Agricultural policy and Covid-19 in Colombia

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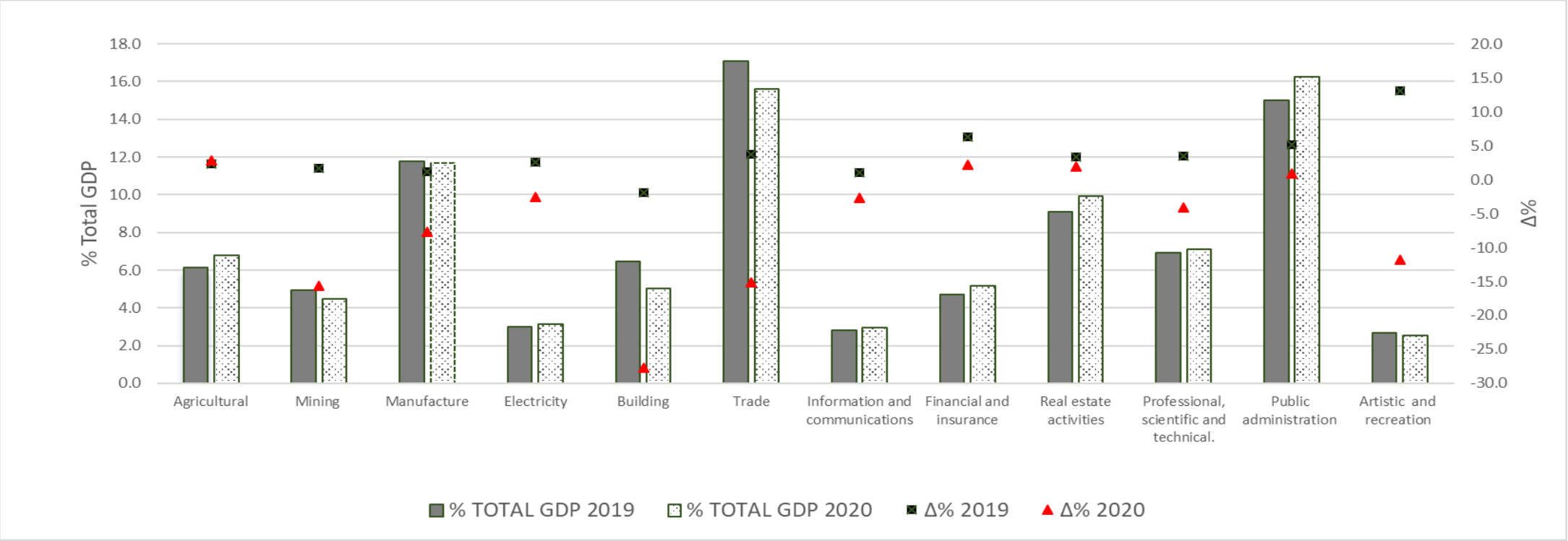
Context

Impact of the Covid-19 pandemic on the Colombian economy:

- GDP presented a drop of 6.8% in 2020
- The unemployment rate was 15.9% in 2020, which represented an increase of 5.4 percentage points compared to 2019 (10.5%).
- The economic sectors most affected were building, mining and quarrying, trade, and artistic, entertainment and recreation activities with falls in the production.
- The least affected economic sectors were the financial sector and the agricultural sector with positive growth rates.

Context

Colombian GDP by sector, 2019-2020



Source: DANE (2020), authors' calculations.

Context

Financial sector:

- The sector grew by 2.1% in 2020
- Financial entities had profits COP $14.23 in 2020.
- Reduction in income tax that went from 33% in 2019 to 30% in 2022.
- Income tax surcharge on the financial sector of 4% in 2020 and 3% for 2021 and 2022.

