

25th Annual Conference on Global Economic Analysis
"Accelerating Economic Transformation, Diversification and Job Creation"
June 8-10, 2022

Evaluation of the socio-economic impact of income inequalities in Morocco using a Computable General Equilibrium Model (CGEM)

RADUF Radouane

Associate professor, Laboratory of Economic Analysis and Modelling (LEAM),
Department of Economics, Faculty of Economics, Law and Social Sciences
Mohammed V University in Rabat (MOROCCO)

Zakaria CHTOUKI

Phd student, Laboratory of Economic Analysis and Modelling (LEAM),
Department of Economics, Faculty of Economics, Law and Social Sciences
Mohammed V University in Rabat (MOROCCO)

OUTLINE

- I. WHY AND HOW?
- II. METHODOLOGY
- III. KEY FINDINGS
- IV. CONCLUSION
- V. NEXT STEP



WHY INCOME INEQUALITY MATTERS?

INTERNATIONAL CONTEXT

- Various exploratory studies assert a global, extremely rapid and irreversible increase in income inequality since the 1980s [Alvaredo et al. (2018); Lanker and Milanovic (2016)].
- Many authors, including Nobel laureates in economics, express concern about the extent of inequality and its impact on economic and social development especially since the 2008 crisis incidents [Deaton A. (2015); Stiglitz J. (2012, 2015); Krugman P. (2008); Banerjee A. & Duflo E. (2003) and Sen A. (1992)].
- On the international agenda, reducing inequality is featured among the 17th Sustainable Development Goals (SDGs).

WHY INCOME INEQUALITY MATTERS?

MOROCCAN CONTEXT

In Morocco, the theme of social inequality has taken a turn during the end of the last decade:

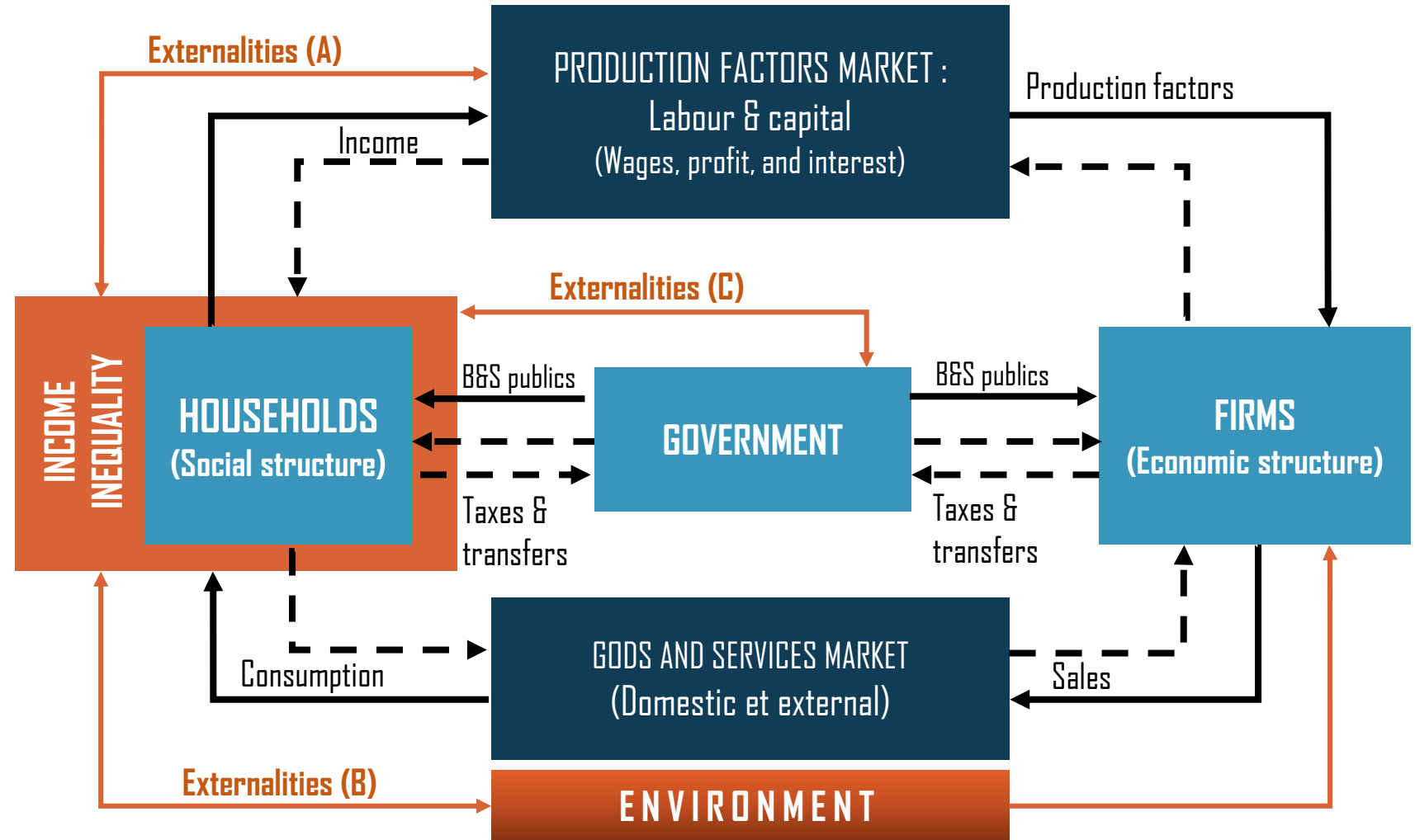
- King Mohammed VI recognized "inequalities" as a central issue in his 2019 Throne Day speech. Thus, Equity and social inclusion are seen as fundamental to the new Moroccan development model in order to restore confidence and ensure sustainable prosperity.
- Since 2016, several institutional reports have been published to acknowledge the emergence of a **multidimensional** and **relative** form of **poverty** in Morocco (HCP, DEPF, CESE, ONDH...).
- Launching of the Social and Territorial Disparities Reduction Program "PRDST (2017-2023)" aimed at reducing social disparities between rural and urban areas.

