

Distributional and economy-wide effects of post-conflict policy in Colombia

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Context

Main moments of the armed conflict in Colombia (Arias et al., 2017):

- 1948: Assassination of a presidential candidate.
- 1960s: two left-wing groups emerged, the Revolutionary Armed Forces of Colombia (FARC) and the National Liberation Army (ELN).
- 1980s: right-wing paramilitary groups emerged to fight these guerrillas.



1948



1960s



1980s

Context - Motivations

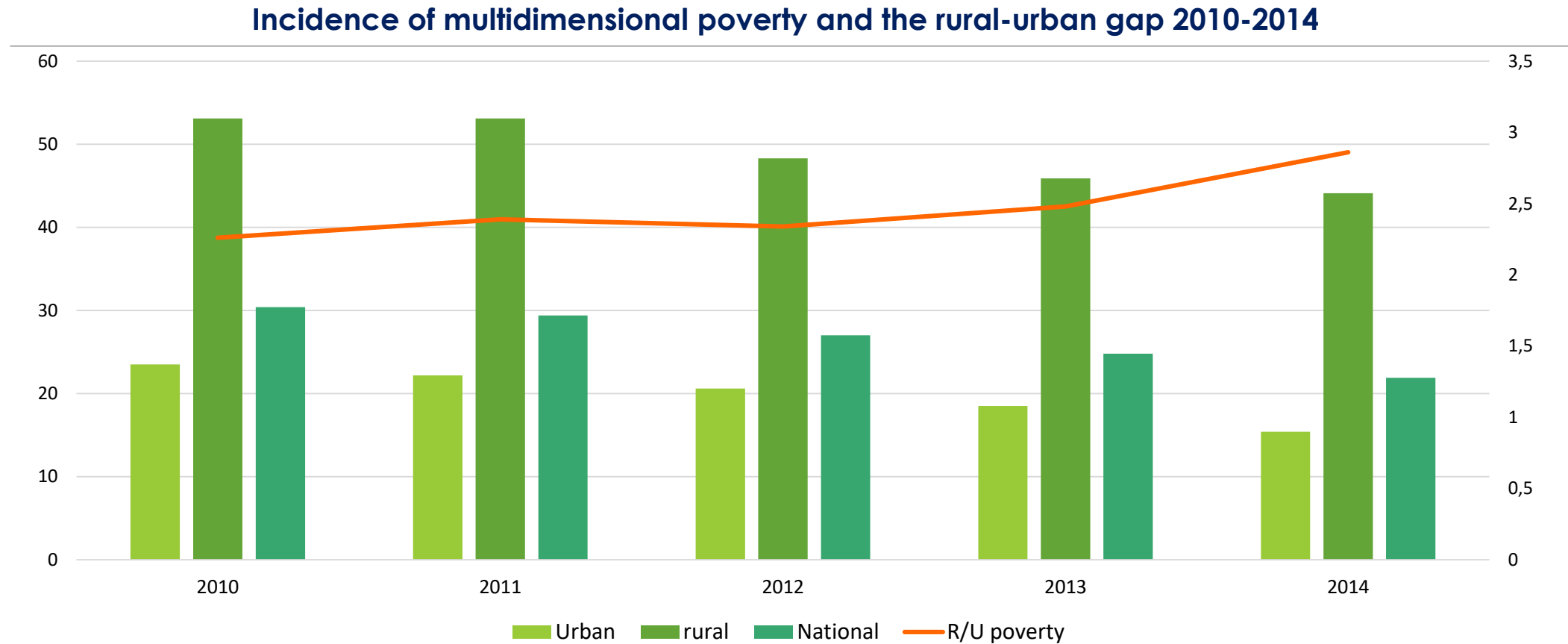
Rural areas have been the most affected by the armed conflict in Colombia

- **Less intensive economic** activity
- Farmers concentrate their activities portfolio in **subsistence activities**
- **Negative** effect on **agricultural investment**

The Peace Agreement (2016)

- **6 points**
 - Point 1: Comprehensive rural reform
 - Point 4: Substitution of illicit crops
- **The obstacles** to rural development might be **removed**
- **Rural households** wellbeing could **improve**.
- Provision of **public goods** for **better security** and **income generation**.

