30,5	31,7	33,6	33,3	32,1	31,2	30,5	25,5	27,2	29,6	18,2	23,7	24,3	26	26,7
IEE/ITE	8,6	7,6	11,1	11,9	9	9,7	10,7	10	7,3	12,3	9,4	1,8	3,5	7	6,3	6

Source: Calculated from Data from the Ministry of Economy and Finance (TGR)

Public expenditure on health is relatively low in Morocco. Table-3 shows that, on average, over the period 2000-2015, it amounts to 5% of the total State expenditure. However, 10% is the international standard set by WHO (World Health Organization) (Khellaf. A, 2015). Their average share of GDP is only 1%: 85% of these expenditures are operating expenses, and 15% are investment expenditures. The Ministry of Health's operating and investment expenditures represent, on average, 6% of total operating expenditure and 4% of total investment expenditure. All these indicators affirm that the sector is still confronted with the low level of health expenditure.

Table 3: Evolution of health expenditure (in billion DHS and %) between 2000 and 2015

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
HE	2	5	5	5	6	7	7	8	8	9	10	9	12	12	13	13
OHE	82,6	84,6	85,1	85,7	82,2	86,1	82,7	83,7	83,2	85,5	82,1	85,5	87,5	88,1	88,4	88,5
IHE	17,4	15,4	14,9	14,3	17,8	13,9	17,3	16,3	16,8	14,5	17,9	14,5	12,5	11,9	11,6	11,5
HE/ GDP	0,5	1	1	1	1,1	1,2	1,1	1,2	1,2	1,3	1,4	1,2	1,4	1,4	1,5	1,5
HE/ TE	2,3	4,3	4,4	4,6	5,1	5	4,6	4,8	4,4	4,7	4,9	4	4,4	4,7	5	5,1
OHE/OTE	5,9	5,4	5,7	5,7	6,2	5,4	5,3	5,6	5	5,5	6	3,6	5,2	5,4	5,7	6
IHE/ITE	3,5	2,8	3,8	4,3	5,5	5,3	5,3	4,7	3,9	3	3,3	3,1	3,1	3,4	3	2,8

Source: Calculated from data from the Ministry of Economy and Finance (TGR)

According to the 2007 ENVM, hygiene and health care are the fourth largest household expenditure for Moroccan households at the national level, with an annual average per person of 809.2 DHS as against 627 DHS in 2001. This expenditure is of 1055 DHS in urban areas with only 489 DHS in rural areas. It reaches 199 DHS in households of the poor class against 1993 DHS in the easier one.

With insufficient and unequal spending on education and health, our simulations require more importance. That's why we will analyze the effects of some expenditures policies on the economic growth and standard of living of the households. These measures are: 1) a decrease of 10% of the total public expenditure (SIM1), 2) an increase of 10% of the expenses of education (SIM2), 3) an increase of 10% of expenditure allocated to the health sector (SIM3) and 4) a combination of the last two measures (SIM4).

d) Discussion of the Results

Public expenditure reforms are generally aimed at reducing government expenditures. A 10% reduction did not have a positive impact on GDP growth (-1.32%) even though almost all sectors recorded an improvement in their value added, demand and intermediate consumption. The decline in prices (-0.09) strengthens the competitiveness of the Moroccan product both in the domestic and foreign markets. Exports made gains in almost all sectors. The demand for work has increased which has resulted in lower wages.

The government's shortfall regarding income and savings following this measure is 6.55% and 0.9%, respectively.

On the other hand, the results obtained, by reorganizing social expenditures such as education and health, show that even if the government lost income (-6.32% for SIM2, -6.35% for SIM3 and -6.30% for SIM4), it won savings (+ 0.17% for SIM2, + 0.05% for SIM3 and + 0.22% for SIM4). We can explain this situation by the drop in transfers from the government to other agents, which allowed it to save more.

