INTERNATIONAL MONETARY FUND

Who Pays the Bill? Distributional and Fiscal Consequences of Elevated Inflation in Thailand

Piyaporn Chote, Corinne Déléchat, Thanaphol Kongphalee, Pym Manopimoke, Vatsal Nahata, Mouhamadou Sy, and Tamon Yungvichit.

WP/24/22

2024
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WORKING PAPER

 WP/24/22

IMF Working Paper
Asia and Pacific Department

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Authorized for distribution by Corinne Déléchat
February 2023

ABSTRACT:

This paper analyzes the distributional impacts of inflation in Thailand. For that aim, the paper uses rich micro-survey data on 46,000 Thai households to study the effect of the recent elevated inflation on poverty, its distributional effects on different income levels, and the fiscal cost to compensate households from real income losses. To study the multidimensional impact of inflation, the paper also studies how inflation differentially affects households through the consumption, income, and wealth channel. The analysis shows that under a baseline scenario, poverty in Thailand could increase by 1.3 percentage points—about 900,000 people—in the absence of government intervention. Targeted fiscal support to only compensate households that are below the national poverty line from rising inflation amount to 0.05 percent of GDP. However, fiscal support to compensate relatively rich households, defined as those above the median of the income distribution, amount to 1.4 percent of GDP. Moreover, due to high levels of debt, richer households benefit from inflation relative to poorer households. Finally, the paper also delves into policy responses undertaken by the Thai government and Asian and emerging economies to mitigate elevated inflation.

JEL Classification Numbers:	D12, D31, E31, I32, O53.
Keywords:	Inflation; poverty; inflation dynamics; income effect; fiscal cost.

[1] This paper is a product of a joint work between staff of International Monetary Fund (IMF), the Bank of Thailand (BOT), and the National Statistical Office (NSO) of Thailand. The authors are grateful to Alessia De Stefani, Gabriel Hegab, Jaewoo Lee, Giacomo Magistretti, Julieth Carolina Pico Mejía, and Marco Poplawski-Ribeiro for useful comments and suggestions.

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I. Introduction

World inflation averaged 8.7 percent in 2022 compared to an average of 3.5 percent in the previous decade (IMF 2023a). Globally, inflation has risen at a rapid pace from mid-2021, particularly in 2022, affecting all countries irrespective of their level of development. The reopening of economies post-pandemic, large fiscal stimulus, supply-chain-related bottlenecks, and Russia's invasion of Ukraine have contributed to pushing prices, particularly food and energy prices, to unprecedented levels. Even countries such as Thailand, with historically low and stable inflation rates, have suddenly experienced a large surge in prices. Inflation in Thailand increased to 6.2 percent in 2022 compared to an of average of 1.2 percent from the last decade. In 2022, food inflation increased by 6.9 percent and energy inflation by 25 percent.

The drivers and macroeconomic consequences of the recent elevated inflation have been extensively documented (see among others Ha et al. 2022, Hall and al. 2023, and Kyrtsou et al. 2023). Its microeconomic effects have been less studied. This paper fills the gap by documenting the distributional and fiscal consequences of elevated inflation in Thailand. Indeed, large price increases, particularly food and energy prices, not only have distributional implications across countries but also within countries. For instance, it is well-documented that households with low incomes tend to have a disproportionately higher share of food expenditure in their consumption basket. This stylized fact is also confirmed across countries with different income levels (Amaglobeli et al. 2023). Low-income countries have a much higher share of food in their consumption basket compared to advanced economies and emerging markets. In turn, at the aggregate level, emerging economies have higher shares of food expenditures in their consumption baskets compared to advanced economies. Rising energy prices also increase consumption inequality and reduce the consumption of the poorest (Bettarelli et al. 2023).

Against this backdrop, this paper is the first to document in depth the distributional and fiscal consequences of the recent elevated inflation in a country. Building on IMF 2022a and IMF 2023b, and using the Thai Household Socio-Economic Survey in 2021, we quantify the effects of rising inflation on Thai households considering different channels of transmission. The paper also documents potential fiscal costs to compensate households that are below the poverty line from rising prices. We estimate that poverty in Thailand may have increased by about 0.5 percentage point or 1.3 percentage points due only to higher inflation during 2022 in the absence of government response. The increase in poverty likely impacted more Thai households that were already benefitting from some form of state income support, followed by farmers, and while having a smaller impact on wage earners and those involved in business. The effects of inflation on Thai households' financial resources worked mostly through the income channel and to a lesser extent through the consumption and wealth channels.[2]

The Thai authorities swiftly responded to rising prices and deployed a range of policy measures to mitigate the impact of rising prices on households. The measures included price caps on fuel products and a reduction in excise taxes on diesel amounting to 1.1 percent of GDP in FY2022. Universal subsidies accounted for about 70 percent of the total cost. We estimate that the broad-based subsidies are about 17 times costlier than a more targeted support that would focus only on people below the national poverty line. The broad-based subsidies benefited mostly high-income earners who have a disproportionately high share of energy in their consumption

[2] The consumption channel reflects the effects in price increases on different consumption patterns. Through the income channel, inflation erodes households' purchasing power. The wealth channel affects households' assets and liabilities through changes in relative asset prices. See Section IV for more details.

basket in Thailand compared to other countries. A counter-factual experiment shows that households who lie above the 50th percentile of the income distribution could account for about 71 percent of the total fiscal support.

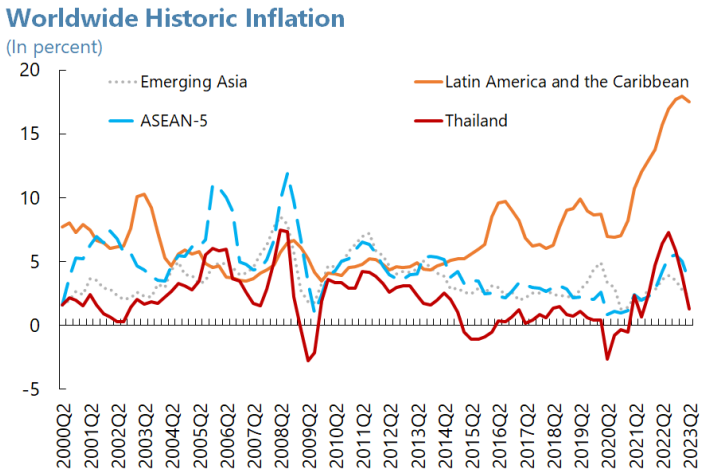
The remainder of the paper is organized as follows: Section II discusses the drivers of inflation dynamics in Thailand. Section III presents the main economic and demographic characteristics of Thai households including from an international perspective. Section IV quantifies the effects of rising inflation on Thai households and potential fiscal costs to shield them from rising prices. Section V discusses the main policy responses in Asia, emerging markets, and in Thailand to mitigate the impact of rising food and energy prices. Section VI concludes.

II. Inflation Dynamics in Thailand

A. Level, Volatility, Persistence of Inflation in Thailand

After more than two decades of low and stable inflation, headline inflation in Thailand surged to unprecedented heights in 2022, alongside advanced and emerging economies worldwide. To get a historical perspective, headline inflation in Thailand experienced a significant decline about two decades ago as shown in **Figure 1**, coinciding with the adoption of a flexible inflation targeting framework by the Bank of Thailand in May 2001.[3] This decline led headline inflation in Thailand to converge to the lower and more stable inflation rates of advanced economies, leading to an era of enhanced synchronization among international inflation rates. This synchronization reflects strong global linkages between countries as well as highlights the important role of global commodity price cycles in driving worldwide inflation rates. Most recently, global supply factors have driven inflation across countries to new heights in the aftermath of the global pandemic and the Russia's invasion of Ukraine. Alongside world inflation that has peaked at 8.7 percent in 2022, headline inflation in Thailand also reached a 14 year high of 7.8 percent in August 2022 (y/y) and remained elevated for 7 months before returning to the Bank of Thailand's upper target range of 3 percent in March 2023.

