

# ECONOMYWIDE RISK ASSESSMENT

## COUNTRY SERIES

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# EGYPT

## Systematic Analysis of World Market and Domestic Production Shocks

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*This study is part of a series of country briefs by IFPRI that leverages economywide models to deliver detailed risk assessments of key economic indicators. This initial analysis evaluates vulnerabilities across economic sectors and key population groups to answer two questions: (1) How vulnerable are Egypt's national economy and population to world market and domestic production shocks? (2) What are the largest risks to Egypt's overall economic performance, private consumption, and reductions in poverty and undernourishment?*

### Overview

Achieving development goals is subject to economic uncertainties, yet policymaking rarely accounts for these risks. This Country Brief quantifies the risks facing Egypt's economy and population, focusing on two primary sources:

- 1) **External risks** stemming from shocks in international commodity prices and foreign capital flows and
- 2) **Domestic risks** associated with production shocks in volatile sectors of the Egyptian economy, such as primary agriculture and hydropower electricity generation, often caused by extreme weather.

The significance of these risks is assessed based on the range of the shocks' impacts on four main economic and development indicators: total GDP, private consumption, poverty rate, and prevalence of undernourishment.

The analysis uses data mining methods to simultaneously sample many shocks from historical data, constructing a comprehensive set of realistic shock scenarios for Egypt. A country-specific, economywide Computable General Equilibrium (CGE) model then simulates the impacts of these shocks on both total and sector-specific economic outcomes, deriving changes in poverty and undernourishment for each shock scenario. Finally, machine learning techniques are applied to obtain metrics for the relative importance of different risk factors.

The results suggest that, for Egypt's economic performance and progress toward ending poverty and hunger, *external risks are much more significant than domestic risks*. This is mainly due to Egypt's integration into global markets and reliance on international trade. At the same time, Egypt's agriculture relies on irrigation that protects food production from droughts and river floods.

Understanding these economic risks is a critical first step in facilitating discussions on potential risk management strategies, such as promoting domestic productivity growth and diversifying economic activity away from high-risk sectors.

## 1. Background and Objectives

Egypt experienced steady annual economic growth over the last four decades, except during the 2011 Egyptian Revolution and the subsequent two years when annual GDP per capita declined (Figure 1A). Following economic reforms, growth resumed and reached more than 2 percent in 2015. However, sector-level growth deviated from the positive long-term trend of total economic growth, especially in the 2010s. Egypt's agricultural production fluctuated around a positive long-term growth trend from the early 1980s until the global food crisis in 2009. Afterward, agricultural production showed a negative trend, with signs of revival after 2018 (Figure 1B).

According to World Bank's Systematic Country Diagnostic (World Bank 2021), the substantial progress in Egypt's overall economic performance after 2015 can largely be attributed to the government's reform efforts, which included fuel subsidy and taxation adjustments, fiscal consolidation, and a transition to a flexible exchange rate regime. While these measures were successful in reviving economic growth, they also contributed to volatile inflation. Efforts to stabilize the current account (Figure 1C) and liberalize the exchange rate (Figure 1D), compounded with external shocks such as international commodity price surges (Figure 1E), led to spikes in inflation (Figure 1F).

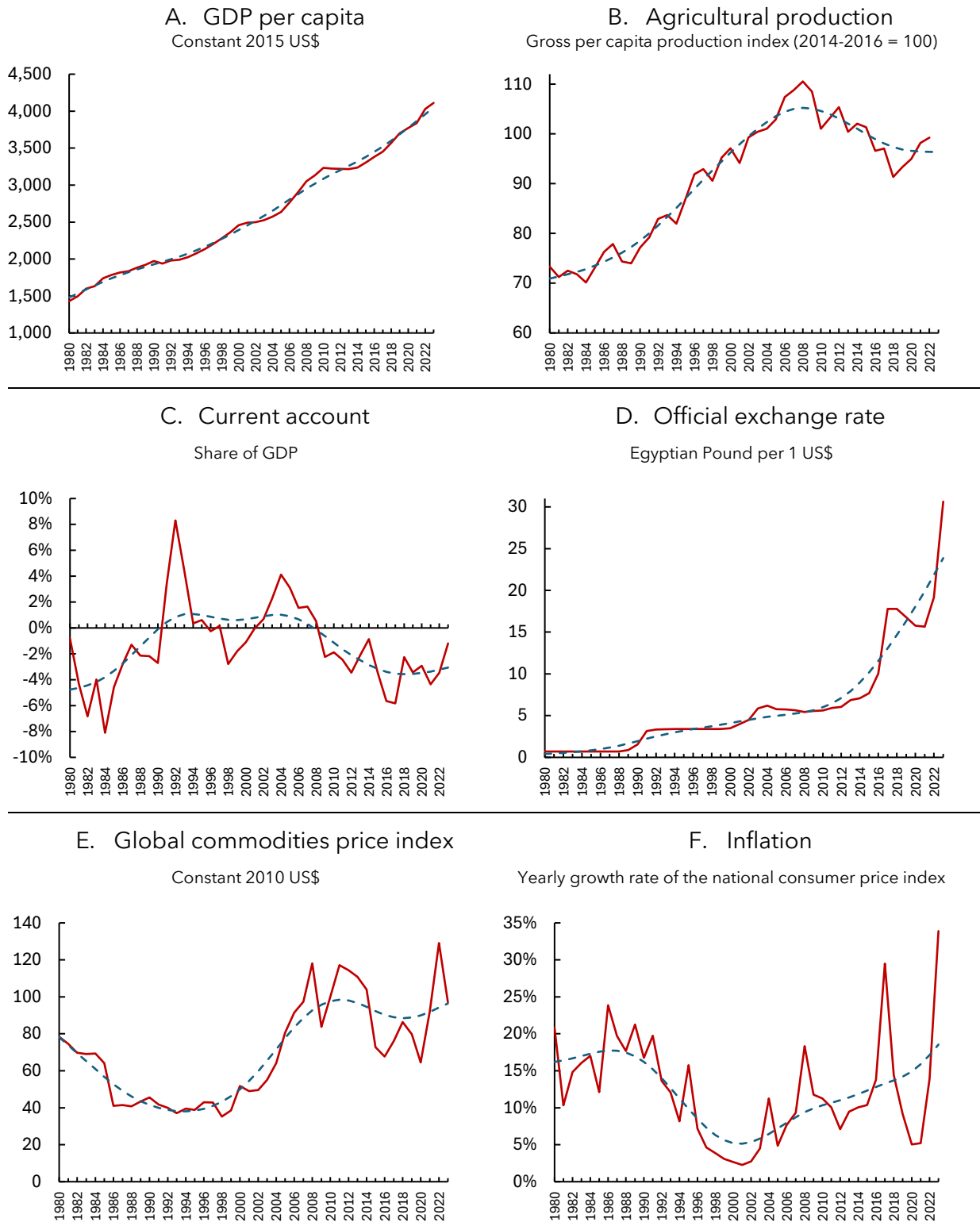
Governments in Egypt and around the world rely on economic projections to inform policy decisions and achieve development goals. However, the accuracy of projected trends and, even more so, the occurrence of economic shocks are naturally uncertain. Recent economic crises such as the global COVID-19 recession and global food and market disruptions due to Russia's invasion of Ukraine are stark reminders of the unpredictability of future events and the severity of these crises' impacts on the national economies and populations of many countries highlighted the unpreparedness of their governments. Major impacts in developing countries included setbacks in poverty and hunger reduction, jeopardizing the achievement of the first two Sustainable Development Goals of UN Member States by 2030.