How income inequality impact socioeconomic structure within the general equilibrium?

We believe that an increase in household income inequalities could affect:

- > Household behaviour (A)
- > Sectorial value added (A/B)
- > Economic environment (B)
- > Government budget (C)

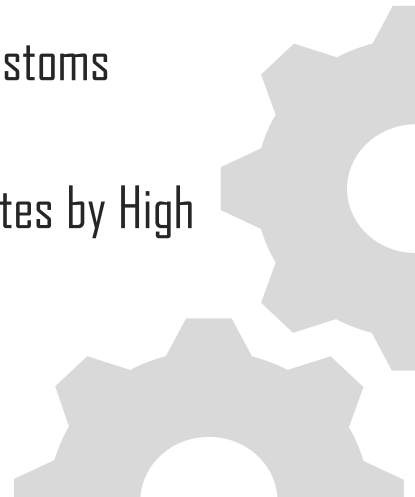
Inequality threaten the the fluidity of this circulation.



METHODOLOGY

Data and modelling strategy

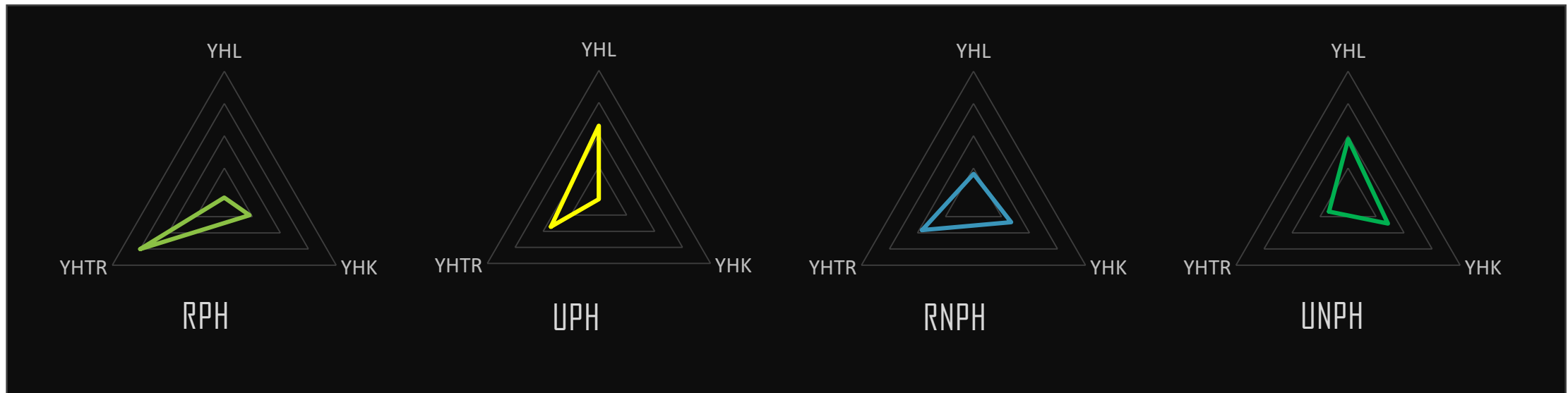
- **National and static CGE Model** for the Moroccan economy.
- Adapted from the PEP1-1 model and calibrated on the **Moroccan SAM (2016)** distributed as follows :
 - **19 branches** consolidated into three main sectors :
 - Primary sector related to agriculture and fishing ;
 - Secondary sector related to industries and manufacturing ;
 - Tertiary sector for private and public services
 - **2 factors** of production: labour and capital ;
 - **6 economic agents**: Government, firms, and **4 households** ;
 - Including 3 additional accounts associated with taxes (indirect taxation "TI", direct taxation "TD" and customs import taxation "TM")
- The elasticities (CET and CES) relating to agent behaviour (consumption, saving, etc.) are taken from estimates by High Commission of Planning of Morocco (2014).
- Income and headcount of each household categories are in line with the HCP survey data (2016).