Context - Motivations



Source: National Planning Department (DNP)

Research questions

Main research questions. Concerning the policies proposed from points 1 & 4 of the Peace Agreement:

- 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 provide **an ex-ante evaluation** of the **agricultural policy** for the **post-conflict** (2017-2030)

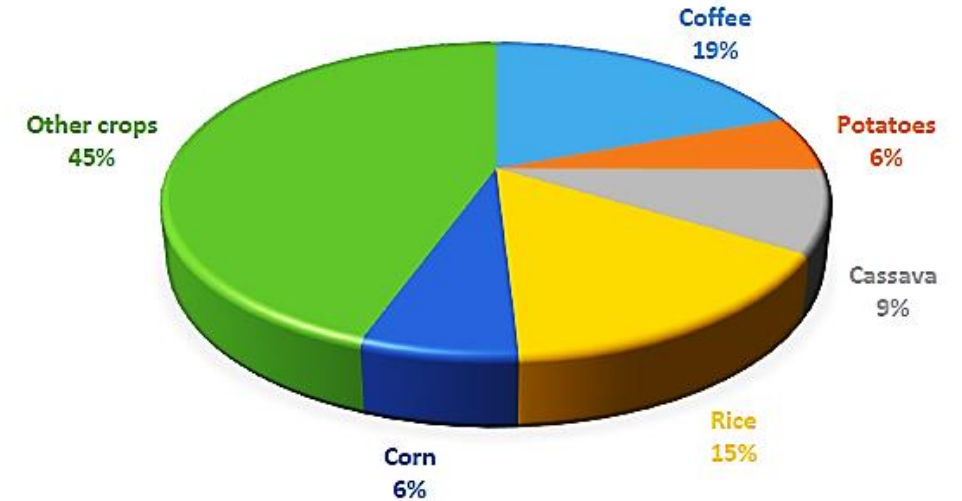


Methodology

Social Accounting Matrix (SAM).

Agricultural production considering:

- **5 important crops**
- **Incidence of the Armed Conflict** (Index) at the municipality level.
- **Different size of farms:** small, medium, and large
- Two types of **households: rural and urban**