Context

Agricultural sector:

- The sector grew by 2.8% in 2020.
- Decrease in the demand internal of agricultural commodities.
- Fall in the price of crops whose final product is the domestic market: cassava, rice, corn and potatoes.
- In rural areas 352 thousand jobs were lost

Context

Crops and Cattle output (Δ%)

Main Crops/cattle	Output (%Δ) - 2020
Cassava	1.5
Corn	-7.8
Potatoes	-5.1
Rice	14.7
Coffee	-10.5
Cattle	1.7

Source: Fenalce, Fedepapa, Fedearroz, Dane 2021

Motivations

Incentives to the agricultural sector in the framework of the declaration of the State of Economic, Social and Ecological Emergency:

- Subsidy to labor
- Subsidy to production
- Subsidy to capital
- Tariff reduction for commodity imports
- Subsidy to cover the interest rate and financial costs and expenses associated with agricultural credit operations

Research project

Main research questions:

- What are the expected **impacts of these policies** **on rural and urban households' income** and how will they differ among them?
- What is the **expected impact of the policies** **on rural labor demand** for skilled and unskilled workers?

Research contribution

- The aim of this research is to examine how COVID-19 is affecting output and employment in the main crops (corn, cassava, potatoes and rice) and livestock grown in Colombia, and to evaluate the impact of the government's economic policies focused at the agricultural sector.

Methodology- Data

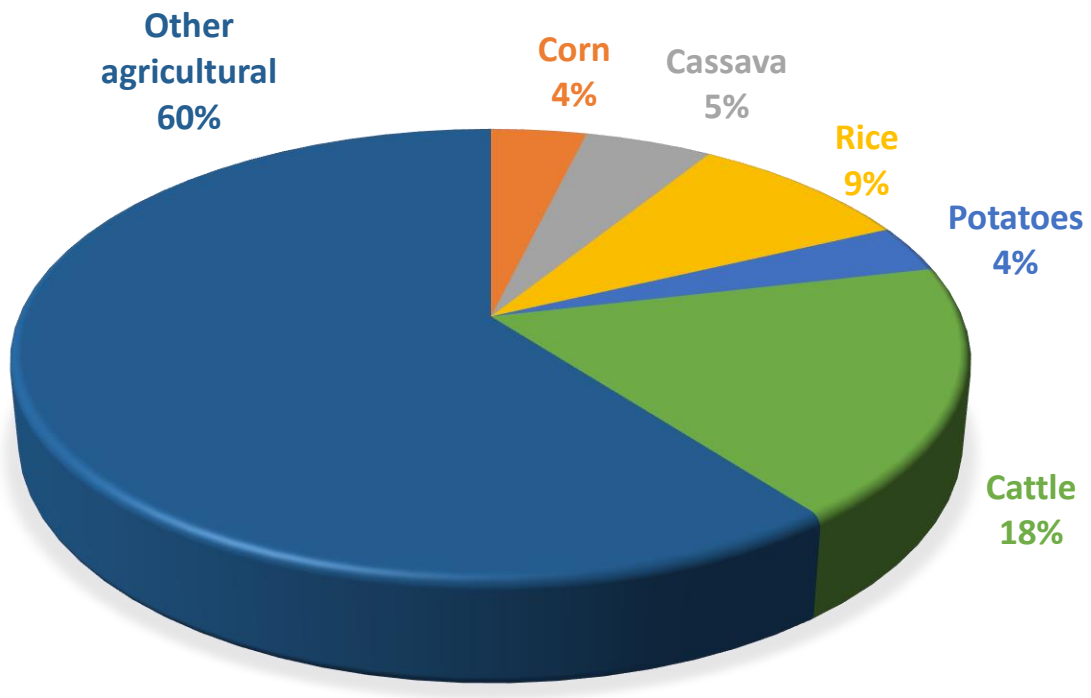
Social Accounting Matrix (SAM).

Agricultural production considering:

- **Different size of farms**: small, medium, and large
- **4 important crops and Cattle**
- Two types of **households: rural and urban**

CGE model

- **PEP1-1 standard model**
- Single-country, static



Data for the SAM

Structure of the agricultural sector

- The agricultural census (2013-2014).
- Structure of costs for agricultural production: Agronet
- System of prices of agricultural commodities: SIPSA
- INCODER-IGAC: sizes of production units.