Policymaking rarely considers the economic risks around projections and shock occurrence. This is mainly because systematic analyses of economic shocks and quantification of the associated risks are lacking, especially for developing countries. We address this gap by providing country-specific economywide risk assessments and detailed risk profiles for key economic and development indicators.

Our analysis addresses two main questions:

- 1) How vulnerable are Egypt's national economy and population to world market and domestic production shocks?
- 2) What are the largest risks to Egypt's overall economic performance, private consumption, and progress toward ending poverty and hunger?

**Figure 1.** Historical movements of main economic indicators in Egypt



**Note:** Dashed blue lines indicate long-term trends. The trend calculation uses the Hodrick-Prescott filter for annual data (Hodrick and Prescott 1997).

**Source:** Own presentation based on GDP per capita and official exchange rate data from World Bank (2024a), global commodity price index data from World Bank (2024b), agricultural production data from FAO (2024), and current account and inflation data from IMF (2024).

## 2. Concept and Methodological Overview

Unlike conventional economic projection analysis, our assessment of economic risks does not require speculation of Egypt's future long-term economic performance. Instead, we focus on economic *volatility* and analyze simulated outcomes for the entire bandwidth of potential but realistic shock scenarios. Innovatively, we adopt the concept of *risk* as understood in finance to a macroeconomic policy analysis framework (Box 1).

We assess risks to the national economy and population of Egypt belonging to two risk types:

- 1) **External risks** associated with shocks in international commodity prices and foreign capital flows (*world market shocks*)<sup>1</sup> and
- 2) **Domestic risks** associated with production shocks in volatile sectors of the Egyptian economy (*domestic production shocks*) caused by extreme weather, for example.

The considered commodities are the goods and services that Egypt trades. The considered sectors are primary agriculture and hydropower electricity generation, which are essential to Egypt's economic performance and Egyptian's wellbeing. Given the size and diversity of the agricultural sector and its crucial role in achieving development goals such as rural development, food security, and poverty and hunger eradication, we disaggregate agriculture into different crop and livestock production, forestry, and fishery subsectors. Our analysis focuses on exogenous shocks, which are beyond the government's direct control.

We examine the external and domestic risks in Egypt's current economic volatility environment using avail-

### Box 1. Terminology

*Risk* is defined as the measurable likelihood of variation in an economic variable and, therefore, differs from *uncertainty*, which broadly refers to the (unquantifiable) unknown. *Risk* can be quantified by using statistical metrics such as variance or standard deviation that measure the degree of variation around a variable's average. Following the terminology in finance, *risk* and *volatility* have similar meanings in our analysis, but we use *volatility* in a more generic sense. *Risk* is inherent in both economic *shocks* and *outcomes*, with the risks of shocks influencing the risks of outcomes. We refer to the contribution of a given shock variable to the volatility of an outcome as *risk factor*. The representation of the *risk factors* of an economic or development outcome ranked by their relative importance is referred to as *risk profile*. A *shock* is a sudden, measurable change that significantly disrupts the functioning of an economy or a part thereof, and an *outcome* is the resulting, measurable change in an indicator of economic performance or development.

able historical information for realistic scenario formulation. To do that, we developed a novel methodology – called *Systematic Risk Profiling (SRP)* – that integrates CGE modelling, data mining, and machine learning methods (Mukashov et al. 2024).

The SRP consists of three sequential steps:

- 1) **Data mining methods** are employed to simultaneously sample world market and domestic production shocks from annual time-series data spanning over four decades (1980 – 2023) to construct a comprehensive set of shock scenarios that realistically represent all possible combinations of exogenous shocks for Egypt.

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<sup>1</sup> International trade flows and foreign capital flows are closely linked, and both affect Egypt's trade balance and exchange rate (see Section 4). We therefore refer to sudden changes in either or both flows as "world market shocks" for brevity.

- 2) An **economywide CGE model** for Egypt is used to simulate the impacts on various (sub)sector-specific economic outcomes for each shock scenario and derive corresponding changes in development outcomes from a linked microsimulation model, and
- 3) **Data mining and machine learning techniques** are applied to quantify the contributions of individual shock variables to the volatility of key economic and development outcomes that are then used to rank these risk factors and produce detailed risk profiles.

The selected economic outcomes are (1) the overall performance of the national economy, as measured by GDP per capita, and (2) private (or household) consumption, as measured by total consumer spending. The development outcome indicators are (3) the poverty headcount rate (measured at the official national poverty line and using per capita expenditure as proxy for income) and (4) the prevalence of undernourishment (i.e., the share of people with insufficient calories, interchangeably referred to as “hunger” in this brief). The results of our analysis are summarized in separate risk profiles that rank the risk factors by their relative importance for each of these four outcomes.

### 3. Structure of the National Economy

To contextualize our SRP analysis and identify vulnerabilities in Egypt’s national economy that may predefine its exposure to exogenous shocks, we first examine the economy’s current structure. Egypt is a lower-middle-income country with a GDP per capita of US\$ 3,457 (in 2023), a national poverty rate of 29.7 percent (in 2019), and a national prevalence of undernourishment of 8.6 percent (in 2022) according to the latest available estimates (World Bank 2024a).

Accordingly, Egypt’s sector composition aligns with typical lower-middle-income country characteristics (Table 1). The primary sector, encompassing agriculture and mining (covering the extraction of crude oil, natural gas, and minerals), still constitutes a considerable share of total GDP, with 14.4 percent from agriculture and 7.7 percent from mining.

The country is moderately industrialized, with manufacturing accounting for 14.6 percent of total GDP (of which agro-processing makes up one-third). The tertiary service sector (which includes tourism, trade, transport, and government services) contributes more than half of total GDP, namely 54.6 percent. Egypt’s largest export and import sectors are non-food manufacturing (accounting for 27.5 percent of total exports and 52.5 percent of total imports) and services (accounting for 54.6 percent of total exports and 25.4 percent of total imports). Key exported manufacturing goods include petroleum products and chemicals, while machinery and industrial equipment are the main imported manufacturing goods. In the services sector, transport and hotel services are the main exports, and transport and business services are the main imports. Notably, Egypt also imports a considerable amount of primary agricultural and agro-processed products, which account for 7.3 percent and 9.6 percent of total imports, respectively.

The decomposition of the national economy by expenditure components reveals that Egypt has a trade deficit of around 5.5 percent of total GDP (Figure 2). While total imports account for 22.0 percent of total GDP, total exports make up only 16.5 percent. Moreover, at 13.2 percent, the share of investments in total GDP is high, with investments concentrated in construction and machinery equipment.