METHODOLOGY

Social hierarchy of households & measuring income inequality

- National household income in the model is divided into three types for four categories of Moroccan households listed from the poorest (RPH) to the richest (UNPH), as shown below :



- Level of income inequality is measured by the Gini index :

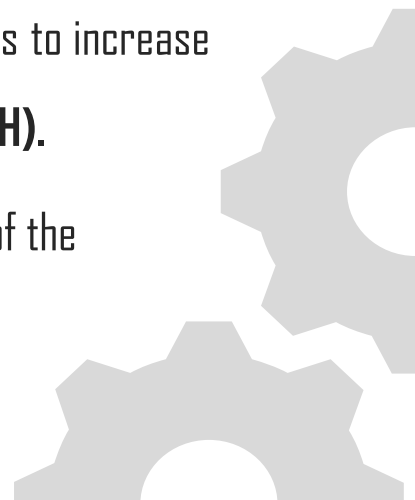
$$I_G = \left| 1 - \sum_{k=0}^{n-1} (X_{k+1} - X_k)(Y_{k+1} - Y_k) \right|$$

- Gini index of household income inequality at level base equilibrium is estimated at 39,3% (Conforme to HCP data 2016).

METHODOLOGY

Numeraire, closure and implementation of shock

- **Numeraire** is the consumer price index
- **The closure** conforms to the classical condition : Investment = Saving (Décaluwé & al, 2001).
- Main fixation of variables applied to solve the CGE model :
 - **External closure** : Exchange rate, Current account balance, International price of import and export
 - **Public closure** : Public expenditures and all tax rates constant.
- **The Implementation of the shock** of household income is generated by 2 instruments :
 - **Tax policy**: implementation of a variation of (-25% to +25%) of a direct tax (**TDH**) on different household incomes to increase (**SIM1**) or decrease (**SIM2**) the existing gap between poor income (**RPH; UPH**) and non poor income (**RNPH, UNPH**).
 - **Mixed policy** : Adding an increase of 20% of public expenditure to the fiscal policy in order to reduce the effect of the increase in government revenue generated by the direct tax on household income (**SIM3; SIM4; SIM5; SIM6**).

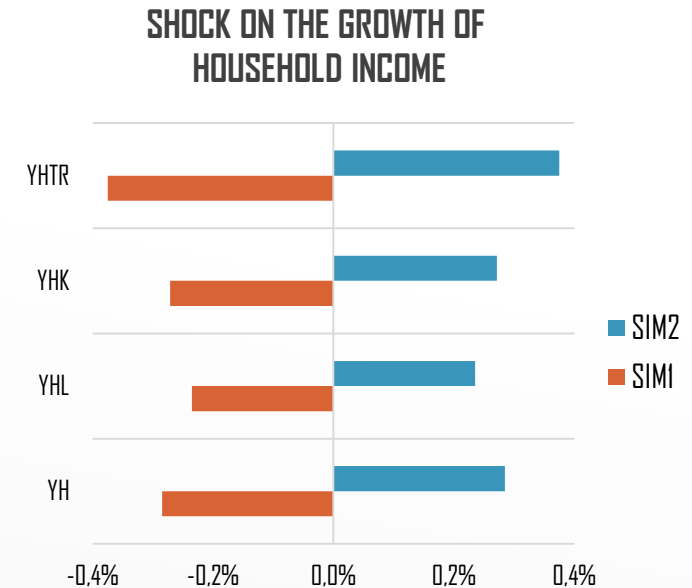
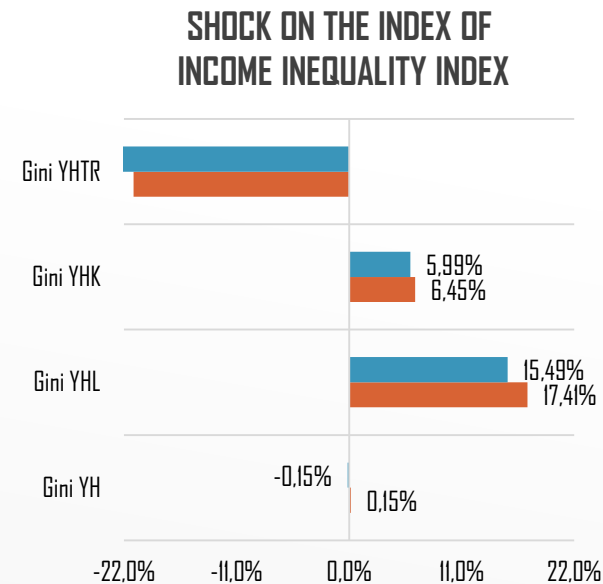