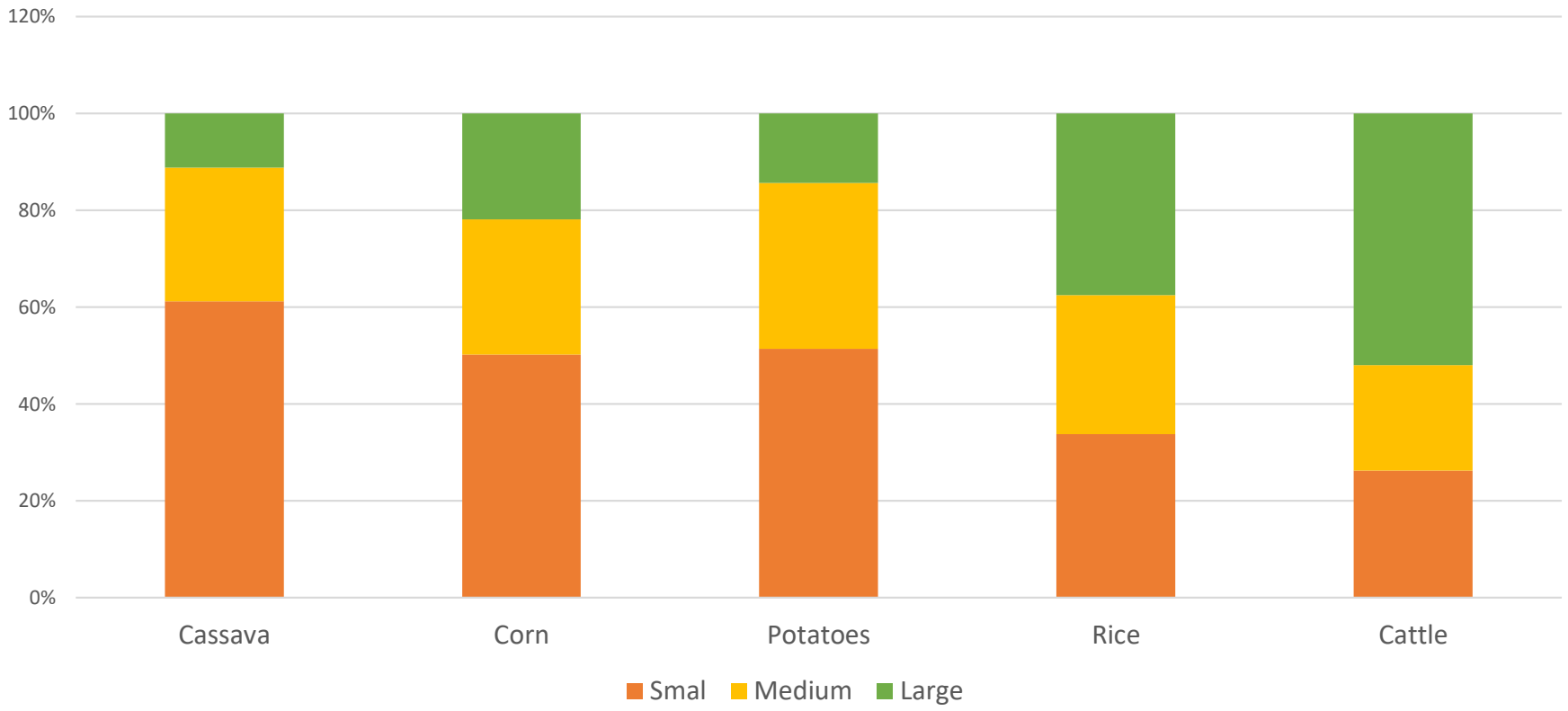
Households' income according to its sources & types (urban/rural)

- The integrated household survey (GEIH-DANE).
- Income and Expenses survey (ENPH-DANE).

Basic information required for building the macro-SAM (2014)

- National accounts: matrixes of supply and utilization, and the general economic equilibrium matrix.