Figure 1: Thai and Worldwide Inflation Rates

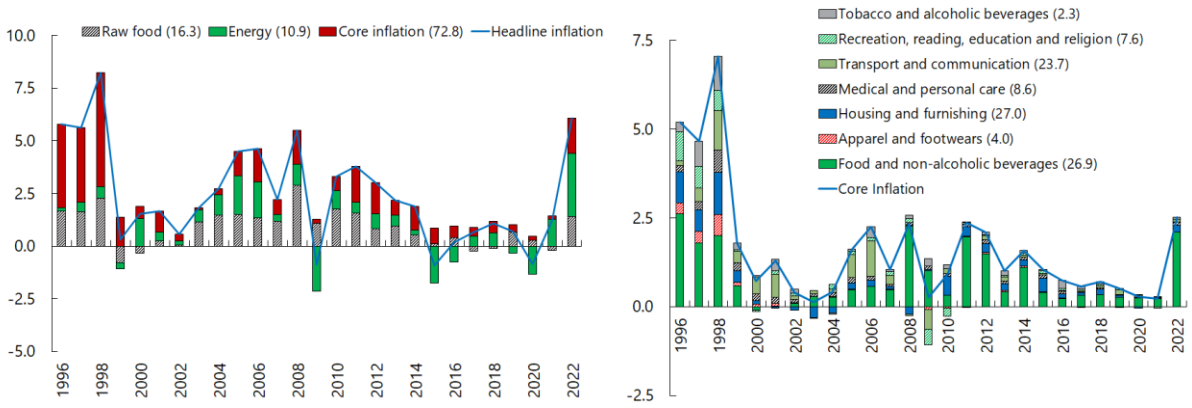


Sources: IMF World Economic Outlook and Authors' calculations.

[3] The Bank of Thailand's inflation target since Inflation Targeting Framework adoption: core inflation within the range of 0-3.5% during 2000-2008; core inflation within the range of 0.5-3.0% during 2009- 2014; headline inflation at 2.5+/-1.5% during 2015-2019; headline inflation within the range of 1.0-3.0% since 2020.

Comparing core and headline inflation rates in Thailand, **Figure 2** shows that the level of core inflation declined dramatically alongside headline inflation in the early 2000s but have shown some visible divergences since then. Most notable is that the level of headline inflation that has stayed mostly elevated above core inflation, including its dynamics that have been more volatile. Since the adoption of the inflation targeting framework, headline and core inflation averaged at 2.1 percent and 1.1 percent, while its variance stood at 4.8 and 0.8 respectively. It is evident from the LHS Figure 2 that most of the fluctuations in headline inflation stems from raw food and energy components while core inflation by contrast remained relatively low and stable. Investigating core inflation components further, the RHS panel of **Figure 3** shows that only the food and non-alcoholic beverages component in core inflation has displayed more sizable movements over past decades.

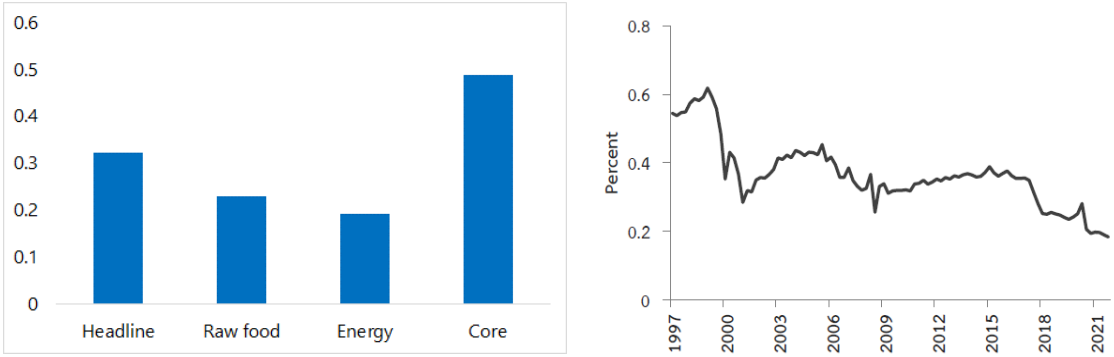
Figure 2: Contributions to Headline and Core Inflation



Sources: Authors' calculations.
Note: The average expenditure share of each category in all CPI baskets since 2000 is reported in parentheses.

The dynamics of headline and core inflation have different implications for inflation persistence (**Figure 3**). Core component of inflation has the highest level of persistence, consistent with its sticky or slow-moving behavior that has resulted in stable core inflation dynamics over past decades. On the other hand, less persistent headline inflation stems from volatile food and energy components, with shocks that have delivered relatively short-lived impacts on overall inflation behavior. A large consensus has been that low inflation persistence has been a characteristic of countries that have credible monetary policy frameworks, which help anchor medium term inflation expectations. This explanation for low inflation persistence applies to Thailand as the RHS panel of **Figure 3** shows that inflation persistence in Thailand declined since the early 2000s after the Bank of Thailand adopted the flexible inflation targeting framework in 2001. As such, while Thailand has been exposed to frequent and volatile food and energy price shocks, its effects have not been destabilizing towards headline inflation. Overall, headline inflation has remained relatively well-anchored since the adoption of the inflation targeting regime, averaging at 2.1 percent which is close to the mid-point of the Bank of Thailand's inflation target range of 1-3 percent.

Figure 3: Inflation Persistence in Thailand



Sources: Authors' calculations.

Note: In the LHS panel, inflation persistence for headline inflation and its components are calculated as the first AR coefficient during the post inflation targeting period 2002Q2-2022Q4. In the RHS panel, inflation persistence is calculated for headline inflation as the first AR coefficient based on a 20-year rolling window since 1997.

B. Role of global and relative price shocks

a) Production structure

Given the importance of food and energy components in driving overall headline inflation, inflation dynamics in Thailand have been particularly sensitive to supply side shocks. Given that supply shocks are mostly sector-specific in nature, they have resulted in large relative price movements for Thailand. According to Apaitan et al. (2020) and Nookhwun and Manopimoke (2023), relative price movements indeed explain a sizable component of overall inflation dynamics in Thailand. More specifically, over half of the fluctuations in headline inflation can be attributed to relative price movements. During the recent inflation surge, it has been evident that both fluctuations in food and oil prices played a prominent role in driving large relative price changes which influenced overall inflation dynamics. In January 2022, pork price increases from the African Swine Fever disease were as high as around 27 percent, which led to further price increases in other food items as well. Global oil prices also surged for most of the second half of 2022, leading the energy component of Thai inflation to explain more than half of the overall variation in headline inflation.

Raw food and energy make up 16 and 11 percent of the overall CPI basket, with the food and beverage component in core inflation adding on an additional 20 percent. While the sizable share of food and energy components in the CPI basket is a common trait among developing economies, the share for Thailand stands on the high end compared to other countries in the region and with comparable level of development (see Section III). Moreover, in Thailand, 70 percent of raw food is produced domestically, thus making food inflation particularly sensitive to domestic supply and weather conditions. As for energy, Thailand is an exceptionally energy intensive country, with a share of energy consumption per GDP at 243.7 which is among one of the highest in the world. Sectors that utilize oil intensively are public utilities, food manufacturing and transportation and communication sectors. To meet consumption needs, Thailand relies heavily on imports, being able to only produce 8 percent of crude oil while importing the remainder of 92 percent. This makes the energy inflation component particularly vulnerable to world oil prices.

b) Diminishing role of domestic factors

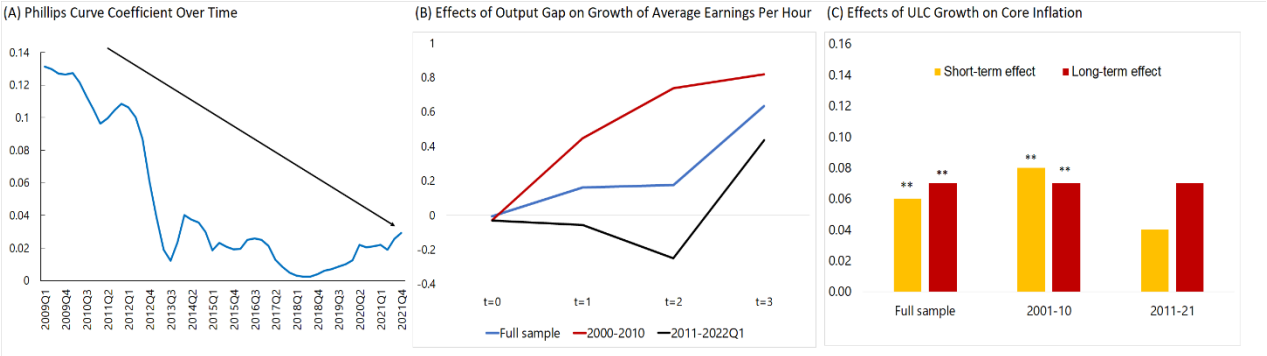
As a small open economy that has a trade openness ratio exceeding 100 percent, inflation in Thailand is highly vulnerable to global shocks. Empirical evidence shows that a global inflation component explains up to 62 percent

of overall headline inflation variability in Thailand since 2001[4], where the importance of this global factor has increased over time. Clarida et al., (2001) show that in the case of open economies, negative cost push shocks (such as Russia's invasion of Ukraine) can cause the terms of trade to depreciate which leads to heightened and volatile CPI inflation. Manopimoke (2018) document that the rising importance of a global factor for inflation since 2000 can be mostly attributed to an increasing role for a global output gap and input linkages, especially during the early 2000s as emerging countries such as China became more integrated into world trade systems including supply and production chains. International input-output linkages in the form of supply chain integrations can also lead to substantial synchronization in producer price indices with input-output linkages accounting for half of the variation in PPI inflation (Auer et al. 2019). Similarly, Nookhwun and Manopimoke (2023) also find that global shocks that are transmitted via world oil price fluctuations explains over half of the variation in overall headline inflation**.** Moreover, during times of liquidity constraints, firms can respond to adverse demand or financial shocks by raising prices in a manner that is countercyclical to fluctuations in output (Gilchrist et al., 2017).

