Impact of the Russia-Ukraine War on two African economies – Egypt and Kenya: a gendered macro-micro modelling assessment

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Abstract

The trade distortions caused by the Russia-Ukraine War have created a crisis that have impacted women more than men, particularly in countries in the Global South. This paper presents a macroeconomic model-based assessment of the economic impacts of the Russia-Ukraine War. Using gendered Computable General Equilibrium (CGE) models combined with micro-econometric models, we find that the war-induced price shocks are country-specific, and that women's economic situation drives the impacts of these shocks. Simulating different mitigation policies shows that these policies could help improve the situation of poverty during crises. However, the policies have different impacts on the economy. Given limited fiscal space to fund mitigation policies policymakers are challenged to carefully design mitigation policies that can protect the vulnerable and at the same time support the growth of the economy. The results provided in this macro-micro modelling assessment can support the discussion of policy decision-making by considering women as a vulnerable group.

JEL: C5; C68; F51; J16; O11; O55; O57; F1.

Keywords: Russia-Ukraine War, trade disruption, gender, poverty

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1 Introduction

The Russia-Ukraine War (RUW)[1] caused a new economic shock by trade disruption for world food, fertiliser and energy markets (Arndt et al., 2022). Starting in early 2022, it followed the COVID-19 pandemic and the economic crisis from 2020 to 2021, which already hampered economic growth in many developing countries. Countries of the Global South and their inhabitants are expected to be most impacted by increasing prices and reduced supply of food, fertiliser and energy. Among people in developing countries, women are more sensitive to these impacts than men (UN Women, 2022a). Indeed, the impacts of crises are never gender-neutral and mostly to the disadvantage of women (Binci, 2014). While the problems are similar in different countries, the specific expression and, thus, the specific impact on women depend on their economic situation in these countries. Thus, comparing the impacts of the RUW on women in different countries can support understanding and the design of specific counteractive policies.

In many countries in the Global South, women have smaller resilience capacities to cope with the negative impacts of economic shocks of unequal access to productive resources such as land or other assets (Deressa and Hassan, 2009; Eastin, 2018; Mehar et al., 2016; Mersha and Van Laerhoven, 2016; Terry, 2009). Many women face significant gender gaps in salary (Doss et al., 2018, 2015; Doss, 2018; SOFA Team and Doss, 2011) and work in sectors sensitive to economic changes (e.g., agriculture, tourism). Furthermore, women are responsible actors for domestic work, which reduces the time they have available for economic opportunities (Elson, 1999; Fontana and Van Der Meulen Rodgers, 2005). The burdens of unpaid care and domestic work often force women to withdraw from the labour market (Azcona et al., 2020; OECD, 2020a). While facing economic disadvantages compared to men, women are essential for the economic development in the Global South. Women work in key economic sectors (e.g. tourism) or food supply (e.g. agriculture) (Awokuse and Xie, 2015; Khan et al., 2020; SOFA Team and Doss, 2011). Furthermore, women work in the care sectors (health, education, and other care), which contribute to human capacity development of both boys and girls, and thus to economic growth in the future. In Africa, the global trade shocks affect women in their triple economic roles as workers, business owners, and consumers (Korinek et al., 2021). The country-specific impacts of economic shocks on men and women depend on the vulnerabilities of urban and rural households and the gender-specific vulnerability to poverty and hunger (Deng et al., 2022). For example, women's vulnerability is determined by various factors, such as the intrahousehold bargaining power, position in small-scale farming and particularly by the access to education, jobs, and financial resources (Papadavid, 2023).

In this study, we investigate the impacts of the RUW-caused trade shocks and mitigation policies on women's welfare in two African countries that are particularly vulnerable to the RUW trade

[1] In this study we use the term Russia-Ukraine War (RUW) to refer to Russian Invasion of Ukraine starting in February in 2022 and still ongoing. The Russian Invasion of Ukraine also is often referred to as Russian war on Ukraine (RWU) or Russian aggression on Ukraine (RAU).

shocks: Egypt and Kenya. Both countries differ in their dependence on impacted trade. While Egypt depends on wheat imports, Kenya depends on the import of oil and fertilisers.

Women's labour market behavior in Egypt and Kenya reflects contrasting structural and cultural realities. In Egypt, female labour force participation is very low (21.9%) despite high education levels (Assaad et al., 2020; World Bank, 2023), with women concentrated in public sector or informal unpaid roles, constrained by patriarchal norms, hiring discrimination, and wage gaps (Biltagy, 2019; Omran and Bilan, 2022). In Kenya, although participation is higher (49.4%), women are concentrated in vulnerable, low-paying agricultural jobs, often engage in two jobs (Wanjala and Were, 2009; Kabubo-Mariara, 2006), and face large wage disparities and time poverty (UN Women, 2023; KNBS, 2023a).

Some recent evidence has documented the wide-ranging economic consequences of the RUW on Egypt and Kenya, among others, without a clear focus on its gendered effects. Survey-based studies in Africa highlight gendered vulnerabilities: for example, in Egypt, rising food insecurity has disproportionately affected female-headed households (Zaki, 2024), while in Kenya, higher fuel costs have shifted households away from kerosene, increasing women's unpaid time burdens (Onyango et al., 2024). At the same time, model-based analyses have focused on aggregate macroeconomic outcomes—using input-output frameworks (Deng et al., 2022), econometric and gravity models (Liadze et al., 2023; Sedrakyan, 2022), or CGE simulations (Mahlstein et al., 2022; Rose et al., 2023). These studies demonstrate substantial impacts on trade, welfare, and poverty, particularly in food- and fuel-import-dependent African economies (Chepeliev et al., 2022; Arndt et al., 2023). Yet they rarely integrate gender explicitly, and when they do, the analysis is typically limited to descriptive vulnerabilities rather than modelling labor market segmentation or household welfare transmission channels. We contribute to this literature by combining gender-disaggregated CGE models with behavioural microsimulation for two structurally distinct African economies. This allows us to capture how RUW-induced price shocks propagate through production, trade, and gendered labor markets into household-level poverty, and to evaluate both broad-based and targeted mitigation policies.

In this research, we analyse the economic impacts of the RUW and of potential mitigation measures in Egypt and Kenya from a macro- and microeconomic perspective to inform policy decision-making. Firstly, we simulate the economic impacts of the RUW channelled by the markets of energy, fertiliser, and food by using a macro-micro-modelling framework. Secondly, we analyse the impact of counteracting mitigation policies. Thirdly, by using a CGE model, we analyse the macroeconomic gendered impacts. Finally, by linking a top-down behavioural micro-econometric model, we analyse the microeconomic impacts on poverty and inequality. Our results reveal that women's economic roles significantly shape the impacts of war-induced price shocks. General policy measures, such as Egypt's food subsidy or Kenya's fuel subsidy, are less effective at supporting women compared to targeted interventions (e.g., direct transfers to vulnerable households and subsidies for hiring female workers).

2 Gendered Economic Context in Egypt and Kenya

While both countries expect to face negative economic impacts caused by the RUW, the initial economic situation is different, particularly with respect to gendered economic. Considering these gendered economic settings is essential for further analysis (Fontana, 2020)

2.1 Gender and Economic Structure

Table 1 presents selected macroeconomic indicators oriented to Fontana (2020) for both countries. While both are ranked as lower-middle income countries, Egypt has – with 3020 USD/head – a significantly higher average GDP than Kenya - with 1817 USD/head. The economies in both countries have developed in recent years based on different economic sectors: mainly petrol in Egypt and agriculture in Kenya. In both countries policies to empower women have been set in place and women's economic empowerment is in both countries an important economic and social objective. In Egypt, the female labour force participation is less than 20%, which is extremely low; for Kenya, female labour force participation stands at nearly 50% of women of working age.

In Egypt, formally women work mainly in services (particularly in the public administration, education, and health system). Policy measures target the improvement of female education and involvement in political functions and decision-making. These measures have increased the education level of women. However, Egypt experiences the "MENA paradox, where women's rising educational attainment has not translated into equivalent employment opportunities. Despite high tertiary enrollment, female labour force participation remains among the lowest globally. This gap reflects the contraction of public sector jobs that traditionally absorbed educated women, limited private sector demand, and persistent social norms that constrain women's work outside the home (Krafft and Assad, 2022). Thus, the share of formally employed women is small, while the share of women working informally and often as unpaid family workers (e.g., in care work) is relatively high.

Irrespective of their education levels, women are less employed in Egypt than in Kenya. Particularly, women with only basic education are less employed in Egypt than in Kenya. The share of women (and men) working in the agricultural sector in Kenya's agricultural-based economy is much higher than in Egypt. Thus, more workers are employed in vulnerable jobs than in Egypt. In Kenya, women work mainly in the agricultural sector, where they face different gender gaps in terms of time use and wage.