In sum, Egypt’s economy displays structural characteristics that predefines its vulnerability to both world market and domestic production shocks. The size of these exogenous shocks, along with the strength of

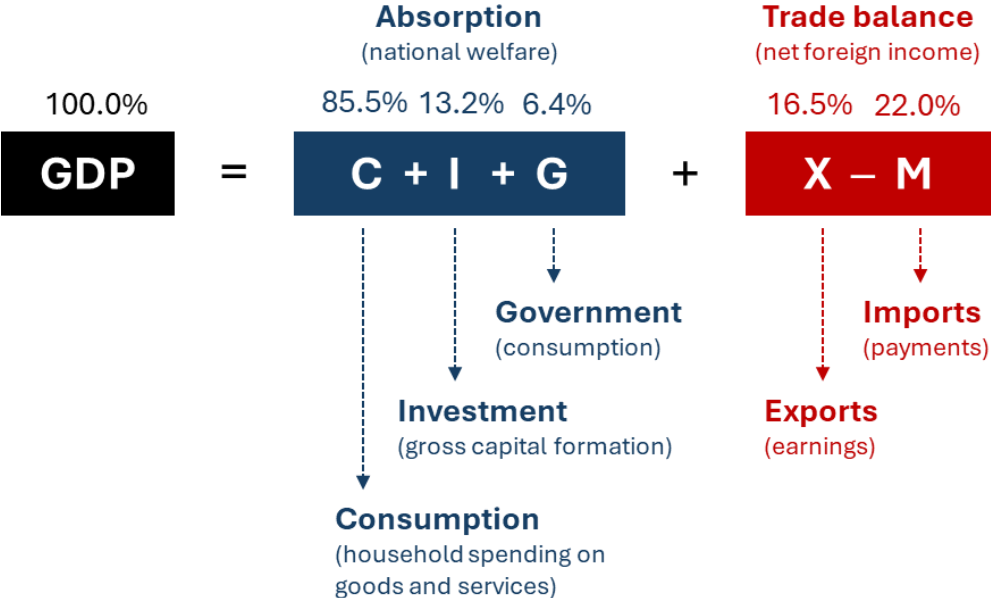
economic linkages - captured in the CGE model - determines the magnitude of outcomes' volatility. However, a snapshot of the current structure of the economy does not provide evidence in this respect. An SRP analysis can aid in developing a comprehensive economic risk profile for Egypt.

**Table 1.** Composition of Egypt’s economy by sectors

	% of total GDP	% of employment	% of total demand	Exports		Imports	
				% of sectoral output	% of total export	% of sectoral demand	% of total import
Primary Agriculture	14.4	36.7	12.7	2.2	3.0	7.9	7.3
Crops	9.0	25.3	8.1	3.5	2.9	11.3	6.6
Fruits	3.2	8.3	2.0	6.3	1.5		
Cereals	2.1	4.8	2.4			27.3	4.8
Vegetables	1.8	6.1	2.0	1.3	0.3		
Livestock	3.9	9.1	3.6			2.1	0.5
Forestry	0.1	0.1	0.1			1.8	0.0
Fishery	1.4	2.2	1.0	0.9	0.1	1.6	0.1
Mining	7.7	0.4	5.6	18.0	12.0	12.8	5.2
Manufacturing	14.6	9.5	34.1	9.7	30.4	25.0	62.1
Agro-processing	3.3	2.9	9.1	3.3	2.9	14.5	9.6
Other manufact.	11.3	6.6	25.1	12.3	27.5	28.8	52.5
Utilities	2.8	1.2	3.2				
Construction	5.8	10.1	6.3				
Services	54.6	42.1	38.2	11.1	54.6	9.2	25.4
Food services	3.4	2.6	3.7	38.6	22.0	24.4	6.5
Public sector	9.9	18.1	7.5	2.8	2.7	2.8	1.5
Other services	41.3	21.4	27.0	8.8	29.9	8.9	17.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>8.9</b>	<b>100.0</b>	<b>13.8</b>	<b>100.0</b>

Source: Own calculations based on official national accounts data as reported in the Egypt 2024 Social Accounting Matrix (IFPRI 2025a).

**Figure 2.** Composition of Egypt’s economy by expenditure



Source: Own calculations based on official national accounts data as reported in the Egypt 2024 Social Accounting Matrix (IFPRI 2025a).

## 4. Exogenous Shocks

In the first step of our SRP analysis, we use historical time-series data and data mining methods to simultaneously sample world market and domestic production shocks.

*World market shocks* consist of international commodity price shocks and foreign capital flow shocks. International commodity price shocks are changes in export and import prices of the goods and services in which Egypt trades. Volatility of these prices is typically driven by global economic and financial market conditions. Foreign capital flow shocks are changes in the flow of foreign capital into the national economy. These capital inflows (comprising foreign direct investment, government and private borrowing abroad, and central bank operations) finance Egypt's trade deficit.<sup>2</sup> The volatility of foreign capital inflows is influenced by both Egypt's attractiveness to foreign investors and global financial market conditions.

*Domestic production shocks* represent productivity changes in primary agriculture and hydropower electricity generation. These sectors are most susceptible to extreme weather events (particularly droughts and river floods in the case of Egypt) and other natural hazards (such as crop pest infestations and livestock diseases).<sup>3</sup>

The time-series data consists of 28 shock variables over the period of 1980 - 2023. These include international commodity prices, foreign capital flow, agricultural production activities, and power electricity generation.

All observations form the dataset from which we randomly sample 10,000 shock scenarios.<sup>4</sup> These shock scenarios together provide a realistic representation of Egypt's economic volatility at the present and in the future, as they capture all possible combinations of all observed exogenous shocks, as well as the shocks' size and direction.

The procedure involves three steps:

- 1) **Trend Calculation:** for each shock variable, we calculate the long-term trend over the 44-years period that is represented by a smoothed curve (shown as a dashed blue line in the graphs of Figure 1).<sup>5</sup>
- 2) **Shock Derivation:** We derive the shocks for each variable by calculating the relative deviations of the annual observations from the long-term trend.
- 3) **Multivariate Estimation:** From the relative deviations of all shock variables, we estimate a multivariate normal distribution and sample 10,000 multivariate shock scenarios. By randomly drawing

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<sup>2</sup> The link of foreign capital flows to international trade flows, as well as the implications of both flows for Egypt's exchange rate, relates shocks in foreign capital flows to international commodity price shocks, but the different mechanisms of the two shock categories make them distinct. We therefore combine international commodity price shocks and foreign capital flow shocks in our simulations of world market shocks but discuss the two shock categories and the related risks separately.

<sup>3</sup> Domestic production shocks enter the CGE model as sector-specific total factor productivity (TFP) changes. We therefore use productivity metrics (e.g., agricultural yields) as TFP proxy indicators, whenever possible. For some (sub)sectors for which productivity metrics unavailable (that are meat and milk production, forestry, and hydropower electricity generation), we use per capita production as a proxy. See Mukashov et al. (2024) for details.