CGE model

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



Data for the SAM

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

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

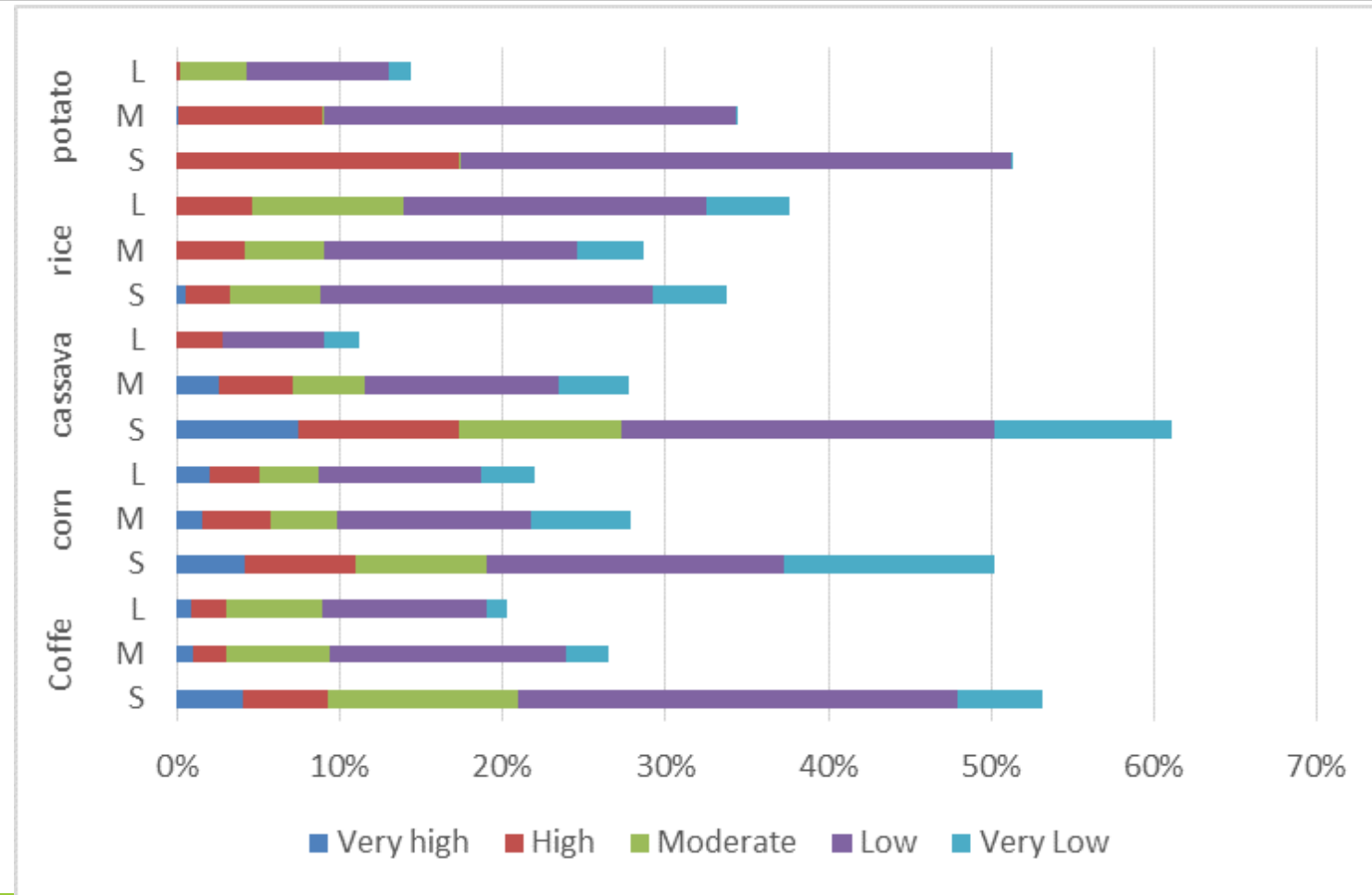
Structure of the agricultural sector

- 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).

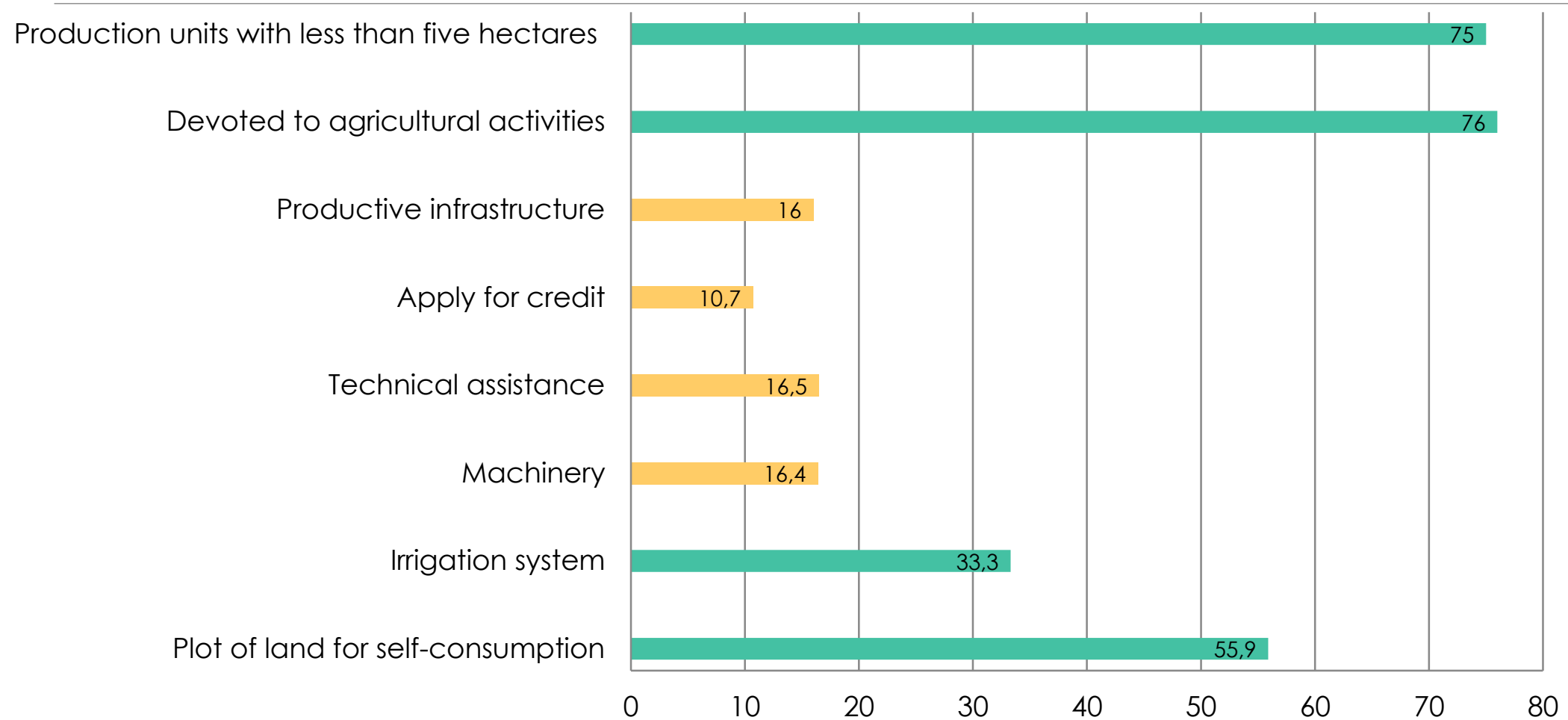
Share of Value Added for Crops by Conflict and Size