Table 1: Macro-economic indicators for recent years (i.e., 2019 for most of the indicators)

	EGY male	fema	both	KEN male	fema	both
GDP per head (UDS/head)			3020			1817
Total unemployment rate (% of male/female labour force)	7.2	22.2		2.5	2.8	
Labour force participation rate (% of male/female population)	70.9	21.9		77.3	72.1	
Female workers of total labour force (% of total labour force)		18.6			49.4	
Workers in agriculture (% of total labour force)	16.9	6.6	23.5	24.6	29.9	54.5
Workers in industry (% of total labour force)	26.9	1.3	28.2	6.3	1.0	7.3
Workers in services (% of total labour force)	37.6	10.7	48.3	19.7	18.5	38.3
Family workers (% of total labour force)	3.1	4.5	7.6	3.0	4.4	7.4
Employed in vulnerable jobs (% of total labour force)	14.3	6.1	20.4	21.9	29.5	51.4
Workers in agriculture (% of labour force in sector)	71.9	28.1		45.1	54.9	
Workers in industry (% of labour force in sector)	95.4	4.6		86.4	13.6	
Workers in services (% of labour force in sector)	77.9	22.1		51.6	48.4	
Family workers (% of family workers)	40.8	59.2		40.8	59.2	
Employed in vulnerable jobs (% of workers in vulnerable jobs)	70.1	29.9		42.6	57.4	
Workers in agriculture (% of male/female employment)	20.8	35.5		48.6	60.5	
Workers in industry (% of male/female employment)	33.0	7.0		12.4	2.0	
Workers in services (% of male/female employment)	46.2	57.5		39.0	37.5	
Family workers (% of male/female employment)	3.8	24.1		6.0	8.9	
Employed in vulnerable jobs (% of male/female employment)	17.6	32.9		43.2	59.7	
Female workers with advanced education (% of female working-age population with advanced education)		43.8			82.3	
Female workers with intermediate education (% of female working-age population with intermediate education)		14.4			64.8	
Female workers with basic education (% of female working-age population with basic education)		4.6			65.8	

Source: World Bank (2023): World Bank Indicators, selected years

2.2 Gendered socio-economic background

Social and masculine norms and perceptions determine how women are positioned in society. The norms and, thus women's position, are strongly determined by religious beliefs. In Egypt, the Islamic religious norms define patriarchal gender roles. In Kenya, Christian religious norms allow a more emancipated role for women (KNBS, 2023a).

In Egypt, women prefer employed jobs in the public sector which offers good working conditions and formal employment. Many jobs in the private sector are avoided because the working conditions are inadequate, and gendered differences are not considered. The not preferred jobs are associated with a higher risk of physical damage and sexual harassment. Employers often do not find women's skills match their demands and in hiring processes, women are still discriminated. Furthermore, after marriage and giving birth, working women or mothers are socially less accepted than women and mothers who are fully dedicated to home production or care work.

In Kenya, social norms allow women to work and female decision-making and empowerment are more established. However, women are mainly represented in vulnerable jobs in agriculture and in

informal house and care services. Women's economic empowerment is limited because of relatively big gender gaps between men and women creating higher salaries for men and higher time poverty for women. According to the adjusted gender wage gap accounts male's salaries at nearly 10% higher for men than for women. The wage gaps depend on sectors, occupations and skills and reach from approximately 14% (in trade) to 38% (in education) (UN Women, 2023). In terms of time use, on average women spend approximately 5 hours per day on unpaid work, while men spend only about 1 hour (KNBS, 2023a).

3 Methodology

3.1 Macro-economic (CGE) model

3.1.1 The macro-model

To simulate the gendered impacts of the RUW trade shocks we develop two country specific Computable General Equilibrium (CGE) models with gendered labour markets. Both CGE models are based on the PEP 1-1 standard model (Decaluwé et al., 2013). However, to represent the specificities of each country, we changed many hypotheses from the standard model. Each model is consistent with the SAM of its country.

For each country, production is defined by a multi-level nested structure. In consistency with the SAMs, in Egypt, there are 10 activities while in Kenya we have 42. At the top level, output is a Leontief type of function between value added and intermediate consumption. At the second level, value added is defined in terms of a CES function between composite labour and composite capital. In Egypt, at the third level, composite labour is disaggregated between rural and urban labour. At the fourth labour, each type of labour is further disaggregated between skilled labour and unskilled labour. Skilled labour is further disaggregated by skill into low- and skilled labour. Low skilled workers is a CES type of function between workers illiterate and workers who have not finished the primary level of education. Each type of education category is then split into male and female. Skilled workers are split between workers who have finished the tertiary level of education and workers who have finished the secondary level of education. Here as well, each type of worker category is further split by gender.

In Kenya, following the SAM and the structure of the economy (see Appendix Section **Fehler! Verweisquelle konnte nicht gefunden werden.**), we assume that the composition of the value added is different whether we refer to agricultural activities or non-agricultural activities. For agricultural activities, the composite labour demand is a CES function between wage-workers and self-employed. Each type of workers is then further disaggregated into male and female workers. For non-agricultural activities, the composite labour demand is a CES function between the three broad types of workers: skilled, semi-skilled and unskilled, each one is then further disaggregated into male and female workers. The composition of labour in each sector is very different, showing sectors which are labour-intensive such as the rice sector in Kenya and education in Egypt. As well, sectors such as health and education

are particularly female-intensive in Egypt, while in Kenya, women are as well present in the trade sector. Since, we represent only formally employed workers in the CGE model, it is important to also keep in mind that in Egypt, most of the women are working informally and as family workers, while in Kenya the share of formally working women is much higher.

In each country, there are ten types of households: households are split according to their quintile of income and location, either rural or urban. Their income is derived from three sources: male and female labour, capital and transfers from other institutions (remittances, dividends, government transfers). The structure of income for the different households is very different. All households use their income to consume, pay direct taxes, pay transfers to other institutions and save. Household behaviour on the consumption side is modelled as a Linear Expenditure System.

Firm's[2] income comes from capital income and transfers from the government and the rest of the world. All firms pay dividends to other agents, pay direct taxes and save. Government income is composed of transfers income, and direct and indirect taxes. It spends most of its income on consumption (administration, education…), transfers to other institutions and saves the rest. To represent the links between each country and the rest of the world, we follow the traditional hypothesis assuming that both countries are small countries and consequently world prices are exogenous. However, to export more, each country producers must be more competitive on the international market.

3.1.2 Closure rules

In terms of closure rules, we assume that the nominal exchange rate is the numeraire of the model. Then, as mentioned above, both countries are considered small open economies and therefore world prices are taken as given. The current account balance is assumed to be exogenous. This assumption is important to keep in mind when analysing the results: indeed, it is not possible to borrow from the rest of the world, and any reduction in imports necessarily leads to a reduction in exports. having an endogenous current account balance would not make much sense in our modelling. in fact, this would allow the country to have its policy financed by the rest of the world without ever having to repay it. For the two countries studied, this is not credible.

Government's savings is endogenous while government spending in goods and services is fixed. In this version of the model, there is no mechanism which would force this or that agent to have a certain level of savings to maintain a constant level of investment (closure like Kaldor for example). Thus, in our model, if the government's income decreases, ceteris paribus, this will lead to a decrease in its savings, which will have an impact on the total investment budget. Capital and land are sector specific while labour is mobile across sectors. In Kenya, agricultural labour is mobile across agricultural sectors only.

[2] In the CGE-model we represent firms as aggregated agent. We do not represent home-based small businesses, which is are firms types typical for women in African countries. For Kenya we represent self-employment in agriculture as a labour type.

Given the specificities of the country, we cannot keep the full employment capacity. Indeed, in Egypt, the labour force participation is very low, especially for women. Consequently, labour supply cannot be fixed. In Egypt, we assume that households devote their time between marketed activities and other activities. By doing so, it allows households to increase their labour supply if job opportunities were to be created. However, in certain circumstances Egyptian women might not be able to apply for job opportunities because of domestic burdens (e.g., childcare). This, situation we cannot represent in the CGE model. Likewise, in the event of a reduction in economic activity, the paid work time perceived by households would decrease.

In Kenya, the situation on the labour market is different. Participation in the labour market is much higher than in Egypt. In addition, there is unemployment among skilled workers, particularly women. Consequently, we decided to model the labour market differently from the modelling used for Egypt. For non-agricultural sectors, we assume that there is unemployment for skilled and middle-skilled workers. Medium-skilled workers who would not find employment as medium-skilled workers will fall back onto the market for unskilled workers. The idea behind this modelling is to represent the fact that workers are primarily looking to find a job and that they are ready to find a job less qualified than their initial qualification level. To model unemployment, we follow the Blanchflower and Oswald (1995) specification. According to these authors, there is an empirical relation between the unemployment rate and wage rates. Specifically, they found that a 10% increase in the unemployment rate leads to a 1% decrease in wages.

3.2 Micro-economic model

3.2.1 Context and data

Kenya's labour market is marked by significant gender disparities, particularly in labour force participation and wage inequality. Women are underrepresented in formal employment and are predominantly found in the informal sector - in secondary activities - where they face low wages and limited opportunities for advancement. Occupational segregation is a persistent issue, with women concentrated in lower-paying jobs. Cultural norms and limited access to education further exacerbate these disparities (Kabubo-Mariara, 2006; Wanjala & Were, 2009).

In Egypt, female labour force participation is even lower, constrained by deep-rooted cultural norms that prioritise women's roles at home. Gender wage gaps are substantial, particularly in the private sector, and occupational segregation further limits women's career progression. The challenges in Egypt are compounded by societal expectations that reinforce the male breadwinner model, limiting women's access to quality jobs (Miyata & Yamada, 2016; Biltagy, 2019; Omran & Bilan, 2022).

3.2.2 Data on Egypt

The microsimulation builds on two data sources: the 2018 Labour Force survey, which also includes a module addressing food insecurity questions (OAMDI, 2021), and 2018's Household Survey

(OAMDI, 2023). While the first was informative of the labour market outcomes at the individual level, the second one provided information on household welfare indicators. Most importantly, the 2018 household survey provided a disaggregation of various sources of income (not available at the LFS) other than labour (self-employment, rental, property, transfers, etc) at the household level. However, given that both surveys do not sample the same households and that the bulk of our variables of interest were in the LFS, we took the latter as our main source and brought complementary variables from the household survey. To do so, we employed a matching algorithm that identified comparable households across surveys[3]. To assess the reliability of the matching procedure, we calculated the poverty rate for 2018 based on the official average poverty line of 736 Egyptian pounds per month using the matched database. We find minor differences when comparing poverty and inequality indicators. Specifically, the matched data showed a poverty rate of 30%, whereas the official one reported 32.5%. Similarly, the matched data Gini coefficient was 0.307, while the official one reported 0.315.