<sup>4</sup> The configuration of our data mining exercise to 28 shock variables and 10,000 shock scenarios is chosen to balance tradeoffs between data availability and computational intensity. It ensures that shock sampling and scenario building are well-supported by the historical data while keeping simulation and post-simulation calculations computationally feasible.

<sup>5</sup> To calculate the long-term trend, we use the Hodrick-Prescott filter for annual data (Hodrick & Prescott 1997). The resulting smoothed curve is less sensitive to short-term than long-term fluctuations.

shocks from this distribution (with assumed zero means and an estimated variance-covariance matrix), our analysis remains agnostic about future shocks, as the deviations found in the historical data are not strictly symmetric around zero.

Figure 3 shows the estimated marginal distributions for the 28 shock variables as box plots in Panel A, and the variables' correlation structure as heatmaps in Panel B. Hence, the graphs in Figure 3A compare the scales of the sample shocks, highlighting the most and least volatile shock variables, and the graphs in Figure 3B illustrate which shocks are most and least likely to occur at the same time. In the following, we discuss the results of the first step of our SRP analysis organized by shock category.

### **International commodity price shocks**

Our analysis of international commodity price shocks, derived from data from World Bank (2024b) and other public databases, reveals *significant differences in volatility across sectors*. Primary commodities show particularly high volatility. Fertilizer, energy, and metal and mineral prices are most volatile (in respective order). Within agricultural commodities, prices of beverage crops (coffee, cocoa, and tea), followed by grain prices, are most volatile. In contrast, prices of manufactured goods and services exhibit greater stability (Figure 3A).

International price shocks for energy, metals and minerals, and fertilizers are strongly, positively correlated (Figure 3B), as global production of these commodities is interconnected. Energy and fertilizer are critical inputs into the production and processing of main agricultural crops such as grains and oilseeds, which explains the strong and positive correlation between the price shocks for these primary commodities. Similarly, the correlations between grain and oilseed price shocks and price shocks for livestock products (meat and milk and dairy products) are strong and positive, because grains and oilseeds are used for animal feed in addition to direct human consumption. Altogether the correlation patterns suggest that international price shocks are likely to affect multiple primary commodities simultaneously, which is mainly due to their joint dependence on global business cycles (Erten and Ocampo 2013). The international price shocks for all goods are negatively correlated with the international price shocks for services. Thus, when the prices of goods in global markets rise above their long-term averages, the price of services tends to drop below its long-term average. Price fluctuations for services, however, are small (Figure 3A).

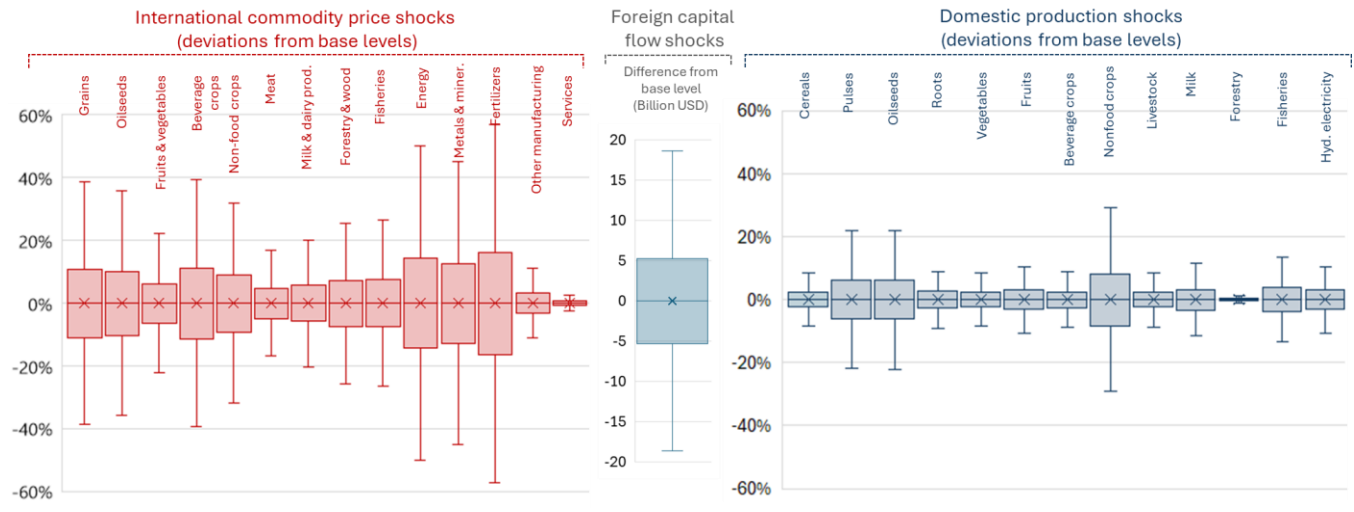
### **Foreign capital flow shocks**

Since the 2007–2008 global food and financial crisis, Egypt has faced a current account deficit (Figure 1C), which has been financed through foreign capital inflows. For our analysis, we assume that these flows enter the economy as foreign savings denominated in foreign currency, influencing both the exchange rate and investment demand, particularly in the construction sector.

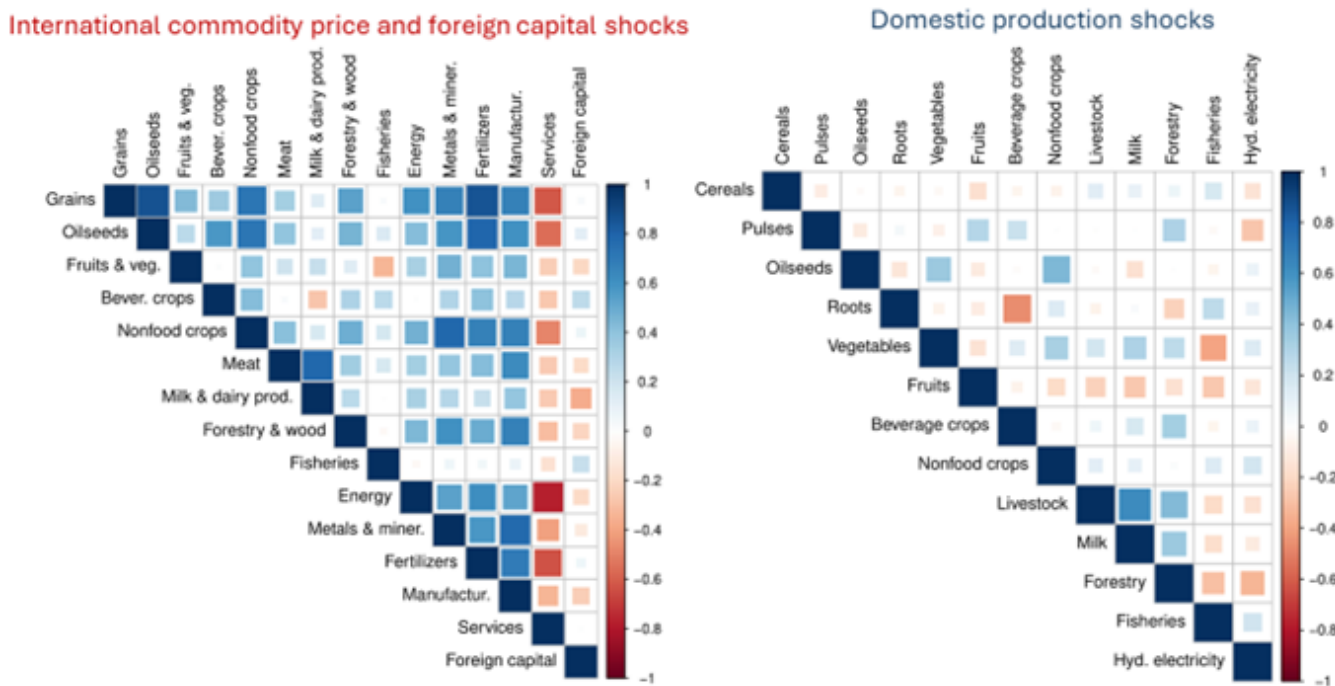
Based on current account data from IMF (2024), fluctuations in estimated foreign savings can reach up to  $\pm$ US\$ 18.6 billion around the long-term average, equivalent to about 5 percent of total GDP (Figure 3A). Despite the link between foreign capital flows and international trade flows, *correlations between shocks in foreign capital flows and international prices of traded commodities are weak* for Egypt (Figure 3B).