Share of value added for crops and cattle by size



Methodology- Model

PEP1-1 standard model with the following extensions:

- Endogenous unemployment modeled through a wage curve.
- Imperfect substitution between similar products produced by different activities.
- Assumption: the "pure" form of the small-country

The closure rules

- External balance: real exchange rate (e as numeraire), CAB fixed.
- Government balance: direct tax rate on household
- Savings-investment balance: household savings
- Labor is assumed perfectly mobile between sectors and there is full employment.
- The model includes the following three options for capital and land:

(i)Capital and land are fixed and specific for each sector (K-fix).
(ii)Capital and land are mobile between sectors (K-mob).
(iii)Land is mobile between sectors and capital has a horizontal supply curve (infinite supply) (K-sup).

Simulated Scenario

Covid-19 economic policy to the main crops and cattle	
Shock	**Description**
TFP + SubLab + SubCap+ SubOutput+ Tariff red G	Subsidy to cover the interest rate and financial costs and expenses associated → (TFP, Echavarria et al., 2018) TFP increases by 6%.
	Subsidy to labor 2.8% + Subsidy to capital 1% + Tariff reduction 0.23% + Subsidy on Output = cassava and cattle 0.8%, potatoes 4.1%, rice and corn 0.6%.
	Rise of G by 1%

Alternatives to finance ↑G

↑ direct taxes on households (*tax-house*)

↑ taxes on the financial sector (*tax-fin*).

Impact (%) on macroeconomic indicators

	Tax-house			Tax-fin		
	K-fix*	K-mob*	K-sup*	K-fix*	K-mob*	K-sup*
Rural-Household consumption	3,96	5,16	8,17	4,09	5,33	7,3
Urban-Household consumption	8,11	8,32	12,81	8,05	8,24	14,47
Impact on rural-urban gap	6,16	6,88	9,26	5.88	6,24	9,83

* % change w.r.t. Covid scenario

K-fix, K-mob and *K-sup* denote capital and land are fixed, capital and land are mobile, and land mobile and horizontal supply curve for capital, respectively

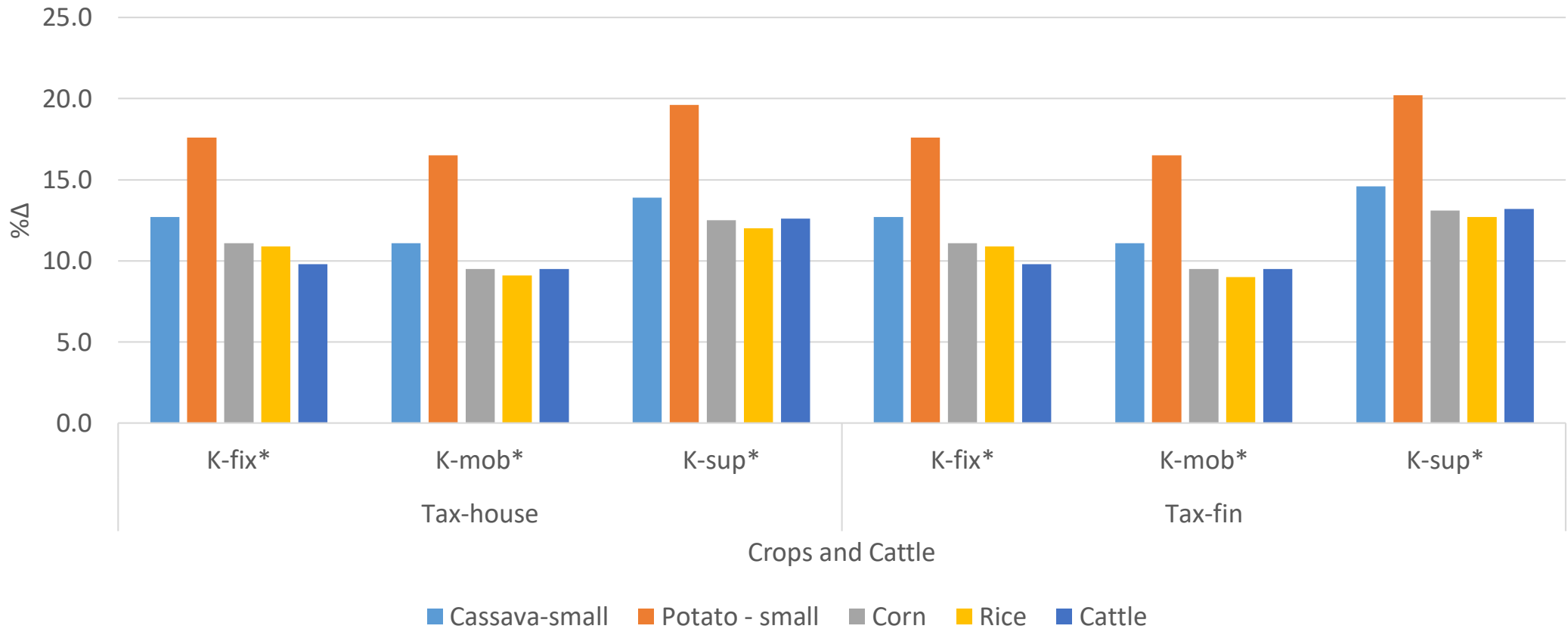
changes (%) in disposable income of households under different government's financing options.