Source: With data of the agricultural census, 2014

Descriptive statistics

Some characteristics of agricultural production units



Source: With data of the agricultural census, 2014

CGE model

PEP1-1 standard model with the following extensions:

- Extended production function by considering fertilizers as substitutes for land in the production of crops.
- 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
- Capital and land are assumed fixed and specific for each sector.
- Labor is assumed perfectly mobile between sectors.

Simulated Scenario

Point 1 - Comprehensive Rural Reform
Point 4 - Illicit Crop Substitution Program

Shock	Description
TFP + TRO + SubCap + G	More technical assistance, construction of irrigation systems and tertiary roads → TFP increases by 4%.
	Subsidy on capital 5.8% + Subsidy to labor employed 12.5% (Fedesarrollo, 2017)
	Rise of G by 1.7% (Fedesarrollo, 2017)

Simulations:

Shocks were introduced in the following equations and parameters:

- Scale parameter φ_j^{VA} in the CES value added equation $VA_j = \varphi_j^{VA} \left(\sum_{l \in L} \delta_{l,j}^L \cdot LD_{l,j}^{-\rho_j^{VA}} + \delta_j^{KTFERT} \cdot KTFERT_j^{-\rho_j^{VA}} \right)^{\frac{-1}{\rho_j^{VA}}}$
- Tax rate on type I worker compensation in industry j (tti_w), in the equation that determines government's revenue from payroll taxes on type I labor in industry j: $TIW_{l,j} = ttiw_{l,j} W_l wdist_{l,j} LD_{l,j}$
- Tax rate on the production of industry j (t_{tip}), of equation: $TIP_j = ttip_j PP_j XST_j$

Alternatives to finance $\uparrow G$

$\uparrow$ Direct tax rate on urban and rural households (Direct).

$\uparrow$ Direct tax rate on urban households only (Direct-urban).

$\uparrow$ Indirect tax on commodities (Indirect).

$\uparrow$ Tax rate on the financial sector (Tax-financ)

$\uparrow$ Tax rate on the mining sector (Tax-min)

Impact on macroeconomic indicators

<i>Variable</i>	<i>Benchmark^a</i>	<i>Tax- Min*</i>	<i>Tax- financ*</i>	<i>Direct*</i>	<i>Indirect*</i>	<i>Direct- urban*</i>
Urban-Household consumption	422.84	-0.18	-0.12	-0.07	-0.49	-0.20
Rural-Household consumption	40.76	0.37	1.12	-0.40	0.45	0.93
GDP at market prices	757.07	0.12	-0.08	0.17	-0.05	0.16