3.2.3 Data on Kenya

We employed the Kenya Integrated Household Budget Survey (KIHBS) 2015-2016 (Kenya National Bureau of Statistics, 2018). It was designed to collect detailed data on household income, expenditure, and consumption patterns across the country. Most importantly, it includes a labour force module with information that we combine with the household level data in order to model the relationship between individual labour market outcomes and household welfare. The survey offers critical insights into the socioeconomic conditions of households, covering a wide range of variables including demographic characteristics, housing conditions, education, health, labour force participation, and access to services.

3.2.4 Microeconometric model: Price channels

In Egypt, the macro model offers highly disaggregated price shocks on about 70 goods and services that we mapped into the available household expenditure data. Each household has a unique expenditure share across these four categories, meaning that price shocks will impact households differently, depending on their individual consumption basket diversification.[4] The i-th household specific consumer price index is defined from the price shocks over the *j*-items noted P_j^0 (before) and P_j^1 (after the shock). The i-th household expenditure share on the j-th item is noted s_{ji}:

$$CPI_i^1 = \prod_j^J \left(\frac{P_j^1}{P_j^0}\right)^{s_{ji}}$$

[3] We employ a nearest neighborhood hot deck approach available in R (library StatMatch). The matching was performed at the household level, based on a variety of demographic indicators including the distribution of characteristics within the household.

[4] Because of their highly regulated price system, price variation is limited, which discourages the estimation of expenditure lineal system that endogenize the expenditure shares as a function of commodity prices.

Similary, in Kenya, the macro model offers disaggregated price shocks on more than 45 goods and services that we mapped into the household expenditure data. The household-specific IPC weights the 45 goods and services, following the same definition as that of Egypt.

3.2.5 Microeconometric model: Labour market channels

3.2.5.1 Egypt

In Egypt, the model assumes that wage workers' mobility exists between ten economic sectors and unemployment. Beyond this sector-based mobility, labour markets are characterized by segmentation, suggesting limited to no mobility across specific cells or clusters. This segmentation is delineated by barriers such as workers' location (urban versus rural), skill levels required for the job (across four distinct tiers), and gender. In line with Cockburn et al. (2017), we recognize significant heterogeneity among wage earners, employers, and the self-employed, and posit that there is no mobility between these groups.

Participation in a given sector is modelled based on a comprehensive set of demographic indicators and household characteristics. The female labour force, who are mainly employed in agriculture, education, and public administration, consists mainly of qualified women (Krafft and Assaad, 2022). In Egypt, women's labour market participation seems to be fundamentally determined by cultural norms, which we consider as unobservables, and that should be controlled for by our econometric specification (Miyata and Yamada, 2016; Biltagy, 2019; Omran and Bilan, 2022). Hence, wages in a specific sector are censored and are modelled by a Heckman specification where the i-th worker wage at sector j-th is defined by:

$$\ln w_{ij} = x_i' \beta_j^g + u_{ij}$$

x_i' represents a set of controls which includes age, age squared, years of education, a regional indicator (urban or rural), and the household's head level of education. This is a gender specific equation, so β_j^g is a gender specific vector parameter. The sector participation equation (probit) includes a set of exclusion restrictions (z_i') i.e. variables other than x_i':

$$\Pr[J = j]_i = \Phi(x_i' \gamma_j^g + z_i' \theta_j^g)$$

Among the exclusion restrictions set within z, we have number of children, number of members older than 65 years, share of female members, as they may relate to the availability and necessity of potential caregivers within the household, which in turn may ease labour market participation. The female specific θ_j^g is crucial, to capture the nuances behind female's labour participation vis-à-vis males in our simulation.

The macroeconomic model introduces shocks that alter the demand for labour at every j-th sector, which in turn leads to hirings or dismissals across various sectors. The behavioural

microsimulation model is then used to determine which individuals are likely to be hired or dismissed, based on their estimated probability of labour force participation. Specifically, if the simulated demand for labour in a given sector exceeds the employment levels in the baseline scenario, the microsimulation identifies the workers most likely to be hired by selecting those with the highest participation probabilities $\Pr[J = j]_i$. Conversely, if the demand decreases, the model identifies those who are most likely to be dismissed based on the same selection probabilities. Similarly, the counterfactual labour income is simulated from the estimated wage equations at every j-th sector and the unobservables' (u_{ij}) under the normality assumption (Bourguignon and Spadaro, 2006). Once the simulated source of income at the individual level is calculated, these are aggregated at the household level, and a total simulated household income is obtained by deflating by the household-specific CPI_i^1 after the shock.

The macro model also provides a simulation of mitigation policies, such as transfers to women. This type of policy is simulated by increasing transfers to specific vulnerable populations i.e. the increase is applied according to the targeting criteria of the intended mitigation policy, such as women's residency (in rural or urban regions) and quintile of household income.

3.2.5.2 Kenya

In Kenya, women are underrepresented in the formal labour market, with many employed in informal sectors like agriculture and low-skilled services. Agriculture plays a crucial role in this dynamic, as many women in rural areas rely on agricultural work as their primary job while taking on secondary jobs, also in agriculture, to supplement their income (Wanjala & Were, 2009). Our microsimulation's main challenge consists of modeling secondary jobs in agriculture, where the most vulnerable women are located. The ideal reference model for this type of labor market is a two-levels nested one. In the first level the individual decides to engage in a primary activity, which will lead to labour income w1 with probability p1. In the second level, the individual may consider engaging in a secondary activity with income w2 and probability p2, given it is already engaged in a primary job. This may be implemented through a nested logit or an equivalent multinomial probit that does not impose the independence of irrelevant alternatives assumption (IIA) (Wen, 2009). As argued by the literature, the estimation of these models rapidly becomes challenging as the number of alternatives increase (Liesenfeld and Richard, 2010; Natarajan et al. 2000). Moreover, its probabilistic simulation would require a sophisticated procedure beyond the scope of this paper. In our case, we should estimate a choice model with too many alternative segments even under a simple specification that considers 5 alternative occupational choices:

1. Non-agriculture employment

Agriculture:

2. Employed in small-scale agriculture

3. Self-employed in small-scale agriculture

4. Employed in pastoralist activities

5. Self-employed in pastoralist activities

Given the 5 alternative job categories for the primary activity and 4 agricultural categories for the secondary activity, the equivalent multinomial probit (without the IIA assumption) should consider all the mutually exclusive combinations of such activities, resulting in 20 theoretical alternatives. The econometric model and its corresponding microsimulation would be intractable. We opt for a parsimonious approach and specify a Heckman model for the occupational choices (for $j = 0,1,\dots,5$), while including unemployment as an additional status ($j = 0$). This is applied to estimate main and secondary job earnings denoted w_{ij} and $\widetilde{w}_{ij}$ respectively:

Main job: $\ln w_{ij} = x_i'\beta_j + e_{ij}$ with probability P_{ij}

Secondary job: $\ln \widetilde{w}_{ij} = x_i'\tilde{\beta}_j + \tilde{e}_{ij}$ with probability $\widetilde{P_{ij}}$

The probabilities P_{ij} and $\widetilde{P_{ij}}$ are standard selection probabilities based on a Heckman specification, incorporating their respective exclusion restrictions. In our case, we chose the civil status, which, in contrast to the number of children in the household, did not exhibit frequent missing values that would lead to a loss in observations among the most vulnerable subpopulations (rural, low-skilled, women) that we aim to model. The set of control variables includes the gender, level of skill, age, age-squared a rural location dummy and the level of skill of household head or its couple, in case it's missing.

The microsimulation algorithm is implemented in two steps:

i. The macro model labour demand shocks (at specific labour market segments) are applied to the main jobs first. Workers are simulated to be dismissed or hired based on their selection probabilities ranking within the labour market segment. Their counterfactual simulated wages are obtained following the normality assumption on e_{ij}.

ii. Once the microsimulation has fulfilled the macro model specification on the main jobs, a similar procedure is applied on the secondary jobs. This only applies to workers conditionally having a main job in (i). Their counterfactual simulated wages are obtained following the normality assumption on $\tilde{e}_{ij}$.

Similarly to Egypt, transfers from the mitigation policies are applied as a flat rate within the ten segments defined by wealth quintiles for urban (5) and rural (5) households. After simulating nominal individual labour earnings and transfers, the household-specific price index allows the calculation of real household per capita income denoted $\hat{y}_h$.

4 Simulations and results

4.1 Macro-results trade shock scenarios: Egypt and Kenya

Using the CGE model, we simulate the increase in world prices for crude oil (+ 41%), fertiliser (+ 27%), maize (+20%), wheat (+52%), and vegetable oil (+7%). These price increases are observed between March 2023 and March 2022 (World Bank, 2023). Once the model is run, the new prices and volumes are transmitted to the micro module (top-down) to estimate changes in poverty distribution and inequality.

The increase in world prices impacts the economy of the two countries through two main channels. On the one hand, imports of these products become more expensive and, depending on the significant internal dependency, lead to higher prices for consumers and industries that use them as input. For instance, as pointed out previously, in Egypt, a high proportion of wheat and maize are imported, while in Kenya, petrol and fertilisers represent a high share of imports, and they are mainly bought as input by industries and farms. On the other hand, if the country exports any of these products, then an increase in the world price will tend to induce local producers to turn their production to the external market. In our cases here, Egypt could benefit from the increase in prices of oil and fertilisers, while Kenya could benefit from the increase in agricultural commodities.