The importance of a global factor for Thailand is in line with the findings of a large international literature that has emphasized a growing role for global factors towards explaining domestic price fluctuations (Borio and Filardo, 2007; Schwerhoff and Sy 2014). As a global factor for inflation gains prominence, many studies have found a diminishing role for domestic factors, notably the domestic output gap through the traditional Phillips curve relationship (Blanchard et al., 2015; Ball and Mazumder, 2011). This phenomenon, also known as the flattening of the Phillips curve, has been observed in Thailand as well. According to **Figure 4a**, the Phillips curve slope for Thailand which captures the relationship between the domestic output gap and core inflation has undergone a notable decline around the early 2000s, towards an estimate of around zero.

Similarly, studies have found that prices in Thailand have responded minimally to domestic labor market conditions as well. The hourly average earning growth in response to a 1 percentage-point increase in output gap has declined during the past decade (**Figure 4b**). Alongside lower wage sensitivity to economic cycles (**Figure 4c**) also documents lower wage-price pass through. Estimates of the link between wage inflation and core inflation for Thailand during the 2000-10 period was as low as 0.1 and became statistically insignificant thereafter. These findings are in line with those in advanced economies, which feature steadily declining wage-price passthrough since the 1980s, due possibly to greater competition in the form of imports from manufacturing-based emerging countries (Boissay et al., 2021; Kohlscheen and Moessner, 2021). In Thailand, the weak wage-price relationship has been attributed to structural features of the labor market that are typically common among emerging economies in Asia. These include a large informal sector that has help increase elasticity in supply, as well as weak bargaining power due to the lack of wage indexation contracts and few labor unions.

Figure 4: Flattening Phillips Curve and Diminished Role of Domestic Factors



[4] Global component is extracted from a dynamic factor model applied to inflation series in 18 countries (AEs: US CA UK FR NL SE SW AU, Asia: JP KR TW PH TH SG, LATAM: BR MX PE CO).

Sources: Authors' calculations.

Note: (A) Plotted is the one-year moving average of the estimated coefficient on the output gap from a rolling Phillips Curve regression based on annualized quarter-on-quarter core inflation over a 15-year rolling window. (B) Results of a local projection of hourly average earning growth in response to a one-percentage-point increase in output gaps. (C) Results of multiple regression of core inflation on its lag and growth of unit labor costs. The calculation of long-term effects considers inflation persistence. ULC stands for Unit Labor Cost.

C. Impact of shocks on inflation

a) Limited pass-through and spillovers of energy and food prices

While food and energy price shocks are prominent drivers of overall fluctuations in headline inflation, their pass-through and spillover to other items in the CPI basket has generally been limited[5]. In other words, food and energy price shocks are relatively sector-specific and do not result in broad-based effects that would make overall inflation entrenched. According to a spillover analysis among 19 sectors in the CPI consumption basket, **Table 1** confirms that the spillover of food and energy shocks are relatively concentrated in only own or few related sectors. For example, shock spillover from food items in column (1)-(7) are relatively contained within related sectors, such as other food items or to food related services. The highest spillover is from food seasonings to food away from home where the degree of spillover is around 30 percent. Next, turning to examine the shock spillover from the energy sector in column (19), it is evident that compared to other sectors, energy is the primary source of shock spillover to other sectors. Nevertheless, the degree of spillover to various other sectors is still not that large – at around less than 20 percent for each sector. Certain sectors face a relatively higher impact from energy price shocks includes public transport services and personal care expenditures, but for most sectors, energy price shocks explain less than 10 percent of variations in their price changes.

Table 1: Spillover of shocks between various sectors of inflation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	From Others
Rice, Flour & Cereal Products (1)	41.73	0.25	5.78	1.68	1.18	1.14	1.45	0.85	6.99	0.20	1.16	1.65	1.18	1.19	7.99	1.26	8.84	7.22	8.26	58.27
Meats Poultry & Fish (2)	0.72	42.31	12.77	1.91	7.27	1.90	1.17	1.97	0.66	4.44	0.46	1.14	0.28	0.12	13.99	3.80	0.27	1.57	3.23	57.69
Eggs and Dairy Products (3)	2.23	7.29	53.26	3.59	2.75	0.10	2.15	0.22	1.09	10.41	2.21	0.85	0.85	0.73	5.13	0.86	1.95	2.61	1.72	46.74
Vegetables and Fruits (4)	3.71	0.95	0.39	66.77	5.36	0.54	0.47	0.30	0.54	0.40	1.81	1.25	1.48	0.12	8.30	1.93	1.25	0.00	4.45	33.23
Seasoning and Condiments (5)	0.63	1.87	11.04	0.67	51.27	3.16	4.09	0.72	6.30	0.41	1.18	8.61	0.88	0.28	0.22	0.53	0.22	0.25	7.67	48.73
Non Alcoholic Beverages (6)	1.74	0.91	0.65	0.35	7.72	26.37	6.75	0.89	1.65	3.53	8.80	0.71	2.72	8.53	2.39	0.54	8.24	2.94	14.56	73.63
Prepared Food (7)	0.79	7.41	8.83	0.18	31.32	1.95	16.20	2.77	9.73	3.03	0.39	0.77	0.72	0.61	1.11	0.86	0.03	1.48	11.80	83.80
Clothing & Footwears (8)	0.44	0.54	0.26	0.04	2.31	0.41	10.29	47.00	7.05	4.37	6.75	6.70	2.77	0.07	1.02	1.42	0.61	1.63	6.32	53.00
House Rent (9)	0.28	0.08	4.00	0.57	1.45	0.24	8.72	1.02	61.04	2.19	1.88	2.44	1.76	0.38	4.53	1.87	0.46	2.13	4.96	38.96
Textile of House Furnishing (10)	1.33	0.73	0.53	0.55	8.35	1.14	10.71	4.98	4.95	50.39	0.50	3.07	4.61	0.44	0.49	0.32	0.46	0.48	5.97	49.61
Cleaning Supplies (11)	0.82	5.24	3.65	0.67	6.96	3.68	7.25	0.68	3.91	0.55	34.66	0.54	5.69	0.30	3.51	3.05	1.10	2.92	14.81	65.34
Medical Care (12)	3.32	0.16	5.59	0.92	1.13	1.57	2.12	11.81	4.45	4.21	1.60	53.85	0.95	1.96	2.92	0.05	1.73	1.24	0.41	46.15
Personal Care Expenditures (13)	0.98	1.10	0.47	0.52	1.55	0.81	14.17	0.12	2.49	3.78	5.22	7.68	43.90	0.48	0.39	0.09	0.28	0.42	15.57	56.10
Public Transportation Services (14)	0.73	0.41	13.12	0.01	2.39	1.47	0.23	0.11	0.69	0.06	6.59	1.49	2.62	39.11	6.28	2.68	0.73	2.26	19.02	60.89
Vehicles & Operation (15)	0.13	0.23	2.48	2.94	3.13	0.08	11.74	0.34	0.08	0.11	1.43	1.34	18.50	0.21	47.24	7.12	0.07	0.06	2.77	52.76
Recreation, Reading, Education and Religion (16)	2.49	0.25	1.21	4.00	1.08	0.32	0.19	6.04	1.51	2.20	4.80	4.74	2.30	4.83	1.09	57.12	0.58	3.94	1.34	42.88
Tobacco (17)	1.71	0.11	0.85	0.31	2.94	0.20	3.18	3.82	2.17	13.34	3.81	2.10	1.10	0.42	2.04	2.13	49.86	9.67	0.24	50.14
Alcoholic Beverages (18)	6.74	4.50	18.89	0.59	2.08	2.38	1.37	0.58	1.06	5.22	1.01	2.40	1.33	0.42	0.35	6.12	4.17	40.67	0.10	59.33
Energy (19)	8.32	0.18	2.58	1.81	1.10	2.06	1.71	6.10	0.48	3.49	1.88	0.47	0.49	0.90	0.45	1.94	0.90	1.71	63.42	36.58
To Others	37.13	32.19	98.09	21.33	90.01	23.17	87.77	43.31	55.81	61.96	51.48	47.94	50.22	21.99	62.20	36.57	31.89	42.53	123.21	**53.36**