KEY FINDINGS

RESULTS OF THE SIMULATION OF INCOME INEQUALITY

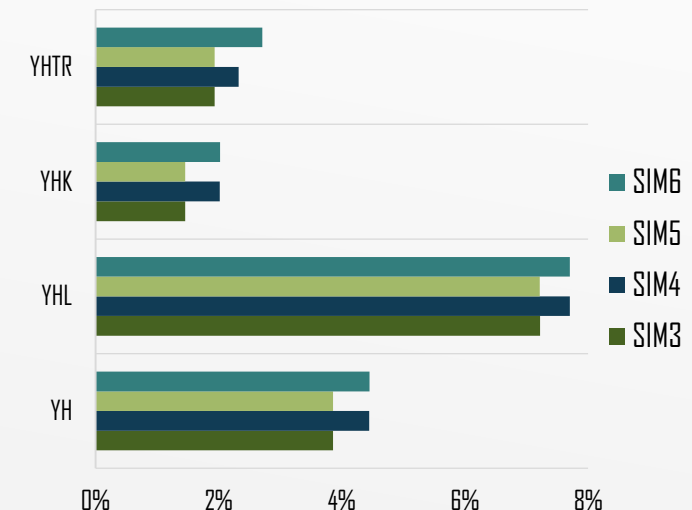
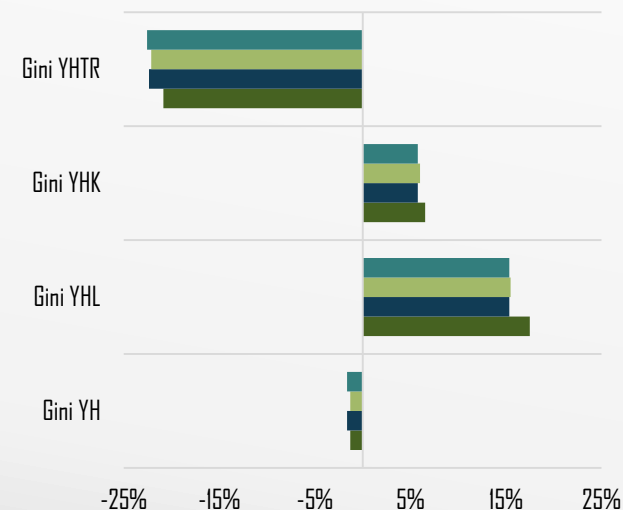
Simulation of tax policy

- > SIM1 results coincides perfectly with the opposite of SIM2.
- > The increase in inequality (SIM1) by (+0,015%) are assorted with a decrease in total household income by (-0,284%)
- > Labour income inequality (GINI YHL) increases three times more than capital income inequality (GINI YHK)
- > Transfers income still the least inequal structure of income



Simulation of mixed policy

- > SIM3 and SIM4 represent, respectively, SIM1 and SIM2 with a 20% increase in public current expenditure
- > Rise of public expenditure decreases inequality in SIM4 ten times more than in SIM2 (tax policy)
- > The income structure that has increased the most is that of wages (about 7.2%)

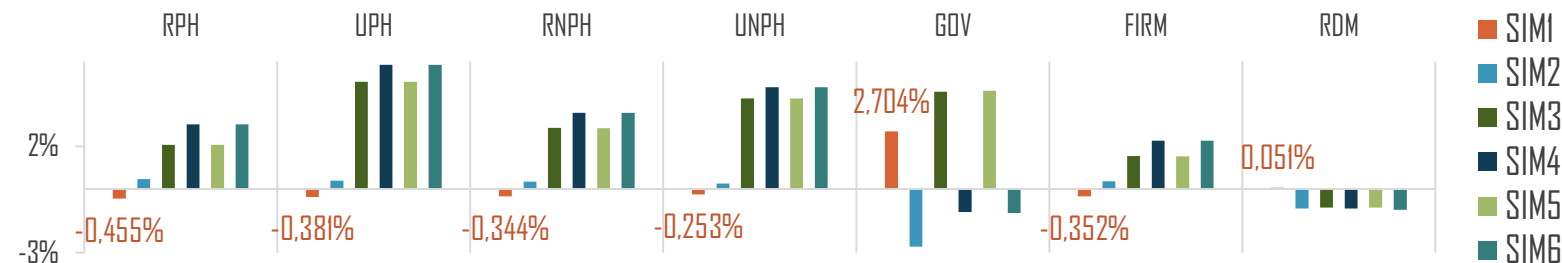


KEY FINDINGS

Impact on the behaviour of economic agents of the CGEM
CONSUMPTION, SAVING ET TRANSFERS