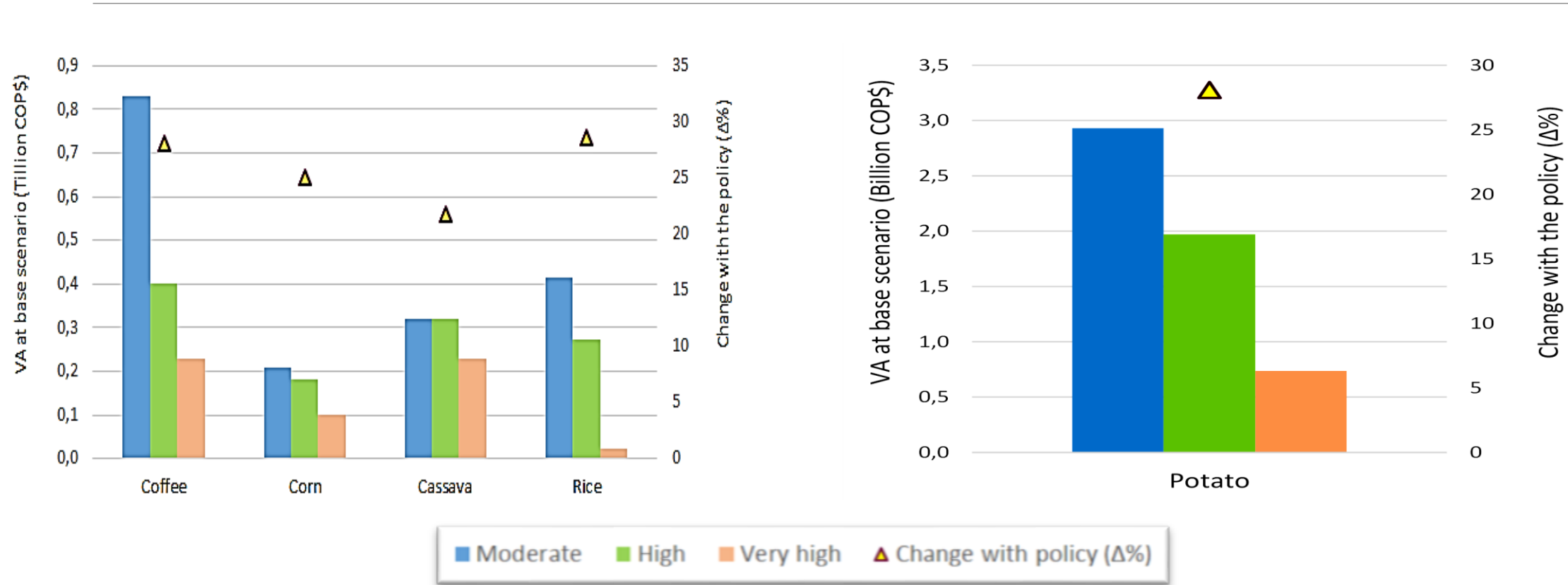
^a Trillion Colombian pesos

* % change w.r.t. base scenario

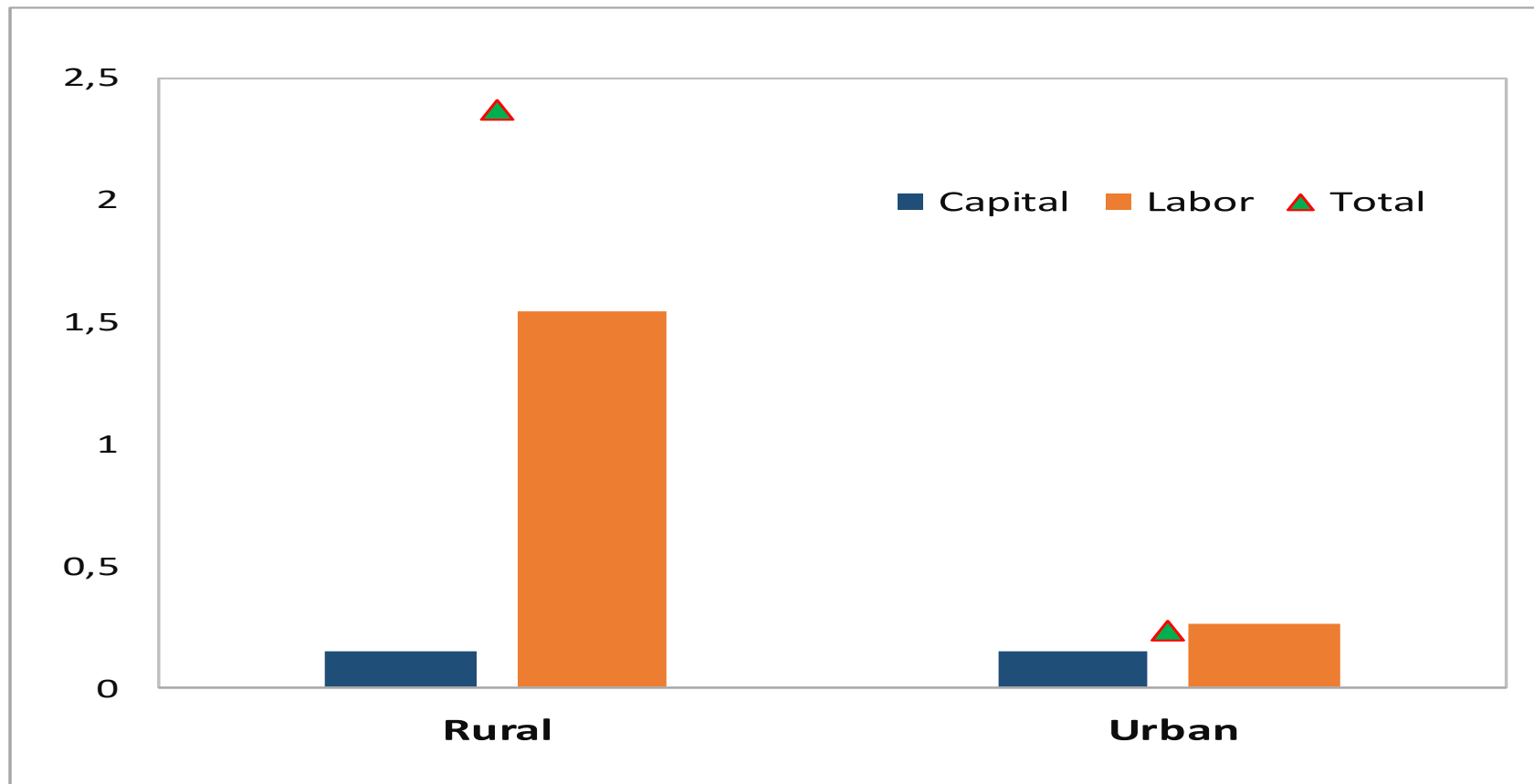
% changes in disposable income of households under different government's financing options.