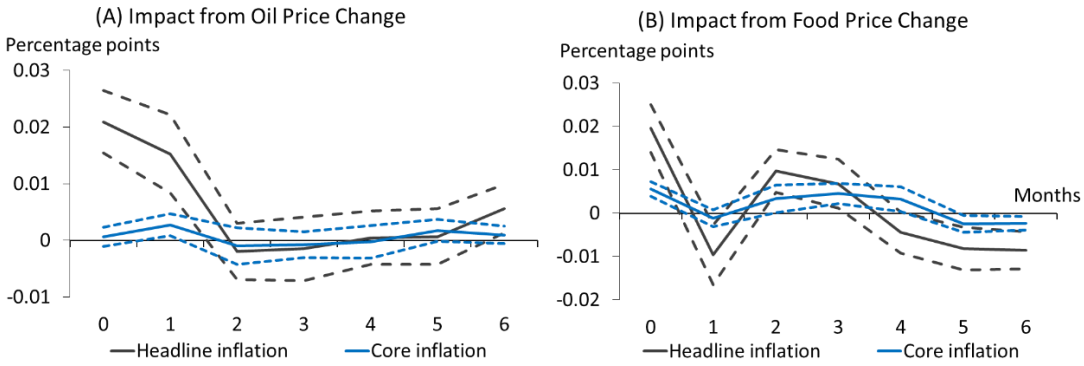
Source: Authors' calculations.

Note: The table shows spillover results as calculated by a one-year-ahead generalized variance decomposition from a generalized Vector Autoregression model. Data consists of monthly inflation rates of 19 sectoral components of CPI (3-digit for food categories and 2-digit for non-food categories) over 2000Q1-2022Q1. Numbers in each row show variance share of inflation rates of a particular good explained by shocks from each of the 19 sectors.

[5] See Choi et al. 2018 for an analysis of pass-through of oil prices from an international perspective.

To quantify the impact of a food and oil price shock on overall headline inflation, Nookhwun and Worasak (2019) carries out an analysis that shows that that 1-percentage point increases in both global oil and food prices raise headline inflation by 0.03 percentage point after one month (**Figure 5)** but have a muted and insignificant impact on core inflation. That is, the impact of oil prices on Thai headline inflation occurs mainly through its direct effects on retail oil prices but delivers limited effects on other prices in core components of the CPI basket. For global food prices, a similar pattern emerges although their effects on core inflation are slightly larger and longer lasting, but still remains small in scale.

Figure 5: Impact of a Change in Global Oil and Food Prices on Thai Inflation



Sources: Nookhwun and Worasak (2019).

Note: Results from local projection models a la Jorda (2005). The figure shows the impact of 1 percentage-point change in global oil and food inflation on Thai headline and core inflation over 6-month horizon. The dashed lines indicate 95-percent confidence bands. Sample periods cover 2000M1-2022M3. Lagged values of the dependent variable up to four periods are included to control for the persistence of inflation. The regression also controls for the output gap to capture domestic economic conditions.

(b) Domestic policies

Given that Thai inflation is exposed to large relative price shocks that could be exceptionally volatile, the Thai government enacts various measures to help limit excessive volatilities for key goods and services to help support living cost. These government measures have had both direct and indirect effects on overall Thai inflation. Apart from helping alleviate the initial impact of sharp price increases onto domestic inflation, it could also prevent the occurrence of second round effects that could lead to large and prolonged price increases as well. More specifically, by reducing the initial impact of a large price shock on firm's input costs, it lowers the chance that firms might pass these temporary price increases to consumer prices. Also, if these initial shocks are not large and prolonged, firms have less likelihood to alter inflation expectations and adjust their price-setting behavior, which helps put a lid on broad-based and persistent price pressures. A notable example of this is during the most recent episode of high inflation in Thailand. Despite high food and energy price shocks, price controls and subsidies in place have helped contribute to a relatively swift disinflation process in Thailand.

Domestic policies on prices come in various forms, but the most popular in Thailand are in the form of price controls and subsidies**.** On legal price controls, the Ministry of Commerce (MOC) regulates goods and services that account for slightly less than 27 percent of the CPI basket, in which the composition of these items varies over time. There are various degrees of price controls, ranging from retail price-setting that needs prior approval from the government for a price change, to more relaxed measures that includes informing the MOC of price changes or details on input costs or promotions. The MOC also conducts price monitoring, with goods and services classified into three main groups – watch list (monitored twice a month), priority list (monitored twice a week), and sensitive list (monitored daily).

III. Thai Households' Consumption

A. Thai Households' consumption basket

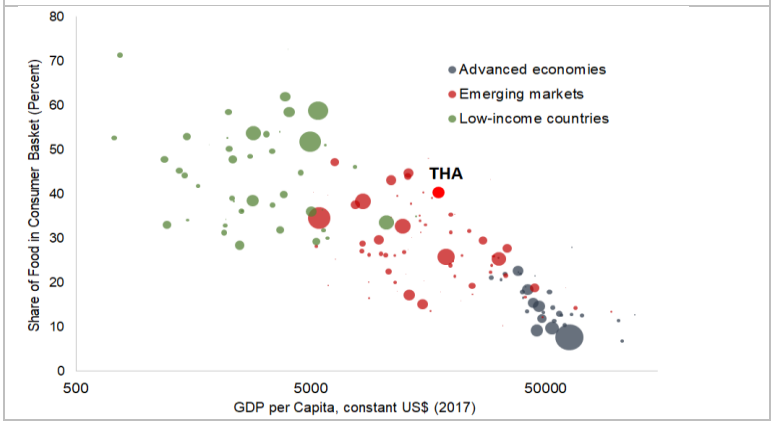
a) Economic and demographic characteristics

Data from Thailand's household's socio-economic survey[6] indicate that the typical Thai household is small, lives in non-municipal areas, and is headed by a male. The survey shows that the average household size in Thailand is about 2.8 persons in 2021. The majority of households, about 53.4 percent, live in non-municipal areas out of which about 15.6 percent are economically inactive, 10.3 percent work in the agricultural sector, and 6.8 percent in construction and mining. Regarding the characteristics of the heads of households, about 59 percent of them are males. About 40 percent of household heads are aged over 60 years, reflecting Thailand's aging society. See Annex I for more information about the survey and the sources of our data.

We found that the typical Thai household is heavily indebted and spends the major share of its income on food. Households had an average income of 27,352 baht (about 780 USD) per month and an average debt of 205,679 baht in 2021. This translates into a debt to yearly gross income of about 63 percent per household. Households for which the heads have a higher level of education have higher average monthly incomes and larger property wealth. Regarding expenditure, Thai households spend on average about 21,616 baht per month of which 87 percent on consumption-related expenditures. Food and beverages (excluding alcohol) account for about 39 percent of consumption expenditure, followed by furniture and equipment (24.6 percent), and travel and vehicle expenses (18.4 percent). **Tables A.1-A.4** in Annex I provide additional information about household characteristics in Thailand.

b) An International Comparison

Figure 6. Food in Consumer Basket and GDP per Capita



[6] The National Statistical Office (NSO) carries out the Household Socio-economic Survey (thereafter called "the survey"). The survey collects detailed information on income, expenditure, debt, and assets of households as well as their demographic characteristics. The survey is conducted every two years across all provinces and in municipal and non-municipal areas. This paper is mainly based on the 2021 surveys. Annex I provides additional details about the survey.