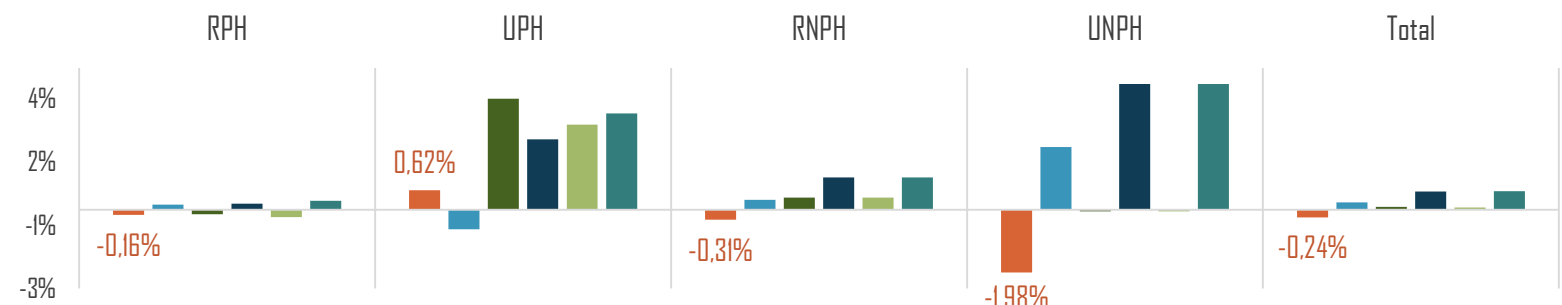
Variations in living standards (agents' incomes)

- > Urban household incomes grow more than rural incomes when government spending increases
- > Increased inequality reduces corporate income



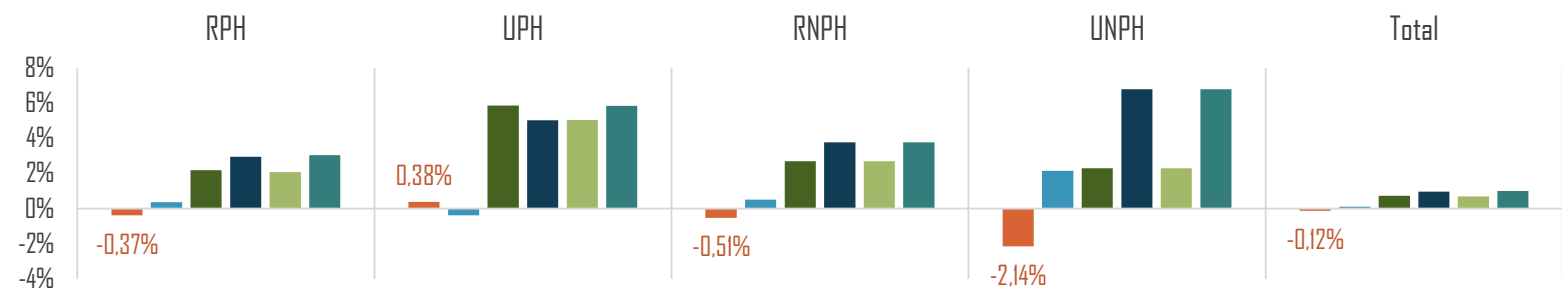
Consumption variations

- > Reducing inequality increases final household consumption
- > Rural consumption is slightly less sensitive to inequality changes