**Figure 3.** Descriptive statistics of the sampled shocks for all shock variables

A. Marginal distributions



B. Correlations



**Note:** The cells in the correlation heatmaps in Panel B show the strength and direction of the correlations between two variables. The sizes of the squares indicate the strength of the correlations, with non-colored cells indicating no or near zero correlations and full-colored cells indicating perfect or near perfect correlation. Blue-colored squares indicate positive correlations, and red-colored squares indicate negative correlations.

Because of missing data, the international prices for some commodities are approximated using related price indexes or prices of similar commodities as available from the World Bank's Commodity Price Outlook Database (World Bank 2024b): The grain price index is used as a proxy for cereal, pulse, root, and milled grain prices. Orange and banana prices are used as proxies for all fresh fruit and vegetable prices (while international vegetable prices are unavailable). Energy and metal price indexes are used as proxies for all energy and metal prices, respectively. For prices of all other (non-agricultural/energy/metal) manufacturing goods, the manufacturing unit value index is used as a proxy. Additionally, the United States consumer price index for services from FRED (2024) is used as price proxy for all internationally traded services in Egypt.

**Source:** Own calculation based on data from World Bank (2024a, 2024b), FRED (2024), FAO (2024), and IMF (2024).

## Domestic production shocks

Based on FAO (2024) agricultural production data, our findings reveal that *Egypt's crop and livestock yields exhibit relatively low volatility*. Most agricultural activities fluctuate within  $\pm 15\%$  of their long-term averages, with three exceptions: pulses, oilseeds, and non-food crops, which exhibit wider fluctuations ranging from 22 to 29 percent. These domestic fluctuations are significantly lower than those observed in international primary commodity prices, which can deviate by as much as 56 percent from long-term averages – as in the case of fertilizers. Unlike in most other developing countries, food and feed crop production in Egypt is largely dependent on year-round irrigation due to the country's arid climate, meaning that seasonal rainfall failures do not significantly impact Egypt's domestic agricultural production.

The correlations between the shocks of most domestic production activities are weak, with no clear directional pattern. The only notable exception is a moderately strong, positive correlation between shocks for meat and milk and dairy production. This is explained by the dual use of cattle, goats, and camels, and the accounting of meat and milk and dairy production as two separate production activities in our analysis.

## 5. Risk Profiles

In the second step of our SRP analysis, we feed the shock scenarios into an **economywide CGE model** for Egypt to simulate their impacts on various (sub)sector-specific economic outcomes.

We use IFPRI's standard CGE model, which forms part of the larger Rural Investment and Policy Analysis (RIAPA) modeling system (IFPRI 2025b). The model is calibrated to a Social Accounting Matrix (SAM) for Egypt, updated to 2024 (IFPRI 2025a, 2025c). The SAM has 46 separate domestic production activities and an equal number of separate commodity groups. A survey-based microsimulation module is linked to the CGE model to translate the simulation results into changes in household-level development outcomes such as poverty or undernourishment.

In the third step of the SRP analysis, we apply **data mining and machine learning** to:

- 1) Quantify how individual shocks contribute to volatility of our four key economic and development outcomes<sup>6</sup>
- 2) Rank risk factors by their importance for overall economic performance, private consumption, poverty, undernourishment

The resulting risk profiles are discussed in the following.

### Risk profile for overall economic performance

The results of our SRP analysis show that exogenous shocks can lead to an increase of Egypt's total GDP by 1.6 percent from baseline in the *best-case scenario*, and a reduction by 2.3 percent in the *worst-case scenario* (Figure 4A) (the baseline reflects a situation in which exogenous shocks are absent). At the sector level, agriculture's GDP can fluctuate between +4.0 percent and -3.4 percent, industry's GDP can fluctuate between +2.7 percent and -4.7 percent, and services' GDP can fluctuate between +4.1 percent and -3.2 percent around their baseline values.