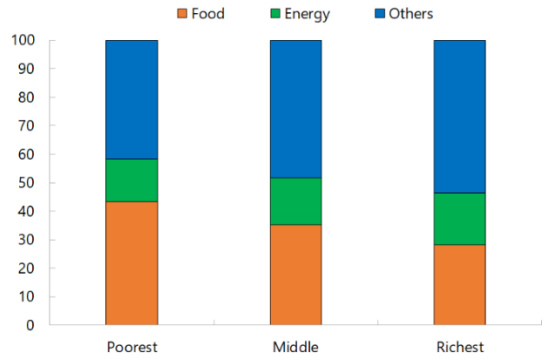
Sources: Amaglobeli et al. (2023); IMF CPI database and *World Economic Outlook*.
Note: Dot sizes represent approximate percentage of population in each household income group within country groupings.

The share of food in the consumption basket is negatively correlated with income. Food inflation has significant negative distributional implications across countries depending on income level. Indeed, the share of food in households' consumption basket in developed countries is lower than the one in emerging markets. In turn, the typical household in an emerging market has a much lower share of food in his consumption basket compared to the typical household in low-income countries (**Figure 6**). Food accounts for about 44 percent of household consumption basket in low-income countries compared to 27 percent in emerging markets and 16 percent in developed countries (Amaglobeli et al. 2023). At about 40 percent, Thailand's share of food in households' consumption basket is 10 percentage points higher than the average consumption share in emerging markets. In addition, in Thailand, low-income households spend a disproportionately high share of their income on food.[7] Expenditure shares for food vary considerably across income groups in Thailand (**Figure 7**). Households spend

a much lower share on food consumption as income levels increase. Households in the lowest income segment spend about 46 percent of their income on food while households in the highest consumption segment spend about 28 percent of their income on food. Household spending on energy increases with income level but the differences across income groups are less pronounced as compared to spending on food.

The same pattern is observed in Asia and in other regions of the world though Thai households spend more on energy. The shares of food and energy in the consumption basket decrease with income in other regions of the world (**Figure 8, panel 1**) and in other Asian countries independent of their stage of development (**Figure 8, panel 2**). This negative correlation is particularly pronounced for food though to a lesser extent for Thailand. This could suggest that the difference between the richest and the poorest households could be more pronounced elsewhere than in Thailand following an increase in food prices. However, energy consumption across income categories is significantly higher in Thailand than the averages in other regions of the world including in Asia and the Pacific. In addition, the consumption of energy increases with income while the opposite is observed elsewhere. This could be driven by the fact that Thailand is an exceptionally energy intensive country as discussed in Section II.

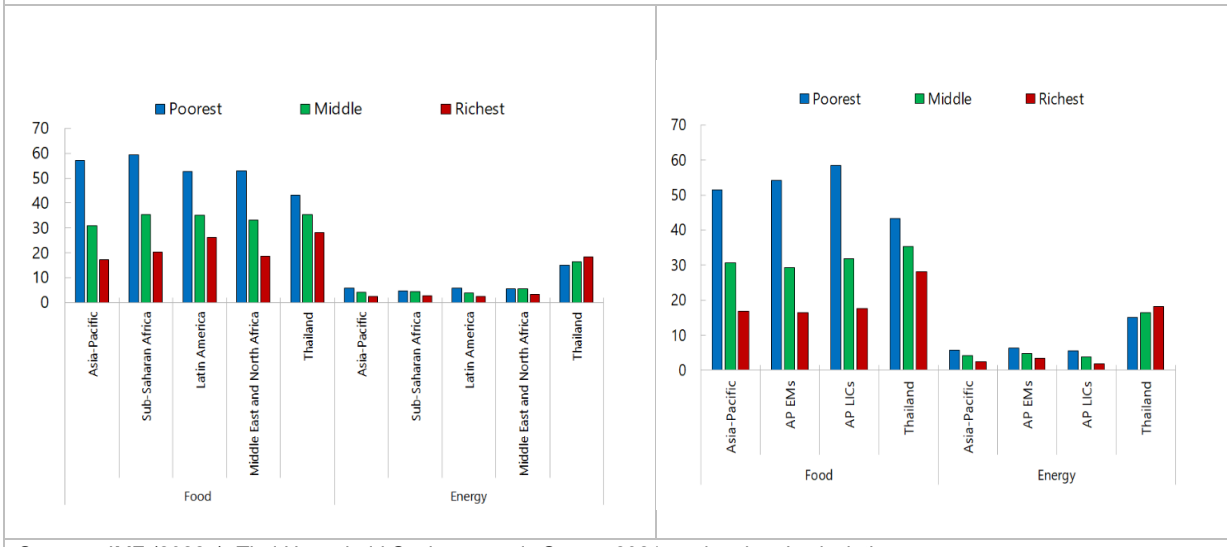
Figure 7. Thailand: Share of Food and Energy in Total Expenditure
(By Income, in percent)



Sources: Thai Household Socioeconomic Survey 2021 and authors' calculations.

[7] Annex II provides details about the main technical assumptions used in the paper.

Figure 8. Share of Food and Energy in Total Expenditure
(Percent)



Sources: IMF (2022a), Thai Household Socioeconomic Survey 2021; and authors' calculations.

IV. The Effects of Rising Food and Energy Prices

A. Channels of transmission

Inflation affects households mainly through consumption, income, and wealth channels (Cardoso and others 2022; IMF 2023b).

- *The consumption channel* reflects the effects of the differences in price increases of various goods and services on different consumption patterns. For example, if the price of prepared food increases more than other commodities, households with higher shares of prepared food in their consumption basket will be more affected.

- *The income channel* reflects the fact that rising prices erode households' purchasing power when nominal incomes such as pensions are not fully indexed. For example, when wages are sticky i.e., not updated frequently, high inflation reduces real wages. Depending on the primary source of income for households, inflation may have a positive or negative income effect. For households that rely on business income or agricultural income to the extent that product prices also increase, inflation could have a positive income effect.

- *The wealth channel* works through how inflation affects households' assets and liabilities through changes in relative asset prices. Inflation induces wealth redistribution between borrowers and lenders with rising inflation benefiting more to net borrowers (the ''Fisher channel''). High inflation also affects more liquid assets such as cash holdings and therefore weigh less on households with high net worth in the form of more diversified financial portfolios.

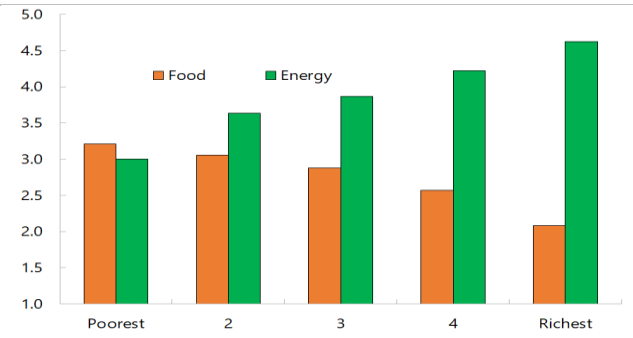
B. The effect of rising food and energy prices on poverty and public finances

Thai household- specific levels of inflation is calculated to illustrate who bears the burden of rising food and energy prices. **Figure 9** shows the differentiated impact of inflation on households depending on their income levels and consumption patterns. It breaks down the average headline inflation of 6.1 percent in 2022 by income and expenditure groups. The figure suggests that the poorest in Thailand are affected by both food and energy inflation while the richest segment of the population are mostly affected by rising energy prices.

The simulations show that the large increase in food and energy prices observed in 2022 may increase poverty.

Figure 9. Contribution of Inflation Components for Households, By Income

(Percent)

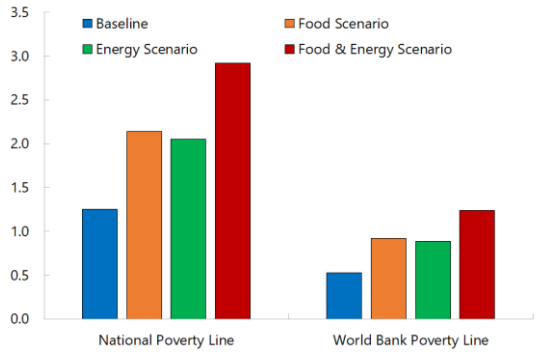


Sources: Thai Household Socioeconomic Survey 2021, and authors' calculations.