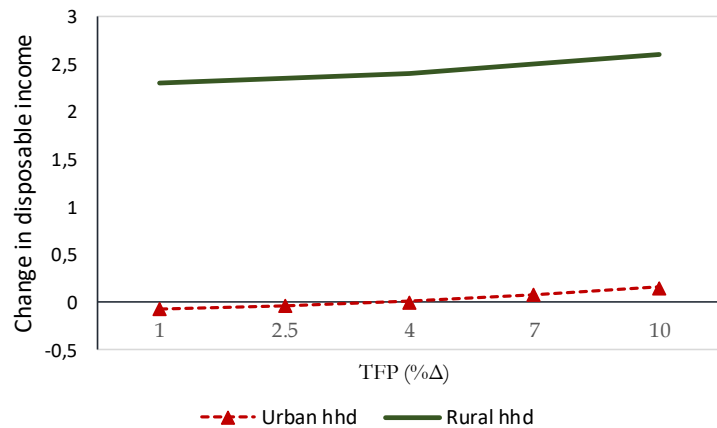
	Tax-Min	Tax-financ	Direct	Indirect	Direct-Urban
Households –rural	1.12	2,40	-0.79	1.97	2.70
Households -urban	-0.01	-0.002	0.19	0.26	0.05
Impact on rural-urban gap					