GDP improved by 0.52% (SIM2), 0.17% (SIM3) and 0.69 (SIM4). These results lead to the conclusion that among all the measures proposed, the most favorable policy for economic growth is that relating to the development of education and health (SIM4). This

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additional allocation of resources for these two social sectors could be more effective than a decrease in total public expenditures.

Regarding indicators measuring the standard of living of households, it is still the SIM4 that has recorded the highest growth rates among the poor and middle classes. Household income increased (1.99% for Q1, 1.87% for Q2, 1.85% for Q3, 1.73% for Q4 and 1.86% for Q5), leading to a larger increase in consumption (1.96% for Q1, 1.79% for Q2, 1.73% for Q3, 1.62% for Q4 and 1.76% for Q5) and an improvement in savings (1.75% for Q1, 1.69% for Q2, 1.63% for Q3, 1.62% for Q4 and 1.66% for Q5). For the tree indicators (YH, CMH, S_H), we can say that this measure is in favor of poor population (Q1, Q2, Q3).

IV. Conclusion

In this work, we tried to provide some answers to the problem of the effectiveness of fiscal policies, as a means of economic growth and the fight against poverty, by improving the standard of living of poor and middle-class households in Morocco.

From a methodological point of view, our analysis was based on a micro-simulated computable general equilibrium model to capture the impact of the proposed fiscal policies on the economy as a whole. The disaggregation of the MCS of the Moroccan economy made it possible to follow the variations of the different variables measuring the standard of living for all household classes.

Simulation results have shown that fiscal policy can serve the goals of economic growth and poverty reduction by contributing to the well-being of households.

Of all the measures proposed, the most effective for both objectives (growth and poverty) is the revision to the increase in education and health spending by 10% each.

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Annex

	Variables		Base	Expenditures Shoks			
				PE	EDUC	HEALTH	ED & HT
				SIM1	SIM2	SIM3	SIM4
				(Var %)	(Var %)	(Var %)	(Var %)
Growth (Macro)	GDP		647530	-1,32	0,52	0,17	0,69
	GFCF		208216	3,28	4,45	4,23	4,56
	IT		215830	3,13	4,28	4,06	4,39
	CPI		1	-0,09	0,09	0,03	0,12
	Wage rate	l1	1	-0,27	0,21	0,07	0,28
		l2	1	-4,57	1,73	0,56	2,3
		l3	1	-5,7	2,01	0,65	2,66
	Saving	firm	80085	9,26	9,68	9,57	9,74
		gvt	40167	-0,9	0,17	0,05	0,22
		row	808	0	0	0	0
	Income	firm	233925	-0,2	0,15	0,05	0,2
		gvt	227039	-6,55	-6,32	-6,35	-6,3
		row	309321	0,54	-0,19	-0,06	-0,25
Poverty (Micro)	YH	Q1	42658	-1,58	0,83	0,35	1,99
		Q2	45975	-1,36	0,75	0,29	1,87
		Q3	64168	-1,22	0,66	0,27	1,85
		Q4	84696	-1,11	0,57	0,23	1,73
		Q5	284726	-1,41	0,67	0,29	1,86
	YDH	Q1	42018	-1,67	0,82	0,32	1,97
		Q2	44511	-1,53	0,7	0,26	1,86
		Q3	61308	-1,24	0,6	0,18	1,82
		Q4	78667	-1,08	0,52	0,15	1,72
		Q5	233533	-1,5	0,57	0,26	1,83
	CMH	Q1	33108	-1,78	0,72	0,23	1,96
		Q2	43790	-1,45	0,6	0,19	1,79
		Q3	54736	-1,33	0,55	0,18	1,73
		Q4	73040	-1,1	0,47	0,15	1,62
		Q5	149495	-1,4	0,57	0,19	1,76
	S_H	Q1	8386	-1,48	0,61	0,18	1,75
		Q2	-511	-1,25	0,52	0,12	1,69
		Q3	4487	-1,13	0,45	0,13	1,63
		Q4	1750	-1,02	0,36	0,11	1,52
		Q5	57401	-1,2	0,47	0,12	1,66

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