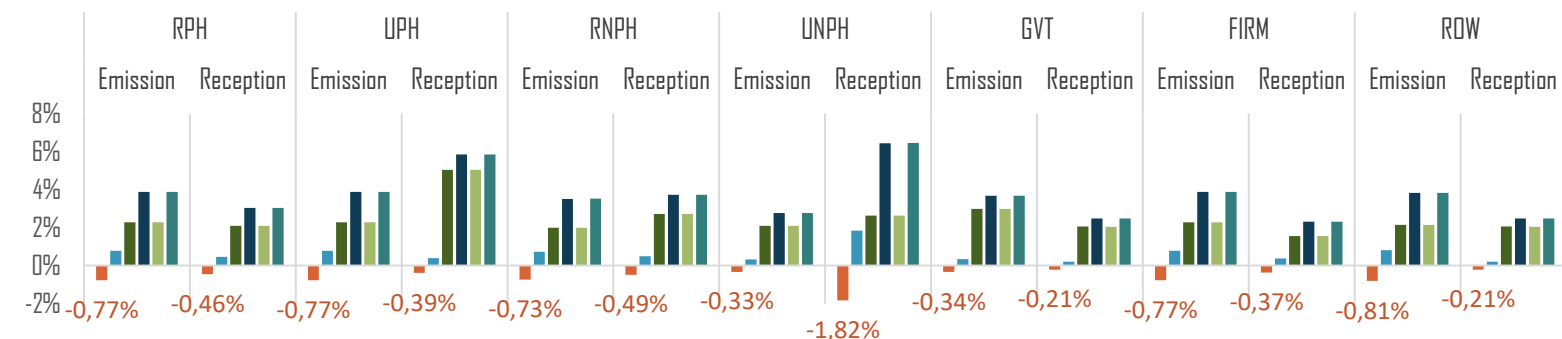
Savings variations

- > Increasing inequality reduces national savings
- > Rural households' savings are more sensitive to inequality changes



Transfers variation

Increased inequality limits the mutuality of transfers between agents, even reducing transfers from abroad

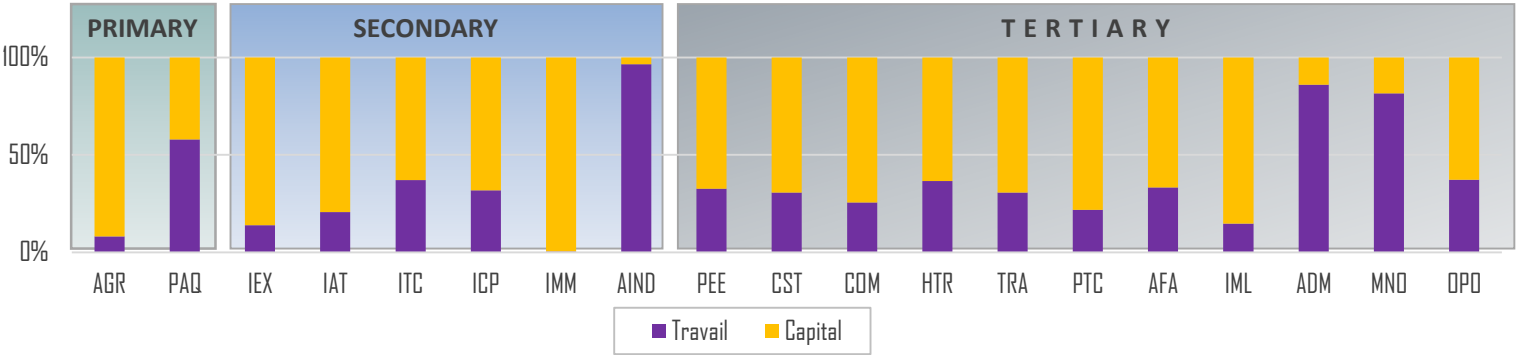


KEY FINDINGS

Impact on the market components of the CGEM
AGGREGATE ECONOMIC DEMAND

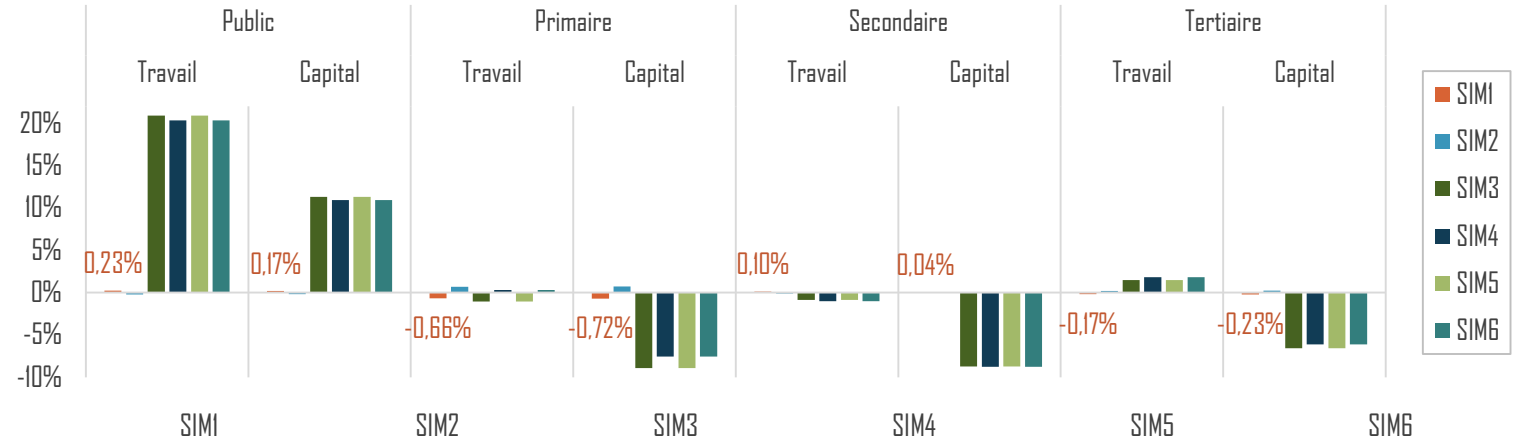
Labour and capital demand by economic branch