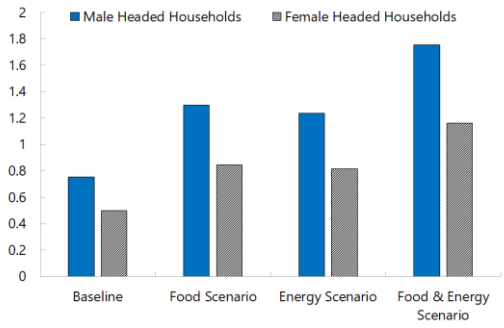
Figure 10. Effects of Food and Energy Prices on Poverty

(Percentage points change)

1. All households



2. By Gender



Sources: Thai Household Socio-Economic Survey, 2021 and authors' calculations.
Note: National Poverty Line is defined as 2,763 baht per person per month. WB Poverty Line is defined as $5.50 per person per day (2011 USD PPP) for Upper Middle-Income Countries.

(**Figure 10, panel 1**). Two poverty lines are used. The national poverty line defined as 2,763 bath (about 79 USD) per person per month while the World Bank's poverty line for upper middle-income countries such as Thailand. The latter is equal to $5.5 per person per day (2011 USD PPP). Under the baseline, poverty could increase by about 1.3 percentage points based on the national poverty line and about 0.5 percentage point based on the World Bank's poverty line in the absence of the government's intervention. Delving deeper, we find that 0.8 percentage point of the increase—under the baseline and using the national poverty line—is attributed to households headed by male members while 0.5 percentage point is attributed to female headed households (**Figure 10, panel 2)**. Female headed households have a slightly higher average per capita income of 89,216 Baht per year compared to male headed households (88,752 Baht per year) but this difference is not statistically significant. However, households headed by male members account for about 60 percent of all households, and given the small differences in income per capita, more male-headed households fall below the poverty line following the inflation shock.

Table 2: Increase in Poverty by Region
(In Percent, unless otherwise indicated)

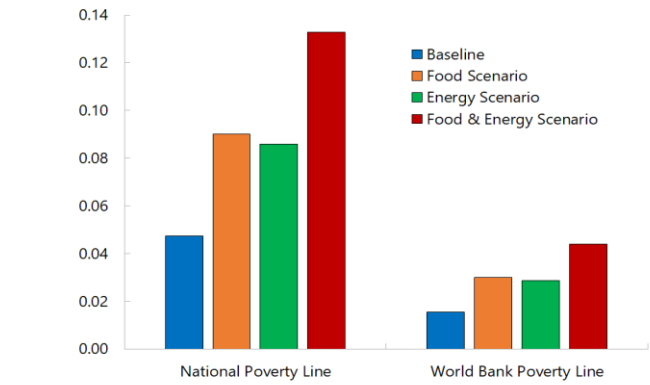
	Thailand	Central (incl. Bangkok)	North	Northeast	South
Poverty rate *(prior to shock)*	5.6	2.0	7.5	9.6	6.6
Increase in poverty	1.3	0.4	1.9	2.1	1.5
Contribution to ↑ in poverty		0.2	0.4	0.5	0.2
# of people *(thousands)*	900	144	266	331	158

Sources: Thai Household Socioeconomic Survey 2021; and authors' calculations.

We also analyze how the increase in poverty in the baseline is distributed across Thailand's four main regions (Table 2). The Northeast region has the largest poverty rate prior to the price shocks but is also the main contributor to the additional increase in poverty following rising prices with about an additional 300 thousand falling into poverty in the absence of government intervention. This pattern is followed by the North region and the South region. In contrast, the Central Region (including Bangkok Metropolitan) witnesses the slowest increases in poverty with about 144 thousand additional persons falling into poverty.

Our analysis also illustrate the impact of different inflation scenarios on Thai households. Under the first scenario, food inflation doubles while other prices are kept constant. Under the second scenario, energy inflation doubles while other prices are kept constant. The third scenario combines the food and energy price shocks. Under the combined scenarios, poverty may increase up to 3 percentage points based on the national poverty line. The increase in relative poverty is much lower, about 1.2 percentage points, if the World Bank's poverty line is used.

Figure 11. Fiscal Cost to Protect the Most Vulnerable
(Percent of GDP)



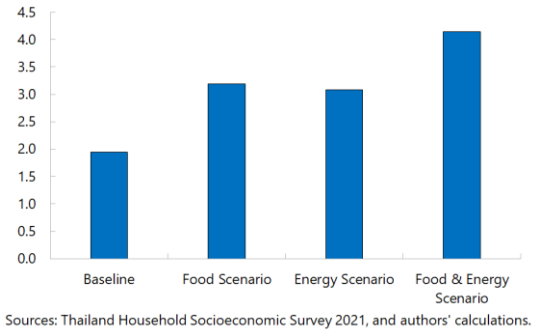
Sources: Thai Household Socioeconomic Survey 2021; and authors' calculations.
Note: The national poverty line is defined as 2,763 baht per person per month. The World Bank's poverty line is defined as $5.50 per person per day (2011 USD PPP) for Upper Middle-Income Countries. Fiscal cost is defined as the amount required to compensate all households below the poverty line for the effect of inflation on their incomes.

The analysis shows that the cost to fully compensate only all households that fall below the poverty lines is negligeable. Based on the national poverty line, the fiscal costs range from 0.05 percent of GDP in the baseline to 0.13 percent of GDP in the combined scenario (**Figure 11**). In the case that the entire Thai population is compensated due to income erosion from inflation, the fiscal cost is of course much higher, 1.9 percent of GDP under the baseline (**Figure 12, panel 1**). However, a closer look at the data shows untargeted fiscal supports benefit mostly to high income earners (**Figure 12, panel 2**). Households under the poverty line accounts only for 2.4 percent of the total fiscal cost. Those with incomes above the 50th percentile of the population account for more than 70 percent of the total fiscal cost.

Figure 12. Fiscal Cost to Protect all Households

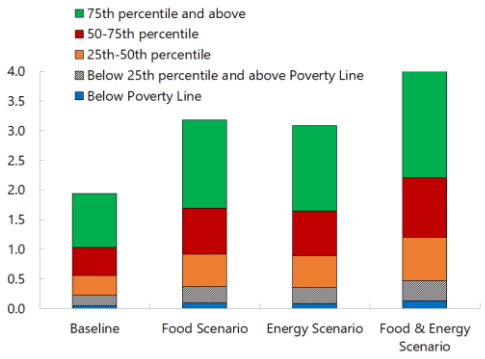
1. Aggregate Cost

(Percent of GDP)



2. Breakdown of the Cost

(Percent of GDP)



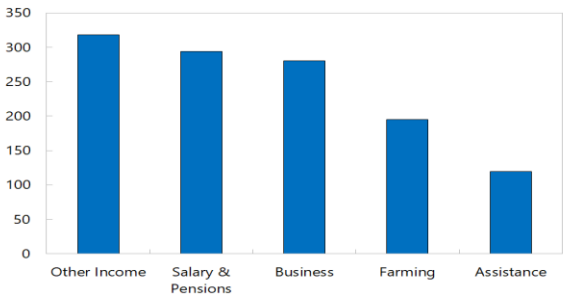
Sources: Thai Household Socio-Economic Survey, 2021 and authors' calculations.
Note: The estimations are based on the national poverty line.

A further look at the data shows that there is heterogeneity among Thai households with respect to their primary source of income. Based on the income channel, we can expect a differentiated impacts of rising food and energy prices given differences in primary source of income. About half of the Thai households earn their primary income from salaries and pensions while about 23 percent primarily from some kind of assistance (**Figure 13**).[8] Rising energy and food prices affect more people under assistance and farmers and to a lesser extent wage earners and business oweners (**Figure 14, panel 1**). The heterogenous impact is reflected in the quantification of the fiscal costs to fully compensate households that are below the poverty line. The breakdown of the fiscal costs (**Figure 14, panel 2**) shows that about half of the potential fiscal cost is accounted by households under assistance in the baseline should the Thai government opted for a more targeted support to households. However, wage and pension earners are the main beneficiaries of the fiscal costs if they are untargeted.