Table 2: Macroeconomic impacts (in %)

	EGY	KEN
Imports	**0.62**	**-5.88**
GDP real	**-0.01**	**-0.13**
Total labour demand	**-0.01**	**-0.33**
Total labour demand male	**-0.02**	**-0.41**
Total labour demand female	**0.02**	**0.02**
Consumer price index	**3.39**	**-5.92**
Total investment (nominal)	**3.56**	**-10.82**
Export demand	**0.05**	**2.81**
Nominal household income	**3.00**	**-8.18**
Total real household consumption	**-0.37**	**-2.41**

The large increase in the world price of the five commodities has a dramatic impact on the Kenyan economy and, to a lesser extent, on the Egyptian economy (Table 2: Macroeconomic impacts (in %)Table 2). First, given the high dependency of Kenya on imported oil, there is an increase in production costs for all the different activities, as well as for households. Firms and businesses reduce their production and lay off workers. The labour demand decreases more in Kenya than in Egypt, and in Kenya, the overall labour demand is decreasing much more for men than for women. Since the proportion of women in the Egyptian labour force is very small, the absolute changes in female labour in Egypt are very small. For both countries, there is a decrease in household's real consumption, with Kenyan households being hit harder. Overall, real GDP decreases for both countries.

The sectoral analysis will help us understand why the results are so different between the two countries (see Table 13 in Annex). As mentioned earlier, for both countries, the rise in oil prices is

increasing the costs of production for the different activities. The increase in production costs is particularly important for the transport sector and the other industries in Egypt. Consequently, these sectors face a decrease in their production. On the other side, Egypt, as it is a net oil and fertiliser exporter, is benefitting from the rise in world prices, leading to an increase in all the prices in the economy. In the sectors involved in the production of fertilisers and petroleum, we observe an increase in production. For these specific sectors, the rental rate of capital increases.

These impacts on the production of the sectors have impacts on the labour demand in the specific sectors. At the macro level, for both countries, there is a decrease in the total labour demand. The decrease depends on how capital-intensive the sectors are in the corresponding countries. If we have a look at the results per type of worker, we can see that the labour demand for unskilled women would slightly increase, but the demand for skilled women would decrease (see Table 14 in Annex).

Skilled women in Egypt mainly work in the administrative sector. Given the rise in prices and the fixed government budget, the public sector needs to reduce its production; hence, its labour demand and skilled women are the most affected, while male workers are less or not affected. In Kenya, skilled and semi-skilled workers face a drop in the labour demand. The semi-skilled workers who cannot find a job as semi-skilled try to find a job as unskilled workers, creating great downward pressure on the unskilled wage rate. Given the massive reduction of the wage rate, activities are hiring such types of workers, which suggests an increase in vulnerable (not good quality) employment.

Households' income is derived from wages, capital and land income and transfers they receive from other institutions. In Egypt, there is a rise in nominal wages and a slight decrease in the total labour demand, while capital income is increasing, as well as nominal transfers. In Kenya, there is a sharp decrease in wages, especially for unskilled workers, and a drop in the total labour demand. At the macro level, the impacts on households' real consumption are negligible for rural households in Egypt, where the decrease in labour demand in rural areas is less expressed than in urban regions (see and Table 13 and Table 14 in Annex). In Kenya, the decrease is general and a bit greater for rural households at the bottom of the distribution because their income is mainly based on agricultural production, for which production costs for fertiliser and energy have increased drastically (see Table 15 in Annex).

4.2 Micro-results trade shock scenario

4.2.1 Egypt

Table 3 shows our Foster-Greer-Thorbecke (FGT) estimates using Egypt's average official poverty line in 2018 (3.8 $US per day or 736 Egyptian pounds). As expected, we notice a worsening of all measured aspects of poverty from the baseline to the RUW simulation scenario. The rise across all three FGT indices indicates not only an increase in the number of poor people, but also in how far below the poverty line the average poor person is, as well as the severity of their poverty. The poverty gap increases from 0.295 to 0.324, implying a rise in poor individuals of about 10%. This resembles Ayaz

et al. (2023) microsimulation of the RUW effect on Pakistan, which found an 11% increase in the poverty headcount at the poverty line of 1.9 $us per day and 5.3% at a line of 3.2 $us per day. In terms of inequality, we found a slight increase of 0.015 (from 0.309 to 0.324) which is consistent with the macro model effects across income quintiles, whereby poorer households were the most affected.

Table 3: Egypt's poverty headcount, gap and severity at baseline and RUW simulation

	FGT (0)	FGT (1)	FGT (2)	Gini
Egypt				
Baseline	0.295	0.227	0.076	0.303
Simulation	0.324	0.271	0.114	0.318
Kenya				
Baseline	0.353	0.101	0.043	0.390
Simulation	0.395	0.131	0.066	0.419

Note: FGT (0) Headcount ratio. FGT (1) Average normalised poverty gap. FGT (2) Average squared normalised poverty gap.

Deepening the analysis reveals distinct patterns in how total household expenditure (representing the income growth rates) changes by gender, location, and skill level (Table 4). The growth rates highlight more severe reduced expenditures at the lower percentiles, particularly for the female and skilled populations, which is consistent with the higher exposure of female and skilled employment to the public sector due to the contraction of government expenditure.

Table 4: Relative change in total household expenditure (per capita in %)

		10th	15th	20th	25th	30th	Mean	Median
Egypt		-17.6	-14.0	-12.1	-10.7	-9.6	-2.8	-2.9
Gender	Male	-16.7	-13.3	-11.4	-10.1	-9.1	-2.6	-2.6
	Female	-18.5	-14.7	-12.8	-11.3	-10.2	-3.0	-3.2
Location	Rural	-18.0	-14.3	-12.2	-10.8	-9.6	-2.8	-2.6
	Urban	-17.5	-13.8	-12.0	-10.7	-9.7	-2.8	-2.4
Skill	Skilled	-18.7	-14.9	-13.0	-11.6	-10.6	-3.0	-3.0
	Unskilled	-15.3	-12.4	-10.6	-9.4	-8.4	-2.7	-2.7
Kenya		-27.6	-22.3	-19.1	-16.8	-15.2	-2.2	-5.2
Gender	Male	-25.6	-21.0	-18.0	-15.9	-14.3	-2.4	-4.9
	Female	-29.0	-23.5	-20.0	-17.6	-15.9	-2.1	-5.4
Location	Rural	-26.0	-21.8	-18.9	-16.8	-15.3	-2.6	-5.7
	Urban	-27.8	-21.6	-18.3	-15.8	-14.1	-1.9	-4.7
Skill	Skilled	-30.8	-23.9	-20.3	-18.0	-16.2	-6.6	-6.9
	Unskilled	-25.0	-20.8	-18.0	-16.1	-14.6	0.5	-5.0

Note: Author's calculations

4.2.2 Kenya

Our Foster-Greer-Thorbecke (FGT) estimates are based on Kenya's average official poverty line in 2015-16 (Table 3). The overall poverty lines for rural and urban areas are calculated in monthly adult equivalent terms by Kenya's statistical office for the rural and urban areas. As expected, all measured aspects of poverty worsen from the baseline to the RUW simulation scenario. The increase across all three FGT indices resembles Egypt's simulation effects on Ayaz et al. (2023). The poverty gap increases from 0.353 to 0.395, so a rise of about 11% in poor individuals. Inequality increases from 0.39 to 0.419, which is driven by the effects on poorer households mainly employed in agriculture. The effects are stronger in Kenya than in Egypt, reflecting Kenya's high vulnerability through its

agricultural sector, whereas Egypt is partly cushioned and may even benefit in some respects from the RUW shock.

Table 4 shows that the RUW shock reduces household expenditure most at the bottom of the distribution, with the poorest households losing over a quarter of their consumption. The female population is hit harder than males, reflecting their greater reliance on vulnerable agricultural and informal work. Although urban households were expected to face larger declines than rural households, given their higher dependence on imported food and energy, they are also less affected by shocks in agricultural activity. Finally, skilled households experience greater losses than unskilled, pointing to the sharp contraction of formal wage employment. Overall, the RUW shock amplifies existing inequalities, with the greatest burden on the poor, women and skilled workers.

4.3 Mitigation policy scenarios

To help their populations cope with this shock, both countries have implemented policies to support their economies. In Egypt, severely affected by rising food prices, the government has increased subsidies for food products (SubFood). In Kenya, the government has implemented a subsidy on petroleum products (SubOil).

In the following series of scenarios, we first implement the policy put in place in each country to help the economy. Next, we evaluate the impacts of two policies per country that are in favour of women. To the policies, we implement both: for all policy mitigation scenarios, we implement the shocks resulting from the RUW. In addition, we implement the country-specific policy measure. In this way, we simulate at the same time the impacts of RUW and the policies to counteract these impacts.

In Egypt, female labour force participation is particularly low, and women in rural areas are particularly vulnerable. First, we evaluate the effects of a wage subsidy policy for unskilled women in the agricultural sector (SubSal). Secondly, we evaluate the impact of a transfer policy for women living in rural areas, specifically women belonging to the first quintile (TransRur).

The amount allocated for each of the three policy scenarios is the same (food subsidy, wage subsidy and transfer to rural women) so that results can be compared.