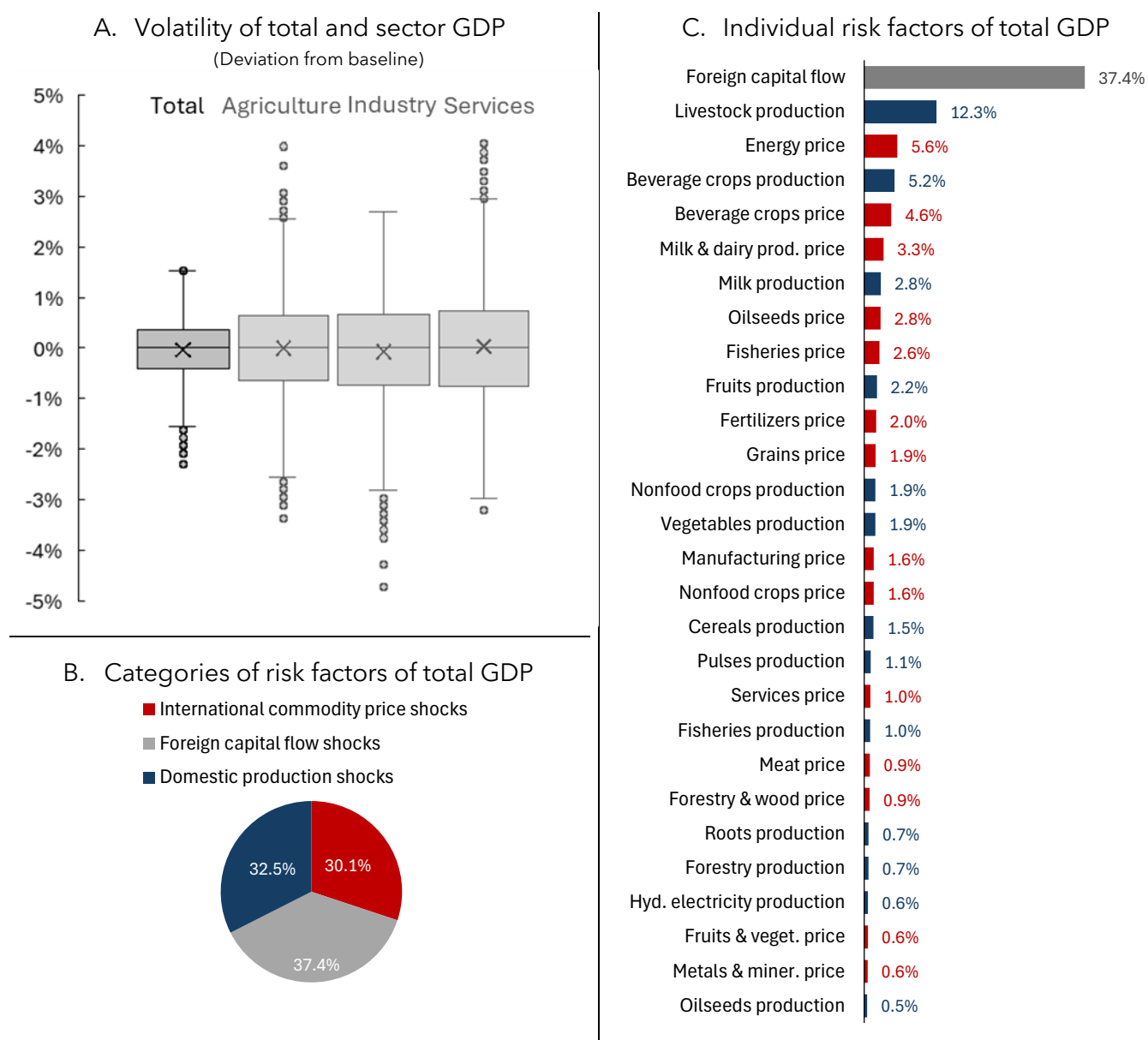
*Shocks in foreign capital flows are the most important risk factor for Egypt's overall economic performance*, accounting for 37.4 percent of the total risk to total GDP (Figure 4B). International commodity price risks

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<sup>6</sup> We use relative importance methods by Lindeman et al. (1980) and Random Forest methods (Breiman 2001), as described in Mukashov et al. (2024) in detail.

together account for 30.1 percent of total GDP volatility. *The largest individual risk factor among the international commodity price risks is energy price shocks* (Figure 4C). Domestic production risk factors together account for 32.5 percent of total GDP volatility. In this category, shocks in meat, beverage crops, and milk and dairy productions are the top three risk factors of overall economic performance (in respective order). The share of the meat production risk is more than twice the share of any other individual risk, other than foreign capital volatility. The largest international commodity price risk factor, and the third largest risk factor overall, is energy prices (which, in the case of Egypt, are driven by the prices of fossil fuels).

**Figure 4.** Components of the risk profile for overall economic performance

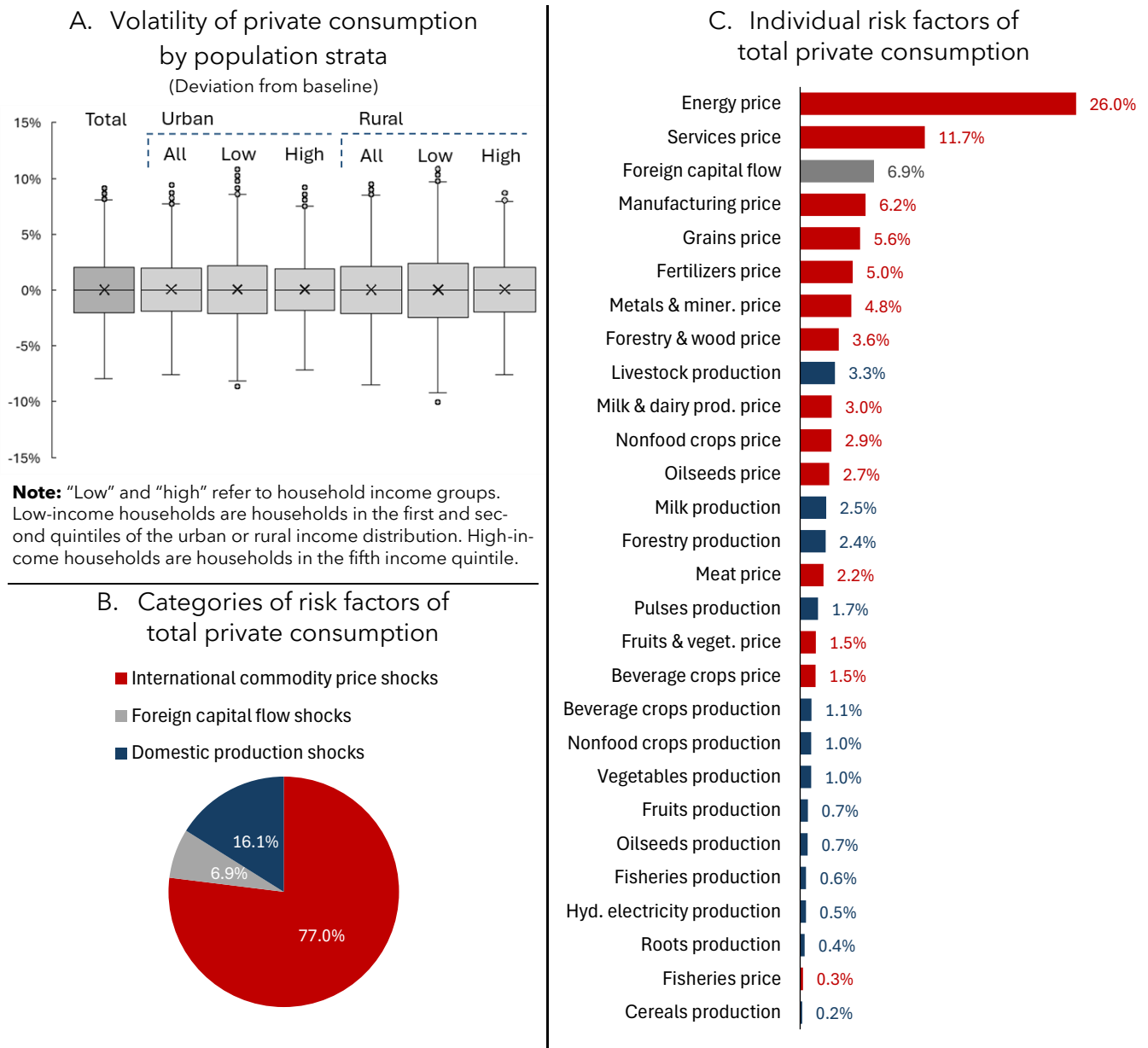


**Note:** The baseline reflects a situation in which exogenous shocks are absent.

## Risk profile for private consumption

In Egypt, *private consumption is more volatile than total GDP*. Private consumption fluctuates around the baseline value in a range of +9.4 percent in the best-case scenario and -7.9 percent in the worst-case scenario (Figure 5A). Measured by standard deviations, *private consumption volatility is three times larger than total GDP volatility*. There is no significant difference in private consumption volatility between urban and rural populations, but distinct (albeit small) differences are observed between lower-income and higher-income population groups. In both urban and rural areas, households in the lowest income quintile are more at risk of exogenous shocks considered than households in the highest income quintile.