Change in the value added of industries that receive the shock

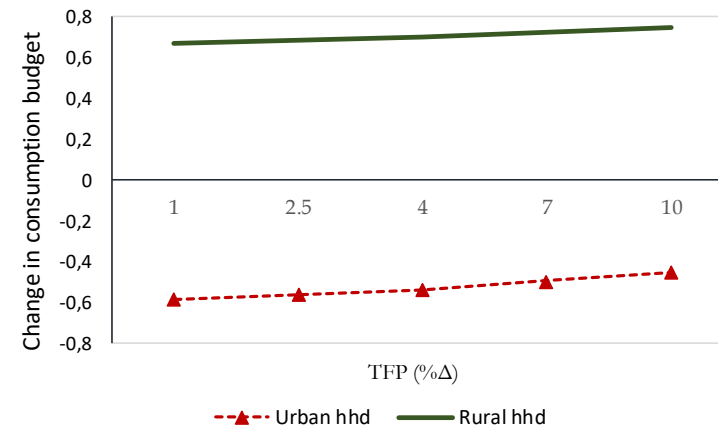


Changes in Income of households (%)

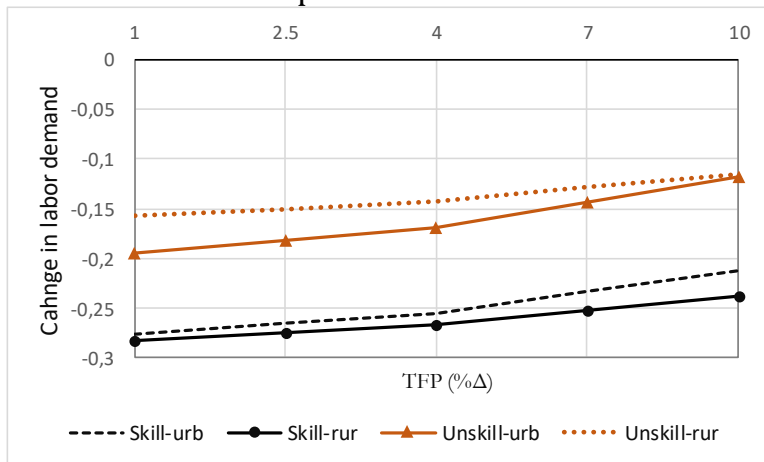




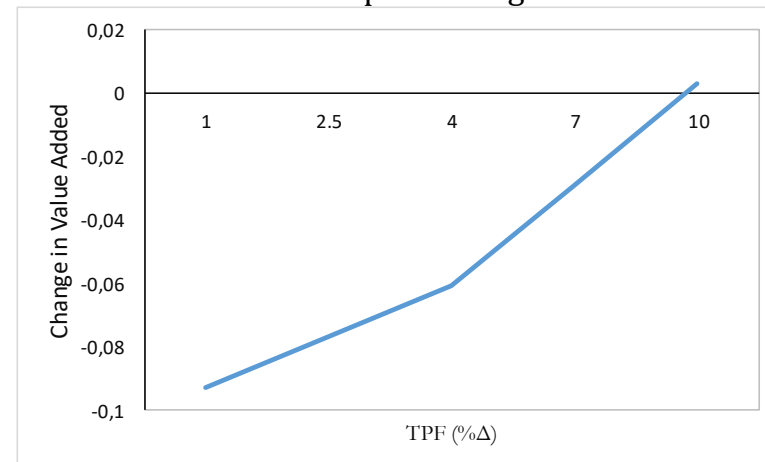
Disposable Income



Consumption Budget



Labor Demand



Value Added

Sensitivity Analysis for TFP Changes

What is the effect of the policy on variables at the aggregate level due to possible changes in TPF?

Concluding Remarks

- The policy that was analyzed is effective in the goals it pursues. The package of activities proposed for it might have a positive impact on the agricultural production in the target zones; i.e., the municipalities that had been intensely affected by the armed conflict.
- The benefits of this set of policies may come at a cost.
 - The production in other sectors such as other industries and other primary goods may fall.
 - Depending on the mechanism to finance the implementation of the policy, rural income may even fall.

Key messages

- It's essential that the way in which the policies in the peace agreement are funded is given careful consideration. The results of this study show that **increasing the direct tax on the financial sector would reduce income inequality between rural and urban zones.**
- The opportunity cost of the policy, can be mitigated if the effect on the productivity of factors introduced by this policy is stronger.
 - Provision of public goods that effectively increase productivity in the zones that are the target of the policy:
 - Infrastructure such as tertiary roads and irrigation systems.
 - The quality of technical assistance and sources of credit may be also key in these efforts.

Acknowledgement

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Thank you!