In Kenya, in the first simulation, we evaluate the implementation of a subsidy for petroleum products as implemented by the government. Then, in order to reduce poverty for the greatest number of women in rural areas, we evaluate the effects of a transfer to rural households belonging to the first quintile to the extent that 99% of women belonging to this quintile are poor. In a second scenario, we evaluate the implementation of a transfer for women living in townships, which represents a new form of vulnerability for women in urban areas. In this scenario, the monetary transfer will be directed towards urban households belonging to the first quintile (i.e., the bottom quintile). As for Egypt, the amount allocated for the three policies is the same, allowing the results to be compared. Table 5 presents

an overview of the simulated scenarios for Egypt and Kenya. The results presented in the following tables are compared to a simulation without any shock.

We anticipate different economic mechanisms behind these three scenarios. In the first scenario, the price of subsidised food products will decrease, which should increase household consumption of these products. An increase in the consumption of these products could have a positive effect on the production of these products, and therefore improve employment in these branches, all other things being equal. In the second scenario, it is the employment of unskilled women in agriculture that will be encouraged. Consequently, the agricultural sector should increase its production, and the income of mainly rural households should increase. This increase will have an impact on consumption, which could boost production. In the third scenario, rural households in the first two quintiles will receive a transfer, which will increase their disposable income and consumption. This increase will have an impact on the sectors producing the different products.

On the other hand, for the three scenarios, the government incurs additional expenditure of the same amount, which further increases the deficit. The investment budget will therefore be impacted, which will have an impact on sectors producing capital goods, such as the construction sector for example.

Table 5: Overview on the mitigation scenario assumptions

Scenario	Assumptions	
	EGY	KEN
RUW	in world prices for crude oil (+ 41%), fertiliser (+ 27%), maize (+20%), wheat (+52%), and	
SubFood	increased subsidies for food products	
SubSal	a wage subsidy policy for unskilled women in the agricultural sector	
TransRur	a transfer to rural households belonging to the first quintile	
SubOil		subsidy for petroleum products
TransRur		a transfer to rural households
TransUrb	transfer will be directed towards urban households belonging to the first quintile	

4.3.1 Mitigation and gender scenarios in Egypt

4.3.1.1 Macro model results

Table 6 shows the impacts on macroeconomic variables for the three mitigation policies compared to the situation with the RUW shocks. The three policies implemented have a negligible effect on real GDP. On the other hand, each lead to an improvement in real household consumption. Compared to other scenarios, the SubSal scenario offers a better effect on total labour with a slight decrease. The impact is particularly positive for female labour with an increase of 0.28%.

Table 6: Difference in percentage points between the RUW scenario and the mitigation scenario (change in ScenShock - change in ScenXX)

	SubFood	SubSal	TransRur
Imports	-0.08	-0.05	-0.06
GDP real	-0.01	-0.01	-0.08
Total labour demand	-0.02	-0.01	-0.16
Total labour demand male	-0.02	-0.08	-0.17

Total labour demand female	-0.02	0.28	-0.15
Consumer price index	-0.43	0.05	0.19
Total investment (nominal)	-0.97	-0.79	-1.76
Export demand	0.04	-0.04	-0.03
Nominal household income	-0.07	0.46	0.99
Consumption real	0.35	0.40	0.82

Notes: SubFood = subsidies on food commodities, SubSal = subsidies on sallies for rural workers, TransRur = transfers to rural households, SubOil = subsidies for petrol, TransRur = transfers to rural households, TransUrb = Transfers to urban households

In terms of production, the different policies have interesting results (see Table 16 in Annex). As expected, the impact on the construction sector is negative as this sector is directly impacted by the drop of the budget for total investment due to the increase of government deficit. In the first two scenarios, the agricultural sector benefits from the policies, especially in the SubSal scenario. The changes in production lead to changes in the labour demand. In the same way as for production, the demand for work (see Table 17 in Annex). Evolves according to the scenarios. in agriculture and the manufacturing sector, labour demands are increasing, while for the construction and trade sectors, they are decreasing. Given the distribution of workers across sectors, not all workers are affected in the same way. The impact on the different categories of workers will depend on the intensity of the sectors in skilled versus unskilled workers, men and women. For example, male workers can be expected to be more impacted than female workers as they are over-represented compared to women in sectors with declining production. On the other hand, given the polarisation of the labour market for women in Egypt, the implementation of policies favourable to the agricultural sector has a beneficial effect on unskilled female workers (see Table 18 in Annex). Regarding households' real consumption, the food subsidy scenario improves the situation for all the different households, especially the poorest, who spend a higher share of their income on food commodities. In the wage subsidy scenario, all rural households increase their real consumption while urban households see their situation getting worse. In the transfer scenario, only households that are receiving the transfer see their situation improving (see Table 19 in Annex). [5]

4.3.1.2 Microsimulation results

Table 7 compares the effectiveness of different mitigation scenarios—food subsidies, wage subsidies, and direct transfers—on poverty and income inequality, as measured by the FGT indices and the Gini coefficient. It shows that neither the food subsidy nor the wage subsidy policies meaningfully alter the distributional outcomes of the RUW shock: poverty headcount and inequality remain virtually unchanged relative to the baseline scenario. This mirrors the macro results, where both policies produced only marginal improvements in household consumption while eroding government savings.

[5] The empirical literature suggests that when women's wages increase relative to men's wages (even when keeping total household income constant) women gain greater decision-making power. There is also evidence that women's earnings are more likely to be spent on children, food, health education. Thus, the gender composition of household income matters for well-being, not only the level. In this work we do not consider this aspect, since we do not consider intra-household decision making processes.

By contrast, the transfer policy generates a measurable reduction in poverty across all FGT indices and lowers inequality slightly, confirming that targeted cash transfers are more effective at reaching vulnerable households. Taken together, these results highlight the limits of broad-based subsidies in protecting the poor and suggest that targeted transfers, despite their fiscal costs, are the most effective short-term instrument for alleviating poverty.

Table 7: Poverty headcount, gap and severity at RUW simulation and mitigation scenarios

	FGT (0)	FGT (1)	FGT (2)	Gini
RUW	0.324	0.271	0.114	0.318
Food subsidy	0.322	0.272	0.114	0.318
Wage subsidy	0.322	0.271	0.114	0.318
Transfers	0.302	0.262	0.108	0.314

Note: FGT (0) Headcount ratio. FGT (1) Average normalised poverty gap. FGT (2) Average squared normalised poverty gap.

An in-depth analysis of the distributional effects of the mitigation scenarios is provided in Table 8. It shows that in Egypt the incidence of mitigation policies is closely tied to their design and the gendered structure of the labor market. The food subsidy produces negligible gains across the distribution, reflecting the macro finding that broad subsidies spread resources thinly while draining public savings. The wage subsidy for unskilled women in agriculture generates slightly higher benefits for female workers in targeted sectors, but its reach is limited given the very small share of women in formal agricultural employment. By contrast, the rural transfer shows the strongest pro-poor profile, with households in the lowest deciles gaining more than 5 percent in expenditure. This reflects the concentration of female-headed households among the rural poor, as well as women's reliance on informal and vulnerable work that is highly sensitive to food price increases. While the transfer succeeds in lifting the welfare of the most vulnerable, the exclusive focus on rural poor households leaves other groups untouched, which explains why median effects remain close to zero and inequality does not decline more broadly. These results reinforce the macro-level message: generalized subsidies are ineffective in protecting poor households, whereas targeted transfers can substantially reduce poverty among women and rural households, though at the cost of widening gaps between beneficiaries and non-beneficiaries.

Table 8: Relative change in household expenditure (per capita) at mitigation scenarios (across percentiles)

Food subsidy	10	15	20	25	30	mean	median
Overall	0.13	0.13	0.14	0.14	0.15	0.06	0.09
Female	0.14	0.13	0.14	0.14	0.15	0.06	0.09
Male	0.11	0.10	0.12	0.13	0.13	0.06	0.03
Urban	0.02	0.03	0.03	0.03	0.03	0.00	0.00
Rural	0.06	0.10	0.12	0.14	0.15	0.11	0.13

Unskilled	0.10	0.11	0.11	0.13	0.14	0.09	0.12
Skilled	0.12	0.10	0.10	0.09	0.09	0.03	0.06
Wage Subsidy							
Overall	0.24	0.23	0.23	0.23	0.22	0.20	0.20
Female	0.17	0.20	0.20	0.21	0.21	0.20	0.25
Male	0.21	0.23	0.23	0.24	0.23	0.21	0.16
Urban	0.25	0.27	0.26	0.26	0.26	0.20	0.23
Rural	0.21	0.22	0.21	0.22	0.22	0.20	0.17
Unskilled	0.21	0.24	0.23	0.23	0.23	0.22	0.17
Skilled	0.25	0.24	0.23	0.23	0.22	0.18	0.26
Urban Transfers							
Overall	5.11	4.98	4.74	4.34	4.12	1.98	2.25
Female	5.07	5.02	4.78	4.37	4.11	1.77	2.10
Male	5.36	5.19	4.85	4.50	4.29	2.18	2.08
Urban	-0.14	-0.16	-0.16	-0.15	-0.16	-0.14	-0.20
Rural	7.62	7.44	7.18	6.59	6.21	3.56	3.20
Unskilled	5.38	5.36	5.33	5.01	4.75	3.37	2.97
Skilled	3.04	2.70	2.50	2.27	2.09	0.67	0.93

4.3.2 Mitigation and gender scenarios in Kenya

To mitigate the negative effects induced by the RUW, we evaluate the effects of three policies. The first scenario (SubOil) evaluates the effects of establishing a subsidy for petroleum products. The second (TransRur) evaluates the effects of a monetary transfer to poor rural women. The third (TransUrb) evaluates the effects of a monetary transfer to women living in informal settlements in urban and in peri-urban regions (e.g., in townships).