**Figure 5** Components of the risk profile for private consumption



**Note:** The baseline reflects a situation in which exogenous shocks are absent.

Because private consumption in Egypt, including household food consumption, is highly dependent on international trade, *international commodity price risks account for the lion's share of the total risk to private consumption*, adding up to 77.0 percent (Figure 5B).

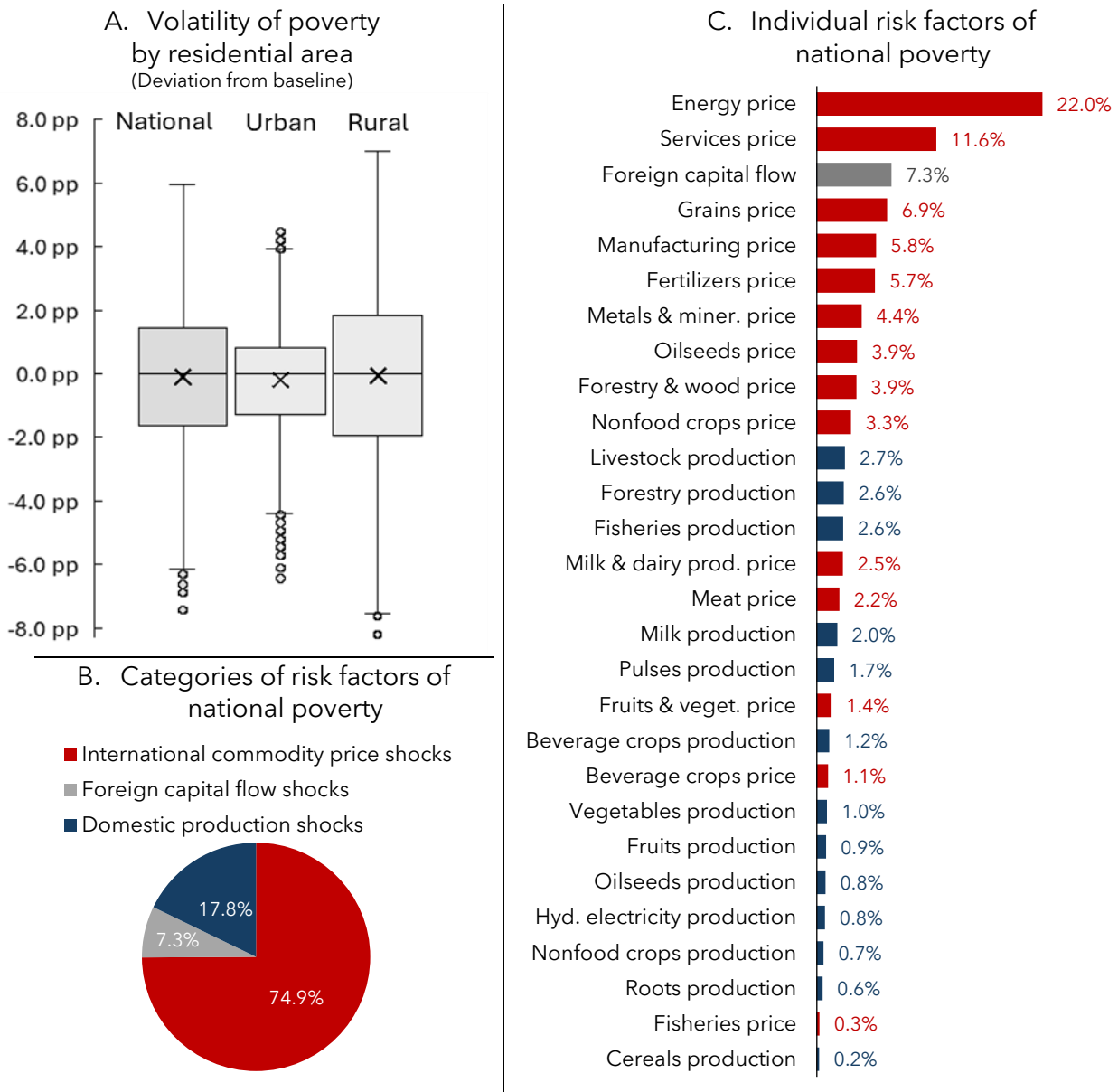
Domestic production risks account for only 16.1 percent of total private consumption volatility. The largest individual risk factor is energy price shocks, which account for 26.0 percent – a much larger share than that of all domestic production risks together (Figure 5C). The second largest risk factor is international services price shocks, accounting for 11.7 percent. Unlike the energy price, the price of services is not very volatile (Figure 3A). However, because of the large contributions of the services sector to Egypt's overall economic performance and trade balance (Table 1), the small risk from international services price shocks is amplified. The third largest risk factor is foreign capital flow volatility. International price shocks for grains, the most important source of calories in Egyptian food consumption baskets, is the fifth largest risk factor. *The largest risk factor among domestic production risks is meat production shocks*, ranked at 9<sup>th</sup> place across all individual risk factors. These risk factors affect the volatility of poverty and undernourishment not only through consumption (or price) links but also through income links in instances where poor or undernourished people are employed in the affected sectors.

### **Risk profile for poverty**

Egypt's national poverty rate can increase by 6.0 percentage points from the baseline rate of 29.7 percent in the *worst-case scenario* and decline by 7.4 percentage points from the baseline rate in the *best-case scenario* (Figure 6A). As expected, the risk profile for poverty resembles the risk profile for private consumption. International commodity price risks also dominate the volatility of the national poverty rate (Figure 6B). Yet the relative importance of individual risk factors is somewhat different, as income and consumption patterns of poor households differ from those of the rest of the population.

While international energy price shocks are the largest risk factor of poverty reduction, its share in poverty volatility is smaller than its share in private consumption volatility (22.0 percent compared to 26.0 percent) (Figure 6C). This result can be explained by a weaker dependence of the poor's income and consumption on energy (especially fuel imports), compared to that of wealthier people. International services price shocks – the second largest individual risk factor – account for nearly the same shares in poverty volatility and private consumption volatility (11.6 percent and 11.7 percent, respectively). Shocks in foreign capital flows are more important to the volatility of poverty than the volatility of private consumption (with shares of 7.3 percent compared to 6.9 percent) but are nevertheless the third largest risk factor of both outcomes. International grain price shocks are the fourth largest contributor to poverty volatility and are therewith more important to poverty than private consumption.