Variable	Tax-house			Tax-fin		
	K-fix*	K-mob*	K-sup*	K-fix*	K-mob*	K-sup*
Households –rural	6,23	10,43	17,35	6,64	10,97	13,92
Households -urban	2,19	3,53	6,18	2,18	3,52	6,81
Impact on rural-urban gap	↓	↓	↓	↓	↓	↓

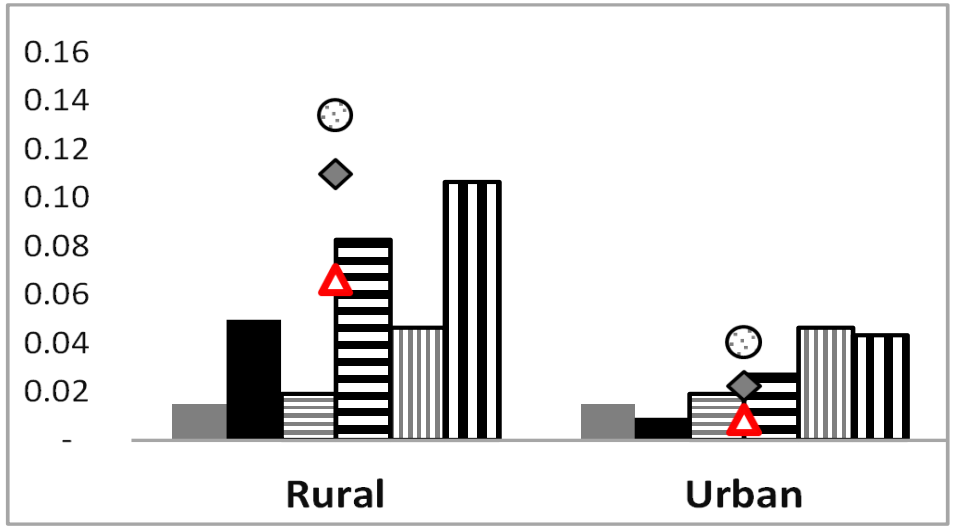
* % change w.r.t. Covid scenario

K-fix, K-mob and *K-sup* denote capital and land are fixed, capital and land are mobile, and land mobile and horizontal supply curve for capital, respectively

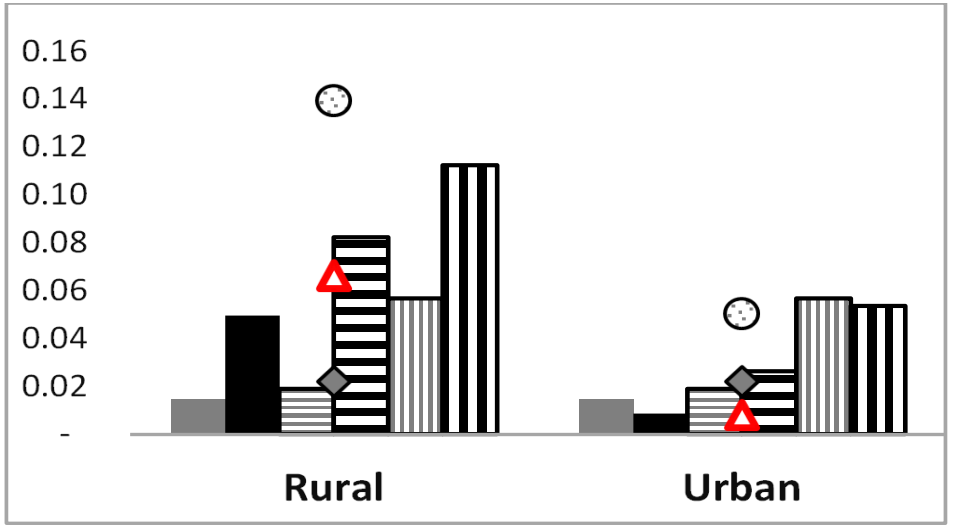
Change in the value added of crops and cattle that receive the shock