4.3.2.1 Macro model results

The results of the three policies are interesting because they show heterogenous different effects (Table 9). Indeed, the establishment of a subsidy for petroleum products affects the entire economy (households and businesses). The economy as a whole will benefit from this subsidy and pay less for the purchase of petroleum products. Ceteris paribus, the price of intermediate consumption for the branches will decrease, reducing the producer price. For households, the subsidy allows them to purchase more petroleum products, but also more other products. Consequently, we are witnessing an overall improvement for most sectors, for which production decreases less than in the crisis scenario. Likewise, sectors are reducing their workers less and this benefits woman in particular. Real GDP is slightly improved.

For the other two scenarios, we have results that point in the same direction. To the extent that the transfer affects a restricted group of people (and not the entire economy as in the SUBOIL scenario), the results will be greater in terms of total household consumption.

Table 9: Difference in percentage points between the RUW scenario and the mitigation scenario (change in ScenShock - change in ScenXX)

	SubOil	TransRur	TransUrb
Imports	-0.06	-0.02	-0.04
GDP real	0.02	-0.14	-0.19
Total labour demand	0.04	-0.36	-0.50
Total labour demand male	0.04	-0.34	-0.47
Total labour demand female	0.05	-0.29	-0.41
Consumer price index	0.29	1.29	1.81
Total investment (nominal)	-1.07	-1.12	-1.57
Export demand	0.05	-0.44	-0.62
Nominal household income	0.53	1.55	2.24
Consumption real	0.26	0.40	0.57

Notes: SubFood = subsidies on food commodities, SubSal = subsidies on sallies for rural workers, TransRur = transfers to rural households, SubOil = subsidies for petrol, TransRur = transfers to rural households, TransUrb = Transfers to urban households

The transfer policy will benefit certain sectors, notably those consumed by poor rural households (mainly food products) and products consumed by poor urban households, whereas, in the first simulation, most sectors see their situation improve. Poor rural households spend mainly their income on food commodities, pulses and maize while rich urban households spend the highest share of their income on food commodities, pulses and vegetables. We can expect an increase in the production of these commodities.

As in the previous table, an improvement in the situation means that sector production decreases less than in the crisis scenario (see Table 20 in Annex). These impacts on production have effects on labour demands in the sectors, with a marked improvement for the SubOil scenario. The construction sector, as well as sectors producing investment goods, are seeing their production decline given the worsening budget deficit following the implementation of support policies. These sectors are particularly intensive in medium-skilled labour. The highest share of unskilled male workers can be found in the food sector (3.5%), the trade sector (1.7%) and the construction sector (1.1%), for women the highest share of unskilled workers can be found in the food sector (0.8%), the trade sector (0.5%) and the construction sector (0.3%) and public services (0.3%). These two sectors see their production improve for each of the sectors, and in the last two scenarios (see Table 21 in Annex). The implementation of the subsidy for petroleum products makes it possible to improve the real consumption of all households while for the two other scenarios, it is mainly rural households who see their situation improve, and for the third simulation, the urban poor (see Table 23 in Annex).

4.3.2.2 Microsimulation results

Our microsimulation confirms the patterns anticipated from the macro results (Table 10). It confirms the patterns anticipated from the macro results. The fuel subsidy reduces poverty only marginally, while increasing inequality, reflecting its broad design that channels benefits to better-off households as well as the poor (richer and urban households spend more on fuel). By contrast, targeted transfers generate stronger reductions in the poverty headcount, particularly when directed to rural households, but at the expense of higher inequality since the gains are concentrated among a single subgroup. These findings highlight the same trade-off suggested by the macro model: general subsidies are fiscally costly and regressive, while targeted transfers are more effective at reducing poverty in the short run but widen measured inequality across household groups.

Table 10: Poverty headcount, gap and severity at RUW simulation and mitigation scenarios

	FGT (0)	FGT (1)	FGT (2)	Gini
RUW	0.395	0.131	0.066	0.419
Fuel subsidy	0.390	0.130	0.065	0.433
Rural transfers	0.385	0.129	0.064	0.434
Urban transfers	0.388	0.128	0.063	0.429

Note: FGT (0) Headcount ratio. FGT (1) Average normalized poverty gap. FGT (2) Average squared normalized poverty gap.

Table 11 illustrates how Kenya's mitigation policies affect different groups once the RUW shock is in place. The oil subsidy produces only small gains for the poorest, while the largest benefits accrue to better-off urban households with high fuel consumption, confirming the regressive pattern anticipated in the macro model. Women show slightly higher proportional gains than men, not because the policy is designed to favor them, but because many women work in agriculture and informal petty trade, where fuel and transport costs weigh heavily on household budgets. The urban transfer performs more progressively, raising expenditures among poor households in cities, with stronger relative gains for women. This reflects women's overrepresentation in low-income urban households engaged in informal service jobs, where direct cash transfers provide immediate relief. The rural transfer shows the clearest pro-poor profile, with the bottom decile recording gains of over 6 percent. These large effects stem from women's concentration in rural poverty and in unskilled agricultural work, including secondary farming activities that are highly sensitive to rising input costs. Female-headed households are also disproportionately present in these rural quintiles, which magnifies the observed gender effect. Yet, because transfers are exclusive to their targeted groups, median gains remain limited and inequality increases between beneficiaries and non-beneficiaries.

Table 11: Relative change in total household expenditure at mitigation scenarios (across percentiles)

Oil subsidy	**10**	**15**	**20**	**25**	**30**	**mean**	**median**
Overall	3.55	2.22	1.45	1.09	0.98	3.07	0.16
Male	3.04	1.93	1.20	0.86	0.75	3.68	0.39
Female	3.87	2.47	1.66	1.28	1.17	2.45	-0.11
Rural	4.18	2.73	1.71	1.03	0.60	0.24	-0.89
Urban	5.43	4.55	4.16	3.91	3.66	5.46	1.73
Skilled	1.06	0.64	0.36	0.18	0.12	3.77	2.58
Unskilled	3.72	2.53	1.71	1.19	0.95	2.66	-0.62
Urban Transfer							
Overall	2.25	1.54	1.10	1.01	1.05	4.31	1.23
Male	1.41	1.01	0.66	0.63	0.70	5.09	1.20
Female	2.76	1.93	1.43	1.28	1.30	3.53	1.11
Rural	3.17	1.82	0.97	0.42	0.11	1.73	-0.41
Urban	35.34	26.06	21.76	18.56	16.29	6.50	3.61
Skilled	0.05	0.21	0.29	0.32	0.36	3.47	2.92
Unskilled	2.39	1.77	1.31	1.07	1.03	4.80	0.92
Rural Transfers							
Overall	6.12	4.76	3.78	3.23	2.87	2.94	-0.05
Male	5.01	3.99	3.12	2.66	2.34	3.64	0.17
Female	6.25	4.97	4.03	3.46	3.11	2.24	-0.31
Rural	7.96	6.24	5.11	4.20	3.57	0.73	-0.10
Urban	1.29	1.40	1.59	1.72	1.71	4.82	1.33
Skilled	1.62	1.08	0.71	0.43	0.29	3.12	2.26
Unskilled	6.18	5.02	4.14	3.49	3.12	2.84	-0.24

5 Conclusions

The analysis of the economic impacts and mitigation policies of the Russia-Ukraine War on women in Egypt and Kenya illustrates that the impacts on the vulnerable population of women are different and depend on the general economic situation within the countries and on women's economic and socio-economic situation in the countries. Thus, impacts of the RUW on women require a country specific analysis to provide country specific information. The mitigation policies can help to improve the consumption of rural poor households, while GDP is only marginally decreased compared to the impact resulting from the RUW caused trade shock.

Table 12 presents the impacts of the trade shock compared to the reference and the impacts of the policy measures compared to the trade shock scenario for both countries. Because of different dependency on oil imports and the capabilities to export oil, the Egyptian economy is less impacted than the Kenyan economy. Economic growth and poverty are more impacted in Kenya than in Egypt. From the macro-economic aggregated result, the negative impacts on female labour are not obvious. However, more detailed analysis shows that educated female workers are suffering the shock on the labour markets and benefitting from the simulated gendered policies.

The microsimulation results highlight the importance of gender in shaping the distributional impacts of mitigation policies. Broad subsidies on food or fuel provide little protection for poor households and do not address women's vulnerabilities, since they tend to channel larger benefits to better-off urban consumers. In contrast, targeted transfers reach those groups where women are most concentrated. In Egypt, rural transfers reduce poverty and also narrow inequality slightly, reflecting the fact that many female-headed households are found among the rural poor, and women's work in unskilled agriculture is highly exposed to rising food prices. By directing resources to these households, the transfer policy not only alleviates poverty but also reduces gendered disparities.

In Kenya, transfers likewise generate the strongest poverty reduction, with clear welfare gains for women who are overrepresented in rural agriculture and in low-income urban services. The bottom deciles, where female workers and female-headed households are disproportionately clustered, record the largest improvements. However, because the benefits are concentrated in targeted groups, measured inequality rises as other households remain excluded.

This contrast underlines that while transfers can be a powerful tool to protect women and the poorest from external shocks, their design must be sensitive to country-specific labor market structures. In contexts like Egypt, where women's labor force participation is low and rural women face the greatest disadvantages, targeted transfers can simultaneously reduce

poverty and inequality. In Kenya, where women are more widely engaged in informal and unskilled work across both rural and urban areas, targeting one group improves poverty outcomes but sharpens divides between beneficiaries and non-beneficiaries.