**Figure 6.** Components of the risk profile for poverty



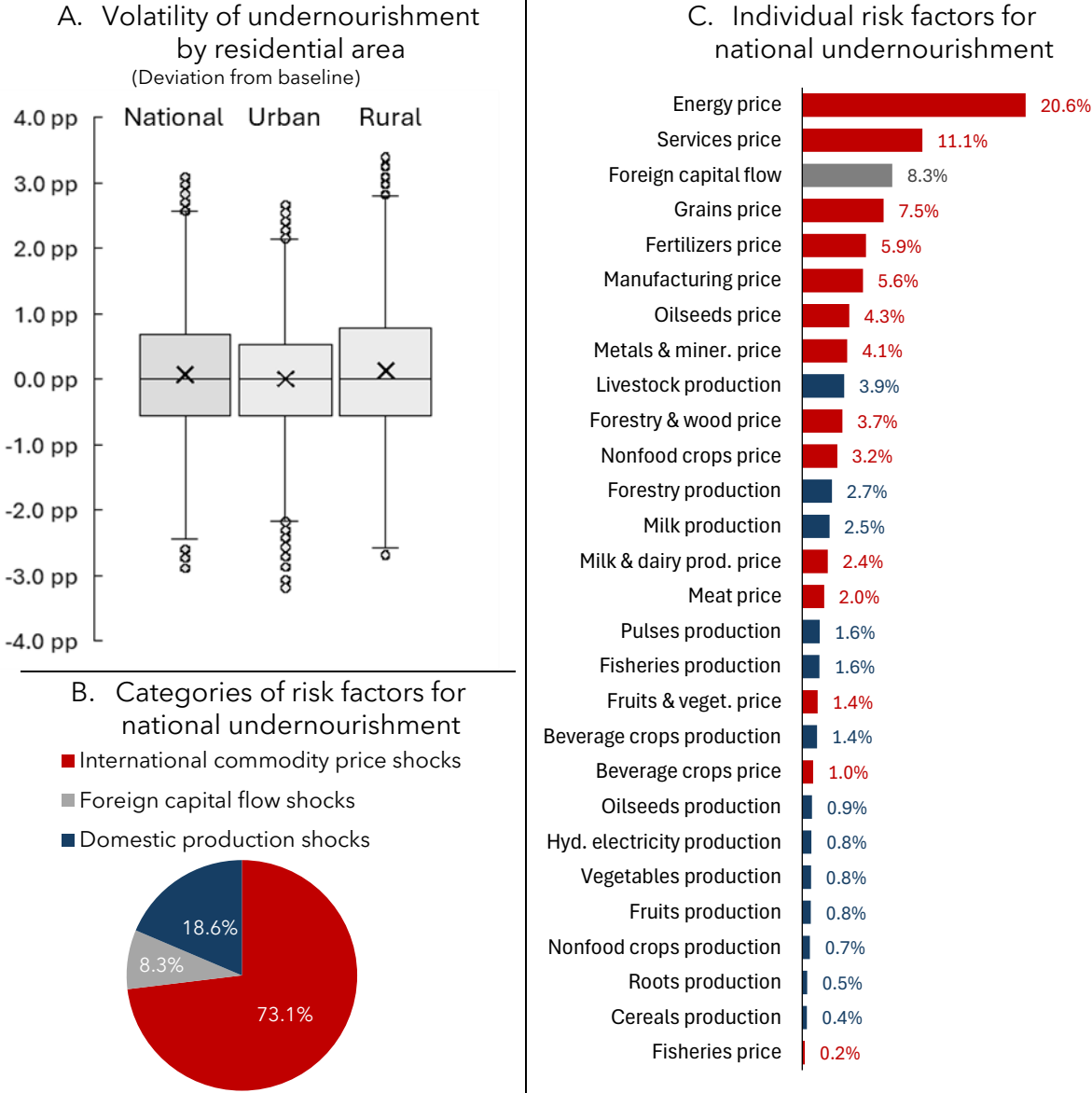
**Note:** The baseline reflects a situation in which exogenous shocks are absent.

### Risk profile for undernourishment

Egypt's national prevalence of undernourishment can fluctuate in a range of 2.9 percentage points above and 3.1 percentage points below the baseline undernourishment rate of 8.6 percent in the worst-case and best-case scenario, respectively (Figure 7A). The three largest risk factors of national undernourishment are the same top three risk factors of private consumption volatility and national poverty reduction. International prices of energy and services and foreign capital inflows are not only critical for overall income and consumption of average and poor Egyptian households but also remain important in defining food consumption of Egypt's poorest of the poor, contributing 20.6, 11.1 and 8.3 percent respectively to under-

nourishment volatility. At the same time, compared to consumption and poverty, factors directly affecting food availability in the country—namely world prices of grains<sup>7</sup>, fertilizers, and oilseeds—are more important for undernourishment than for consumption and poverty (e.g., the world price of oilseeds is twice as important for undernourishment as it is for consumption).

**Figure 7.** Risk profile for undernourishment



**Note:** The baseline reflects a situation in which exogenous shocks are absent.

<sup>7</sup> Grains, especially wheat, are the main staple food in Egypt, and large quantities are sourced through imports, accounting for approximately 40 percent of total calorie consumption (according to data from FAO (2024)).

## 6. Conclusions

Achieving development goals –like becoming a higher middle-income country or ending poverty and hunger by 2030–is subject to economic uncertainties. Yet policymaking rarely incorporates risk assessments, relying instead on deterministic trend projections.

To address this gap, inform national development strategies, and complement standard economic projections, *Systematic Risk Profiling* (SRP) provides a novel approach integrating CGE modeling, household microsimulation, and machine learning. Our SRP exercise for Egypt assesses the risks from exogenous shocks for the national economy and population and simulates the potential impacts of these shocks on the country's overall economic performance, private consumption, poverty, and undernourishment.

The analysis reveals that Egypt's economy and population are more exposed to external risks – especially international commodity price volatility and capital flows – than to domestic production shocks (such as extreme weather). This is due to Egypt's global trade-oriented economy, import-dependent private consumption, and low volatility of domestic production, particularly agriculture. Because of Egypt's arid climate, agriculture relies on irrigation that shields food production from droughts and river floods.

External risks account for at least two-thirds of total risk, across all outcomes examined. These risks comprise of international commodity price risks and foreign capital flow volatility. The top risk factors – energy and services price shocks, and foreign capital flow volatility – have cross-cutting impacts on consumption, poverty, and undernourishment.

The analysis presented in this Country Brief provides an initial assessment of major economic risks in Egypt. Understanding these risks is a critical first step in facilitating discussions on potential risk management strategies such as promoting domestic productivity growth, adopting technologies and practices for reducing production uncertainty, and diversifying economic activity away from high-risk sectors. A next step would be for national policymakers or advisors to evaluate alternative risk management strategies.

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