Figure 13. Thai Households' Primary Source of Income

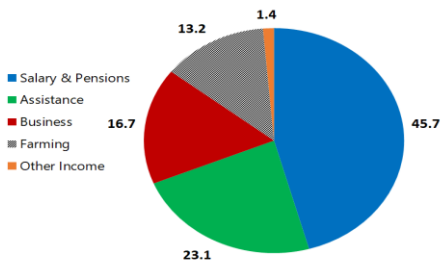
1. Median Annual Income

(Thousands of Baht)



2. Distribution

(Percent)



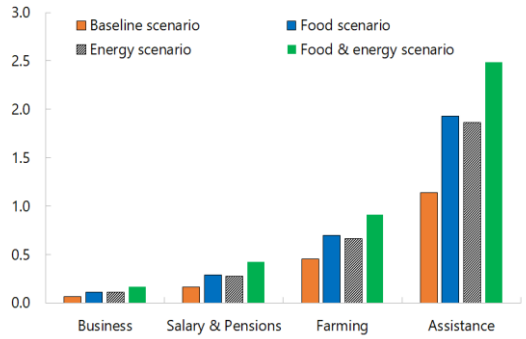
Sources: Thai Household Socio-Economic Survey, 2021 and authors' calculations.
Note: Households are categorized into an income group on the basis of their primary source of income. Assistance income includes income assistance received from people outside the household and any elderly or disability assistance received. Farming

[8] For example, external assistance income and elderly disability income.

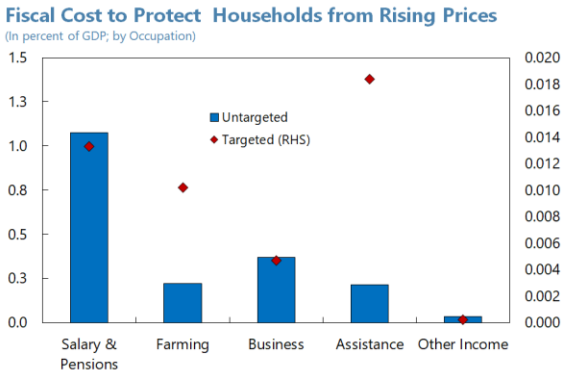
and business incomes comprise profits made from farming and business operations. Other income includes income received from rent, interest, dividends, scholarships, inheritances, insurance, lottery earnings and gambling. Each inflation scenario is defined as the effect on overall inflation due to rise in prices throughout 2022 from that component.

Figure 14. Impacts of Food and Energy Prices by Primary Source of Income

1. Poverty
(Percentage points)



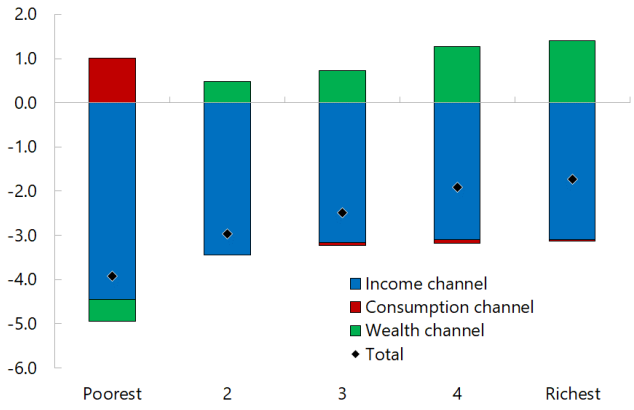
2. Fiscal Cost
(Percent of GDP, by Occupation)



Sources: Thai Household Socio-Economic Survey, 2021 and authors' calculations.
Note: The charts are based on the national poverty line. Households are categorized into an income group on the basis of their primary source of income. Assistance Income includes income assistance received from people outside the household and any elderly or disability assistance received. Farming and Business Income comprises profits made from farming and business operations. Other Income includes income received from rent, interest, dividends, scholarships, inheritances, insurance, lottery earnings and gambling. Each inflation scenario is defined as the effect on overall inflation due to rise in prices throughout 2022 from that component.

Beyond the income channel, inflation affect households' financial resources through other transmission channels. The simulations go one step further to illustrate how the combined consumption, income and wealth channels can affect households' financial resources following the sharp increase in commodity and food prices

Figure 15. Rising Inflation and Households Financial Resources
(Percent of household income)



Sources: Thai Household Socioeconomic Survey 2021; and authors' calculations.

in 2022.[9] **Figure 15** illustrates the three channels for Thai households by income groups. Three lessons stand out. First, the total effect of rising prices is negative for all households particularly the poorest. Second, the income channel accounts for the bulk of the real losses in households' net assets across all income groups. Third, the consumption channel only benefits the poorest households due to their relatively lower ''energy inflation''. The consumption channel is negligeable for other income groups. Fourth, the average Thai households is benefiting from rising inflation through the wealth channel given that they are net borrowers.[10] Indeed, Thai households level of indebtedness remains elevated, at about 87 percent of GDP in 2022.

V. Policy Responses to High Prices

A. Policy Measures in Emerging Markets and Asia

Governments implemented a range of policy measures to mitigate the impact of rising food and energy prices. IMF staff (Amaglobeli et al. 2023) recorded over 700 policy announcements in 174 countries. These measures aimed to reduce the pass-through of the high food and energy prices on domestic prices. The measures included a range of actions such as reduction in taxes, increase in cash transfers, below the line operations (e.g., guarantees) and non-fiscal measures (e.g., export bans).

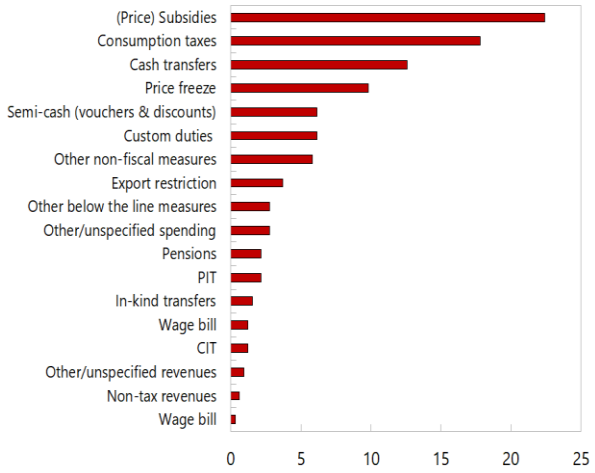
Price subsidies to energy and food companies are the most common measures in emerging markets and in Asia. To cushion the effect of rising international prices on domestic prices, many governments in emerging markets prioritized direct price subsidies, followed by reduction in consumption taxes (particularly VAT and excises), increases in direct cash transfers and price freezes (**Figure 16, panel 1**). The picture is broadly similar to what happened in Asia and the Pacific even though the region used, on average, more direct price subsidies (**Figure 16, panel 2**) than other measures. Other main measures in the region included reduction in consumption taxes, the use of below the line operations and vouchers and discounts (semi cash).

[9] See Annex II for more details about the various channels and the underlying technical assumptions.

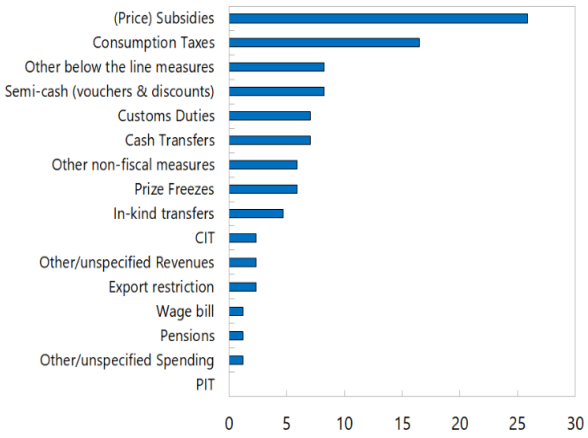
[10] Using only net of financial assets. Non-financial assets are excluded. See Annex II for more details.

Figure 16. Policy Measures to Mitigate Rising Prices
(Percent)

1. Emerging Markets



2. Asia-Pacific

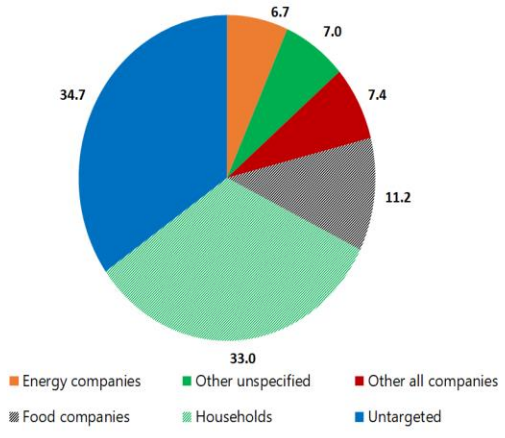


Sources: Authors' calculations using IMF-FAD DEFPA.
Note: Percent of the count of each measure type by total number of measures.