Table 12: Impact on macroeconomic indicators in trad shock and mitigation scenario in Egypt and Kenya

	EGY				KEN			
	Shock	Policy scenarios			Shock	Policy scenarios		
		SubFood	SubSal	TransRur		SubOil	TransUrb	TransRur
	%	%points			%	%points		
Imports	0.62	-0.08	-0.05	-0.06	-5.88	-0.06	-0.04	-0.02
GDP real	-0.01	-0.01	-0.01	-0.08	-0.13	0.02	-0.19	-0.14
Total labour demand	-0.01	-0.02	-0.01	-0.16	-0.33	0.04	-0.50	-0.36
Total labour demand male	-0.02	-0.02	-0.08	-0.17	-0.41	0.04	-0.47	-0.34
Total labour demand female	0.02	-0.02	0.28	-0.15	0.02	0.05	-0.41	-0.29
Consumer price index	3.39	-0.43	0.05	0.19	-5.92	0.29	1.81	1.29
Total investment (nominal)	3.56	-0.97	-0.79	-1.76	-10.82	-1.07	-1.57	-1.12
Export demand	0.05	0.04	-0.04	-0.03	2.81	0.05	-0.62	-0.44
Nominal household income	3.00	-0.07	0.46	0.99	-8.18	0.53	2.24	1.55
Real consumption	-0.37	0.35	0.40	0.82	-2.41	0.26	0.57	0.40

Notes: SubFood = subsidies on food commodities, SubSal = subsidies on sallies for rural workers, TransRur = transfers to rural households, SubOil = subsidies for petrol, TransRur = transfers to rural households, TransUrb = Transfers to urban households, % = percentage change in the shock scenario compared to the reference, % points = percentage points difference between the impacts in the policy scenario and the shock scenario compared to the reference.

The results suggest that alternative mitigation policies could represent valuable options to counteract poverty in the countries, compared to the implemented ones (food and oil subsidy).[6] This study is motivated by analysing the impacts of the RUW induced trade distortions on women in Egypt and Kenya. However, the results can be informative also outside the context of the RUW for policy decision making. The results raise the question of the advantages of subsidies targeting commodities or production factors versus cash transfers targeting specifically poor households.

As economic model-based assessment the analysis is limited to the methodological framework of the models. The limits of the CGE model framework results from the aggregated nature of the data, which cannot consider individual decision making or specific business types. However, by applying micro econometric techniques as a complementary analysis tool, we overcome some of the limits of the CGE model. Reducing the limits further of the macro-micro model compound depends mainly on the availability of data and can be objective of further research.

The modelling exercise presented in this paper illustrates that a macro-micro model assessment framework in combination with an expert guided co-modelling approach can be a fruitful approach to provide detailed and insightful results. In this study we focussed the analysis on short-term economic

[6] Leakages and inefficiencies resulting from poor implementation of the policies caused by corruption, bad targeting etc. is not represented in the CGE model and thus not considered in this study.

impacts. Further modelling research can consider broader and longer-term impacts resulting from economic shocks or mitigation policies. For example, considering the long-term environmental impacts of fuel subsidies could provide a broader view to assess the favourability of this policy option in countries where of relevance. Further research can also analyse scenarios which compare different options to fund mitigation policies. Since Southern countries found themselves in the challenge to cope with polycrisis and limited fiscal space, the evaluation of potential funding options could be of significant policy interest.

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Appendix

Table 13: Impact on the labour demand per activity in Egypt and Kenya (in %)

	EGY	KEN
aggr_agrforfis	0.44	
aggr_amaiz		-1.35
aggr_aocer		9.60
aggr_apuls		-2.50
aggr_aoils		-0.56
aggr_avero		-3.02
aggr_afrui		-1.50
aggr_aocrp		3.04
aggr_acatt		2.67
aggr_aoliv		2.15
aggr_afore		-7.21
aggr_afish		-8.33
aggr_afood		-6.26
aggr_amanuf	5.19	1.48
aggr_otherindu	-0.61	-1.83
aggr_acons	0.81	-8.67
aggr_atrad	0.87	-3.21
aggr_atran	-2.80	0.26
aggr_apadm	-1.05	4.80
aggr_aeduc	0.19	4.85
aggr_aheal	-0.01	2.58
aggr_aserv	-0.99	-1.93

Notes: aggr_ = aggregated industries inclucing … , agrforfis = agriculture & forestry & fishery, amaiz = maize production, aocer = other cereals incl. rice and wheat, apuls = pulses, aoils = oilseeds, avero = vegetable & root crops, afrui = fruit, aocrp = other crops, acatt = cattle, aolive = other livestock, afore = forestry, fish = fishery, afood = food industry, amanuf = manufacturing, otherindu = other industries, acons = construction, atrad = trade, atran = transport, apadm = public services, aeduc = education, aheal = health services, aserv = other services

Table 14: Impact on the labour demand per type of labour in Egypt and Kenya (in %)

	EGY	KEN
male_rura_unsk	0.00	
fema_rura_unsk	0.12	
male_rura_prim	-0.01	
fema_rura_prim	0.15	
male_rura_seco	-0.02	
fema_rura_seco	0.06	
male_rura_tert	-0.05	
fema_rura_tert	-0.01	
male_urba_unsk	0.00	
fema_urba_unsk	0.09	
male_urba_prim	0.00	
fema_urba_prim	0.12	
male_urba_seco	0.00	
fema_urba_seco	-0.03	
male_urba_tert	-0.05	
fema_urba_tert	-0.05	
flab-n		50.02
flab-nf		53.22
flab-p		-2.79
flab-pf		-2.59
flab-s		-0.75
flab-sf		0.03

Notes: male_rura_unsk = male workers in rural regions without scholar education, fema_rura_unsk = female workers in rural regions without scholar education, male_rura_prim = male workers in rural regions with primary education, fema_rura_prim = female workers in rural regions with primary education, male_rura_seco = male workers in rural regions with secondary education, fema_rura_seco = female workers in rural regions with secondary education, male_rura_tert = male workers in rural

regions with tertiary education, fema_rura_tert = female workers in rural regions with tertiary education, male_urba_unsk = male workers in urban regions without scholar education, fema_urba_unsk = female workers in urban regions without scholar education, male_urba_prim = male workers in urban regions with primary education, fema_urba_prim = female workers in urban regions with primary education, male_urba_seco = male workers in urban regions with secondary education, fema_urba_seco = female workers in urban regions with secondary education, male_urba_tert = male workers in urban regions with tertiary education, fema_urba_tert = female workers in urban regions with tertiary education.

Table 15: Impact on households' real consumption (in %)

	EGY	KEN
hhd-r1	**-0.11**	**-2.62**
hhd-r2	**-0.20**	**-2.53**
hhd-r3	**-0.23**	**-2.49**
hhd-r4	**-0.25**	**-2.37**
hhd-r5	**-0.27**	**-2.34**
hhd-u1	**-0.29**	**-2.19**
hhd-u2	**-0.40**	**-2.39**
hhd-u3	**-0.45**	**-2.33**
hhd-u4	**-0.47**	**-2.22**
hhd-u5	**-0.59**	**-2.40**

Notes: hhd- = household income decile, r1= rural first decile, …, r5 = rural fifth decile, -u1= urban first decile, …, u5 = urban fifth decile

Table 16: Difference of change in percentage points production (change in policy scenario - change in RUW scen)

	SubFood	SubSal	TransRur
all sectors	0.03	-0.01	-0.05
aggr_agrforfis	0.02	0.43	-0.07
aggr_amanuf	0.31	0.02	0.18
aggr_otherindu	0.04	-0.09	0.07
aggr_acons	-0.58	-0.55	-1.12
aggr_atrad	-0.05	-0.10	-0.17
aggr_atran	-0.04	-0.03	0.01
aggr_apadm	-0.10	-0.18	-0.33
aggr_aeduc	-0.15	-0.18	-0.30
aggr_aheal	0.01	0.11	0.24
aggr_aserv	-0.07	-0.04	0.01

Notes: aggr_ = aggregated industries inclucing … , agrforfis = agriculture & forestry & fishery, amaiz = maize production, aocer = other cereals incl. rice and wheat, apuls = pulses, aoils = oilseeds, avero = vegetable & root crops, afrui = fruit, aocrp = other crops, acatt = cattle, aolive = other livestock, afore = forestry, fish = fishery, afood = food industry, amanuf = manufacturing, otherindu = other industries, acons = construction, atrad = trade, atran = transport, apadm = public services, aeduc = education, aheal = health services, aserv = other services, SubFood = subsidies on food commodities, SubSal = subsidies on sallies for rural workers, TransRur = transfers to rural households, SubOil = subsidies for petrol, TransRur = transfers to rural households, TransUrb = Transfers to urban households

Table 17: Difference of change in percentage points in labour demand per sector (change in ScenShock - change in ScenXX)

	SubFood	SubSal	TransRur
aggr_agrforfis	0.05	1.02	-0.16
aggr_amanuf	1.10	0.08	0.64
aggr_otherindu	0.17	-0.39	0.27
aggr_acons	-1.11	-1.05	-2.15
aggr_atrad	-0.14	-0.26	-0.47
aggr_atran	-0.06	-0.04	0.01
aggr_apadm	-0.11	-0.20	-0.38
aggr_aeduc	-0.18	-0.21	-0.34

aggr_aheal	0.03	0.21	0.45
aggr_aserv	-0.13	-0.08	0.02

Notes: aggr_ = aggregated industries inclucing … , agrforfis = agriculture & forestry & fishery, amaiz = maize production, aocer = other cereals incl. rice and wheat, apuls = pulses, aoils = oilseeds, avero = vegetable & root crops, afrui = fruit, aocrp = other crops, acatt = cattle, aolive = other livestock, afore = forestry, fish = fishery, afood = food industry, amanuf = manufacturing, otherindu = other industries, acons = construction, atrad = trade, atran = transport, apadm = public services, aeduc = education, aheal = health services, aserv = other services, SubFood = subsidies on food commodities, SubSal = subsidies on sallies for rural workers, TransRur = transfers to rural households, SubOil = subsidies for petrol, TransRur = transfers to rural households, TransUrb = Transfers to urban households