Changes in Income of households (%)



(a)



(b)

Capital income (K-fix)
Labor income (K-fix)
Capital income (K-mob)
Labor income (K-mob)
Capital income (K-sup)
Labor income (K-sup)
Total income (K-fix)
Total income (K-mob)
Total income (K-sup)

Concluding Remarks

- The set of policies analyzed in this paper lead to an increase in the production of main agricultural products, well above 10% after the COVID-19 pandemic shock
- The labor demand also increases, especially in the rural sector which benefit the most from these policies. In particular, with the implementation of these policies, the demand of unskilled labor in the rural sector increase.
- Disposable income and consumption of rural households recover to pre-covid levels.
- In regards to the policy that is focused on small farmers of potatoes, it can recover the conditions of those peasants severely affected by the negative shock due to the pandemic.

Thank you !

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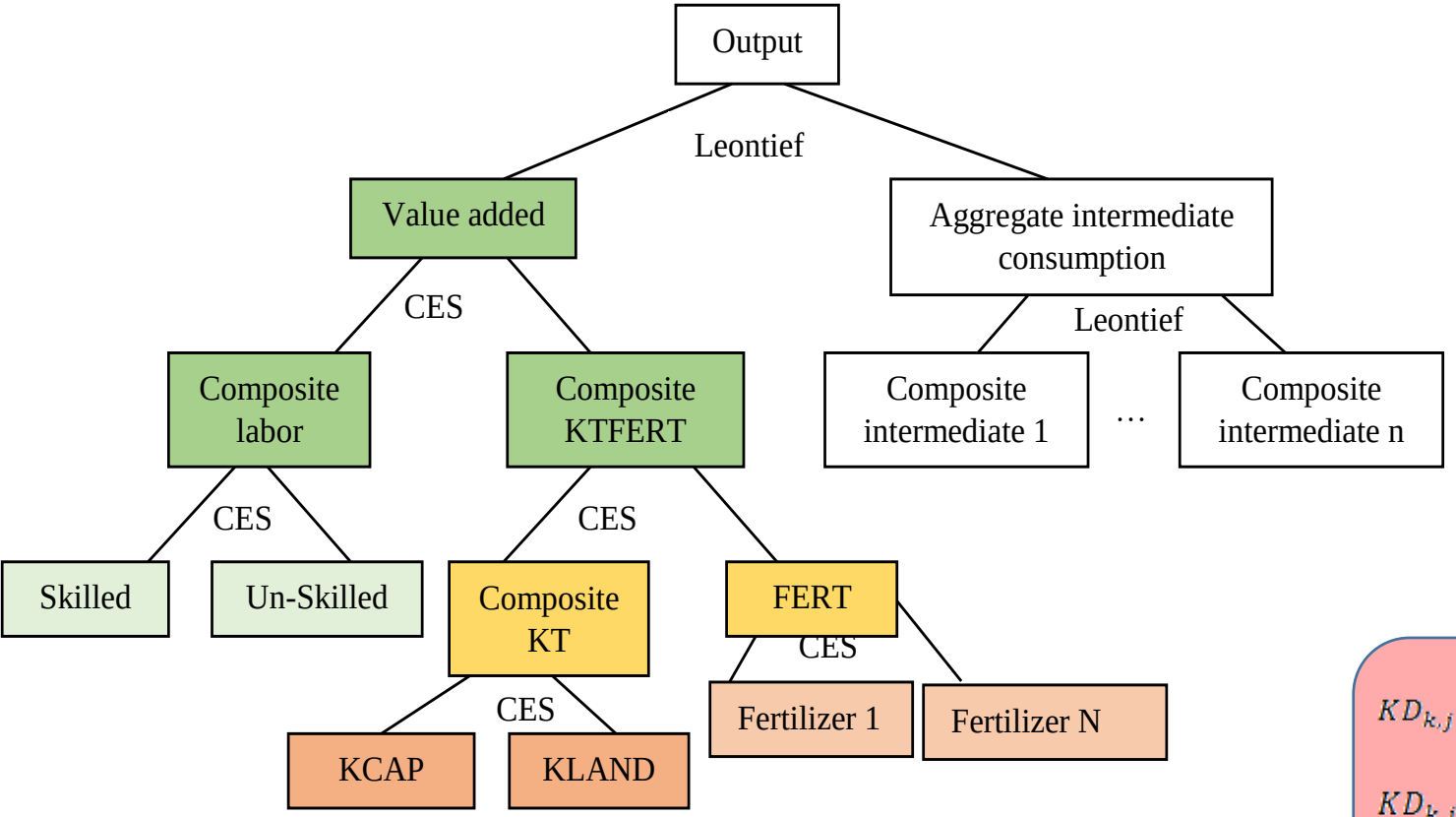
Form of the production structure for agriculture