Most branches depend on capital except fishing (PAQ), other industries (AIND), public services (ADM) and social services (MNO)



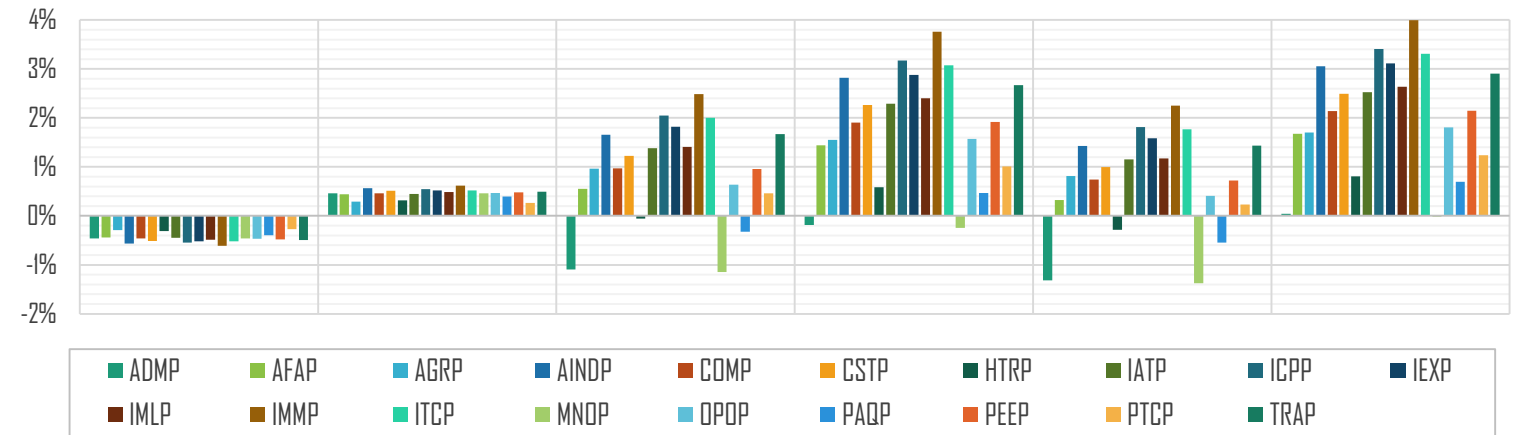
Variation in factor demand by sector

- > increasing inequality reduces the demand for factors related to the primary and tertiary sectors, which may restrict job creation.
- > Increasing public expenditure negatively affects the demand for capital (especially in the presence of inequality, the case of SIM3)



Overall consumption by product

- > More inequality leads to a fall in all economic agents' consumption
- > Consumption of social services such as education and health (MNOP) as well as agricultural products (AGRP) declines with increasing inequality despite the application of a budgetary stimulus policy (SIM3)



KEY FINDINGS

Variations in production following tax shock implementation

- > Increased inequality reduces GDP and agricultural value added, increases industrial value added and has no effect on services
- > more inequality lowers household demand due to incomes decline
- > This equilibrium characterized by higher social inequalities benefits activities that rely more on the capital factor, in this case the industrial sector (IEX; IAT; ITC; ICP; IMM; AIND)

Variations in production following tax and budgetary shock implementation

- > Increased public spending has a corrective effect on the impact of inequality (SIM1 to SIM3)
- > All scenarios that lead to a decrease in inequality show a decline in the value added of the industrial sector