Table 18: Difference of change in percentage points in the different type of demand (change in Policy Scenario - change in RUW)

	SubFood	SubSal	TransRur
male_rura_unsk	-0.03	-0.19	-0.42
fema_rura_unsk	0.00	1.37	-0.37
male_rura_prim	-0.03	-0.18	-0.42
fema_rura_prim	0.00	1.39	-0.37
male_rura_seco	-0.03	-0.19	-0.37
fema_rura_seco	-0.01	-0.17	-0.25
male_rura_tert	-0.03	-0.18	-0.22
fema_rura_tert	-0.04	-0.18	-0.16
male_urba_unsk	-0.02	0.01	0.00
fema_urba_unsk	-0.01	0.02	0.03
male_urba_prim	-0.02	0.01	0.00
fema_urba_prim	0.00	0.02	0.04
male_urba_seco	-0.01	0.01	0.01
fema_urba_seco	-0.03	0.01	0.00
male_urba_tert	-0.02	0.01	0.00
fema_urba_tert	-0.04	0.00	-0.01

Notes: male_rura_unsk = male workers in rural regions without scholar education, fema_rura_unsk = female workers in rural regions without scholar education, male_rura_prim = male workers in rural regions with primary education, fema_rura_prim = female workers in rural regions with primary education, male_rura_seco = male workers in rural regions with secondary education, fema_rura_seco = female workers in rural regions with secondary education, male_rura_tert = male workers in rural regions with tertiary education, fema_rura_tert = female workers in rural regions with tertiary education, male_urba_unsk = male workers in urban regions without scholar education, fema_urba_unsk = female workers in urban regions without scholar education, male_urba_prim = male workers in urban regions with primary education, fema_urba_prim = female workers in urban regions with primary education, male_urba_seco = male workers in urban regions with secondary education, fema_urba_seco = female workers in urban regions with secondary education, male_urba_tert = male workers in urban regions with tertiary education, fema_urba_tert = female workers in urban regions with tertiary education

Table 19: Difference of change in percentage points in for households' real consumption (in %)

	SubFood	SubSal	TransRur
hhd-r1	0.36	1.11	8.81
hhd-r2	0.34	1.03	4.79
hhd-r3	0.34	0.96	-0.01
hhd-r4	0.33	0.96	-0.02
hhd-r5	0.33	0.75	-0.04
hhd-u1	0.39	-0.08	-0.23
hhd-u2	0.38	-0.10	-0.25
hhd-u3	0.37	-0.10	-0.25

hhd-u4	0.36	-0.10	-0.25
hhd-u5	0.34	-0.13	-0.26

hhd- = household income decile, -n1= (non-rural = urban) first decile, …, n5 = (non-rural = urban) fifth decile, -r1= rural first decile, …, r5 = rural fifth decile, -u1= urban first decile, …, u5 = urban fifth decile

Table 20: Change of production between the RUW scenario and the mitigation scenario (in percentage points)

	SubOil	TransRur	TransUrb
all sectors	0.02	-0.15	-0.20
aggr_amaiz	0.06	0.35	0.45
aggr_aocer	0.02	0.05	-0.06
aggr_apuls	0.05	0.35	0.48
aggr_aoils	0.07	-0.09	-0.22
aggr_avero	0.08	0.17	0.37
aggr_afrui	-0.03	-0.36	-0.42
aggr_aocrp	-0.11	-0.54	-0.94
aggr_acatt	0.03	0.08	0.09
aggr_aoliv	0.04	0.06	0.16
aggr_afore	-0.16	-0.29	-0.44
aggr_afish	0.15	0.14	0.30
aggr_afood	0.20	0.29	0.49
aggr_amanuf	0.15	-0.19	-0.25
aggr_otherindu	0.03	-0.22	-0.32
aggr_acons	-0.57	-0.94	-1.31
aggr_atrad	0.08	0.13	0.23
aggr_atran	0.03	-0.19	-0.26
aggr_apadm	0.17	-0.64	-0.90
aggr_aeduc	-0.06	-0.60	-0.90
aggr_aheal	0.26	-0.57	-0.84
aggr_aserv	0.08	-0.08	-0.14

Notes: aggr_ = aggregated industries inclucing … , agrforfis = agriculture & forestry & fishery, amaiz = maize production, aocer = other cereals incl. rice and wheat, apuls = pulses, aoils = oilseeds, avero = vegetable & root crops, afrui = fruit, aocrp = other crops, acatt = cattle, aolive = other livestock, afore = forestry, fish = fishery, afood = food industry, amanuf = manufacturing, otherindu = other industries, acons = construction, atrad = trade, atran = transport, apadm = public services, aeduc = education, aheal = health services, aserv = other services, SubFood = subsidies on food commodities, SubSal = subsidies on sallies for rural workers, TransRur = transfers to rural households, SubOil = subsidies for petrol, TransRur = transfers to rural households, TransUrb = Transfers to urban households

Table 21: Difference of change in percentage points in labour demand per sector (change in ScenShock - change in ScenXX)

	SubOil	TransRur	TransUrb
aggr_amaiz	0.16	0.99	1.26
aggr_aocer	0.05	0.12	-0.13
aggr_apuls	0.12	0.82	1.12
aggr_aoils	0.15	-0.20	-0.50
aggr_avero	0.19	0.38	0.80
aggr_afrui	-0.05	-0.60	-0.71
aggr_aocrp	-0.25	-1.10	-1.94
aggr_acatt	0.41	1.08	1.25
aggr_aoliv	0.75	1.09	2.39
aggr_afore	-2.62	-4.73	-7.13
aggr_afish	3.56	3.29	7.03
aggr_afood	0.72	0.86	1.49
aggr_amanuf	0.90	-0.68	-0.88
aggr_otherindu	0.06	-0.73	-1.05
aggr_acons	-1.37	-2.26	-3.14
aggr_atrad	0.16	0.26	0.46
aggr_atran	0.11	-0.63	-0.86
aggr_apadm	0.22	-0.86	-1.22
aggr_aeduc	-0.08	-0.76	-1.15
aggr_aheal	0.39	-0.85	-1.26
aggr_aserv	0.30	-0.14	-0.29

Notes: aggr_ = aggregated industries inclucing … , agrforfis = agriculture & forestry & fishery, amaiz = maize production, aocer = other cereals incl. rice and wheat, apuls = pulses, aoils = oilseeds, avero = vegetable & root crops, afrui = fruit, aocrp = other crops, acatt = cattle, aolive = other livestock, afore = forestry, fish = fishery, afood = food industry, amanuf = manufacturing, otherindu = other industries, acons = construction, atrad = trade, atran = transport, apadm = public services, aeduc = education, aheal = health services, aserv = other services, SubFood = subsidies on food commodities, SubSal = subsidies on sallies for rural workers, TransRur = transfers to rural households, SubOil = subsidies for petrol, TransRur = transfers to rural households, TransUrb = Transfers to urban households

Table 22: Impact on the labour demand per type of labour in Kenya (in %)

	SubOil	TransRur	TransUrb
male_empl_crop	0.00	0.00	0.00
fema_empl_crop	0.00	0.00	0.00
male_self_crop	0.00	0.00	0.00
fema_self_crop	0.00	0.00	0.00
male_empl_past	0.00	0.00	0.00
fema_empl_past	0.00	0.00	0.00
male_self_past	0.00	0.00	0.00
flab-n	1.10	14.63	19.74
flab-nf	0.44	15.22	20.54
flab-p	-0.06	-0.82	-1.10
flab-pf	-0.02	-0.74	-1.00
flab-s	0.08	-0.62	-0.86
flab-sf	0.10	-0.60	-0.85

Notes: male_rura_unsk = male workers in rural regions without scholar education, fema_rura_unsk = female workers in rural regions without scholar education, male_rura_prim = male workers in rural regions with primary education, fema_rura_prim = female workers in rural regions with primary education, male_rura_seco = male workers in rural regions with secondary education, fema_rura_seco = female workers in rural regions with secondary education, male_rura_tert = male workers in rural regions with tertiary education, fema_rura_tert = female workers in rural regions with tertiary education, male_urba_unsk = male workers in urban regions without scholar education, fema_urba_unsk = female workers in urban regions without scholar education, male_urba_prim = male workers in urban regions with primary education, fema_urba_prim = female workers in urban regions with primary education, male_urba_seco = male workers in urban regions with secondary education, fema_urba_seco = female workers in urban regions with secondary education, male_urba_tert = male workers in urban regions with tertiary education, fema_urba_tert = female workers in urban regions with tertiary education

Table 23: Difference of change in percentage points in for households' real consumption (in %)

	SubOil	TransRur	TransUrb
hhd-r1	0.33	9.09	0.39
hhd-r2	0.34	0.30	0.39
hhd-r3	0.33	0.23	0.30
hhd-r4	0.31	0.13	0.16
hhd-r5	0.29	0.03	0.02
hhd-u1	0.21	-0.16	117.83
hhd-u2	0.22	-0.27	-0.37
hhd-u3	0.21	-0.35	-0.49
hhd-u4	0.20	-0.50	-0.68
hhd-u5	0.21	-0.49	-0.67

hhd- = household income decile, -n1= (non-rural = urban) first decile, …, n5 = (non-rural = urban) fifth decile, -r1= rural first decile, …, r5 = rural fifth decile, -u1= urban first decile, …, u5 = urban fifth decile