Nested Structure of Agricultural Production

$$VA_j = \varphi_j^{VA}\left(\sum_{l\in L}\delta_{l,j}^{L}\cdot LD_{l,j}^{-\rho_j^{VA}} + \delta_j^{KTFERT}\cdot KTFERT_j^{-\rho_j^{VA}}\right)^{\frac{-1}{\rho_j^{VA}}}$$

$$KTFERT_j = \left(\frac{PVA_j}{PKTFERT_j}\right)^{\sigma_j^{VA}}\left(\delta_j^{KTFERT}\right)^{\sigma_j^{VA}} VA_{j,t}\left(\varphi_j^{VA}\right)^{\sigma_j^{VA}-1}$$

$$LD_{l,j} = \left(\frac{PVA_{j,t}}{WFA_{l,j,t}}\right)^{\sigma_a^{VA}}\left(\delta_{l,j}^{L}\right)^{\sigma_j^{VA}} VA_{j,t}\left(\varphi_j^{VA}\right)^{\sigma_j^{VA}-1}$$

$$KT_j = \left(\frac{PKTFERT_j}{PKT_j}\right)^{\sigma_j^{KTFERT}}\left(\delta_j^{KT}\right)^{\sigma_j^{KTFERT}} QKTFERT_j\left(\varphi_j^{KTFERT}\right)^{\sigma_j^{KTFERT}-1}$$

$$FERT_j = \left(\frac{PKTFERT_j}{PFERT_j}\right)^{\sigma_j^{KTFERT}}\left(\delta_j^{FERT}\right)^{\sigma_j^{KTFERT}} KTFERT_j\left(\varphi_j^{KTFERT}\right)^{\sigma_j^{KTFERT}}$$

$$KD_{k,j} = \left(\frac{PKT_j}{WFA_{k,j}}\right)^{\sigma_j^{KT}}\left(\delta_{k,a}^{T}\right)^{\sigma_j^{KT}} KT_j\left(\varphi_j^{KT}\right)^{\sigma_j^{KT}-1} \quad k \in KLAND$$

$$KD_{k,j} = \left(\frac{PKT_j}{WFA_{k,j}}\right)^{\sigma_a^{KT}}\left(\delta_{k,j}^{K}\right)^{\sigma_j^{KT}} KT_j\left(\varphi_j^{KT}\right)^{\sigma_j^{KT}-1} \quad k \in KCAP$$

$$DI_{i,j} = \left(\frac{PFERT_j}{PC_i}\right)^{\sigma_j^{FERT}}\left(\delta_{i,j}^{CFERT}\right)^{\sigma_j^{FERT}} FERT_j\left(\varphi_j^{FERT}\right)^{\sigma_j^{FERT}-1} \quad i \in IFERT$$