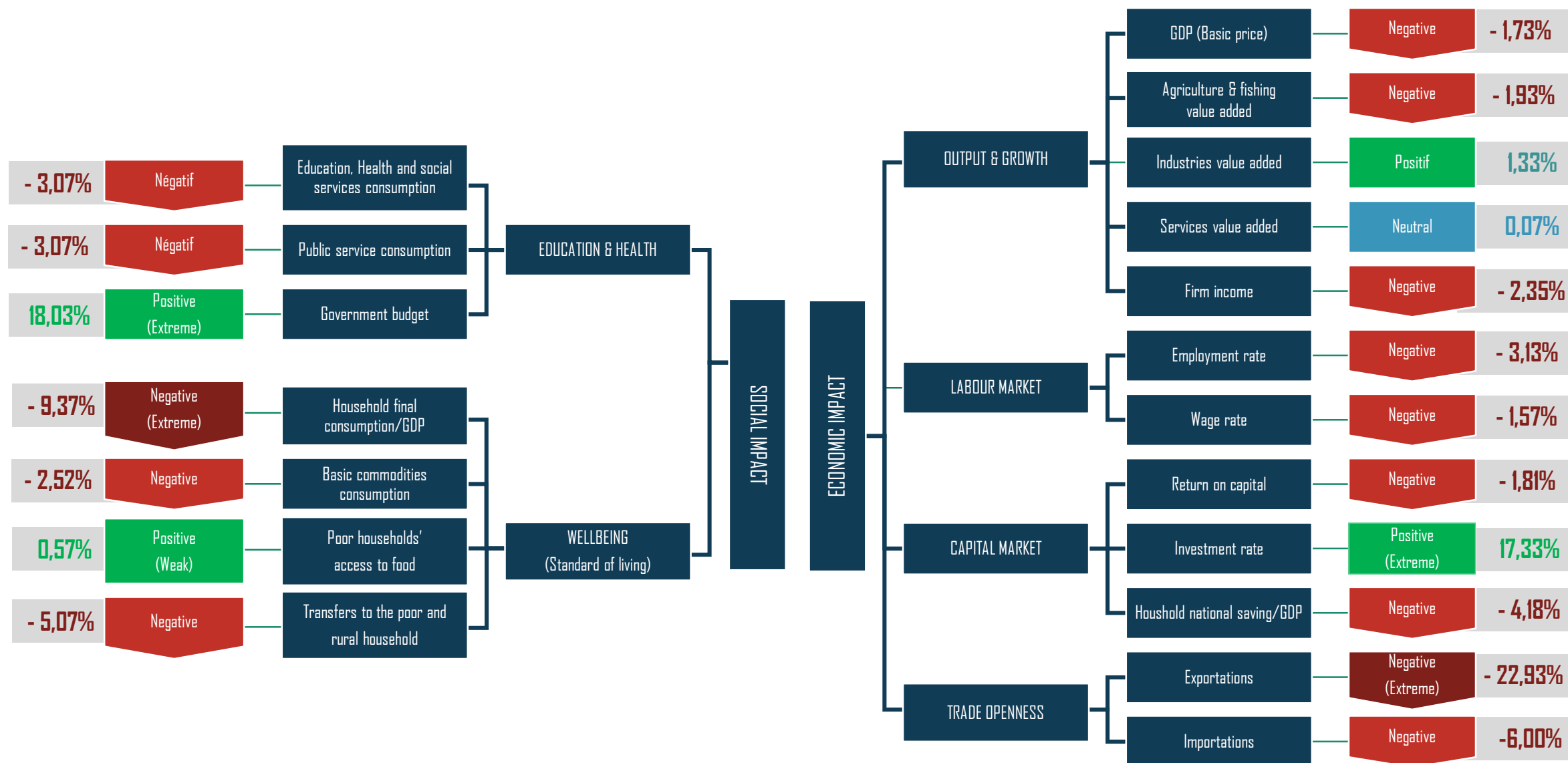
Variations in value added by branch

- > Construction value added (CST) increases more when inequality rises and decreases drastically when it falls as a result of mixed policy shocks
- > Increase in public expenditure leads to a substantial increase in social services (MNO)



CONCLUSION : MAIN RESULTS OF SIM1

SOCIOECONOMIC IMPACT OF INCREASE OF 1% OF HOUSEHOLD INCOME INEQUALITY



IMPLICATIONS & STUDY LIMITS

- Ensuring equity in income distribution is essential for sustainable economic development and true social inclusion.
- By extension of the model results, 1% increase in income inequality negatively impacts output by (-1.73%) on basic GDP and (-1.60%) on GDP at market price
- These results are limited to the Moroccan context as well as the need to consider the impact of monetary policies and inflationary hazards on prices.

NEXT STEPS

- This work could be improved by incorporating the microsimulation approach on household account and dynamics to capture long-term trends and interactions
- Evaluation of inequality-reducing policy proposals on economic equilibrium and output development (such as: universal allowance, lifetime wage, Sen's capability approach...);

THANK YOU
FOR YOUR ATTENTION