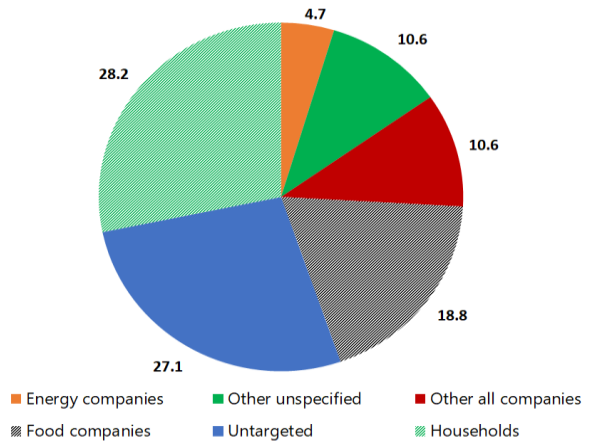
Governments in emerging markets mostly provided blanket price subsidies. About 35 percent of announced measures in emerging markets were untargeted (**Figure 17, panel 1**). The same pattern is found in Asia where about 27 percent of announced measures were untargeted (**Figure 17, panel 2**). Governments' goals to limit the pass through of the surge in commodity and energy prices to domestic prices could explain the large use of blanket price subsides (Amaglobeli et al. 2023). However, untargeted policy measures induced much larger fiscal costs.

Figure 17. Targeted Policy Measures to Mitigate Rising Prices
(Percent)

1. Emerging Markets



2. Asia-Pacific



Sources: Authors' calculations using IMF-FAD DEFPA.

Note: Percent of the count of each measure type by total number of measures.

B. Policy Measures in Thailand

The Thai authorities swiftly responded to mitigate rising food and energy prices. The government introduced a range of measures to alleviate the impact of high prices. Measures to shield households from soaring prices included, for example, subsidies for cooking gas and reduction in fuel tariffs for electricity users. Vendors and hawkers also benefited from the reduction in cooking gas prices. Taxi drivers benefited from the reduction in natural gas price under the scheme ‘’Breathe Together’’. Excise diesel tax was cut to five baht per litre and companies benefited from tax relief on some expenses.

The Thai government mostly provided universal subsidies with a sizeable fiscal cost. Total measures to mitigate the effect of rising energy prices are estimated at 1.1 percent of GDP in FY2022 and 1.0 percent of GDP in FY2023 (**Table 2**).

Table 2. Thailand: Measures to Mitigate Rising Prices

	FY2022			FY2023		
	Billion baht	Share	Percent GDP	Billion baht	Share	Percent GDP
Broadbased measures	137.7	70.2	0.8	30.2	17.8	0.2
Targeted measures	2.0	1.0	0.01	25.9	15.2	0.1
Tax expenditures	56.4	28.8	0.3	113.8	67.0	0.6
Total	**196.1**	**100**	**1.1**	**169.9**	**100**	**1.0**

Sources: Thai authorities; and authors’ calculations.

To carry out price subsidies, several quasi-fiscal institutions have helped in stabilizing the price of some necessity goods for households such as fuel, electricity prices, and cooking gas. The measures were mostly financed through extra-budgetary and quasi-fiscal operations, particularly via the Oil Fund. For fuel, the Oil Fuel Fund, established with the objective of stabilizing domestic fuel prices following the Oil Fuel Fund Act in 2019[11], compensates fuel producer and importers to be able to accommodate price caps. Other measures are a reduction or exemption of the Oil Fuel fund levy for diesel LPG and gasoline, in which this scheme would be adjusted over time to stabilize retail fuel prices. For electricity, the Electricity Generating Authority of Thailand (EGAT) capped fuel tariffs for electricity production while PTT Plc. subsidized natural gas for public transportation.

The authorities are expected to gradually phase out universal subsidies as inflation decelerates. Headline inflation averaged 1.4 percent in January-November 2023, much lower than the average inflation (6.1 percent) in 2022. Core inflation is also decelerating albeit at a slower pace.

VI. Conclusion

[11] The Oil Fund, an extrabudgetary fund, was established in 2004. Its objective is to stabilize domestic fuel prices (gasoline, kerosene, diesel fuel, fuel oi, and similar oil products) and prevent domestic petroleum oil shortages. The main contributors to the Oil Fund are: (1) producer and distributor of fuel that is locally produced; (2) importer of fuel into Thailand; (3) and buyer or receiver of liquified petroleum gas derived from the separation of natural gas that was purchased or received from a concessionaire government.

Inflation rates sharply increased across the world from mid-2021 to end-2022 including in countries such as Thailand that have historically experienced low and stable inflation. The large increase in global inflation has been largely driven by increases in commodity prices. Given the importance of food and energy in households' consumption basket, rising prices have particularly affected the most vulnerable segments of the population. For Thailand, our analysis shows that poverty could increase by about 1.3 percentage points based on the national poverty line in the absence of government's support. A closer look at the data has shown that households who already benefited from government assistance have been particularly affected by rising food and energy prices. The effects of inflation on households in Thailand mostly worked through the income channel and to a lesser extent through the consumption and wealth channels.

However, the Thai government swiftly responded to the inflation shock and deployed a range of policy measures to alleviate the effects of rising prices on the population. Universal price caps on fuel products have been the main tool used to mitigate the effects of rising prices. The measures limited the increase in poverty and second round effects. But the fact that about 70 percent of the measures have been broad-based made them costly. The total cost is estimated at 1.1 percent of GDP in FY2022 financed mostly though quasi-fiscal operations.

Our analysis indicates that a more targeted intervention would have limited the costs to the public finances. Indeed, a counter-factual exercise shows that households under the poverty line account for only 2.4 percent of the total fiscal cost. Households with relatively high income—above the 50th percentile of the population—account for more than 70 percent of the total fiscal cost. Going forward, more targeted intervention will allow to create additional fiscal space to fund, for example, the much-needed green investment and scale up public spending on education and health to cope with aging population (IMF 2022b). In order to provide more targeted assistance that focuses on vulnerable segments of the population, Thailand will need to strengthen its various social safety nets. Broad-based energy subsidies are being gradually phasing out and should be replaced in the future with better targeted social assistance schemes. The government can strengthen and build on the increased number of State Welfare Card registrations to reach the vulnerable (OECD 2023).

Annex I. Thai Households' Characteristics

Thailand's Household Socio-Economic Survey

Background. The National Statistical Office (NSO) conducted the first Household Socio-economic Survey in 1957 and has repeatedly conducted the survey every five years. Since the economy was rapidly expanding and the society changing, the survey was designed to be conducted every two years from 1987. However, since 2006, the household expenditure survey is conducted every year and the household income survey every two to three years.

Objective. The survey aims to collect detailed information on economic and social matters of Thai households such as (1) income; (2) expenditure; (3) assets and liabilities; (4) structure of household members; (5) housing characteristics; and (6) migration and remittance transfers.

Scope and coverage. The survey covers all private, non-institutional households residing in all provinces, and also in municipal and non-municipal areas. The survey excludes households of foreign diplomats and other temporary residents.

Methodology. A stratified two-stage sampling is adopted for the survey. Bangkok Metropolitan and other provinces are considered as strata. Strata is the process of dividing a population into homogeneous subgroups before sampling. There are a total of 77 strata, which each stratum (except Bangkok Metropolitan) being divided into two parts according to the type of local administation area corresponding to the Department of Provincial Administation, namely, municipal and non-municipal areas.

Table A.1. Household by Area and Socia-Economic Class, Percent

	2019			2021		
	Municipal area	Non-municipal area	Total	Municipal area	Non-municipal area	Total
Economically inactive	**9.3**	**14.7**	**24.0**	**9.9**	**15.6**	**25.5**
Farm Operator	**2.4**	**10.7**	**13.1**	**2.7**	**10.3**	**13.0**
- Plant/animal/culture	1.9	9.6	11.5	2.2	9.2	11.3
- Fishery, Forestry, Hunting, Agricultural Services	0.4	1.2	1.6	0.5	1.2	1.7
Entrepreneurs for non-agricultural business	**9.7**	**7.1**	**16.9**	**9.1**	**6.9**	**16.0**
Professional , Technician and Manager	**6.6**	**3.6**	**10.2**	**7.1**	**3.7**	**10.8**
Labourers in agricultural , Forestry and Fishery	**0.6**	**2.2**	**2.8**	**0.6**	**2.4**	**3.0**
Labourers in Logistics, transportation and basic works	**1.3**	**1.7**	**3.0**	**1.3**	**1.6**	**3.0**
Clerical, sales and service workers	**10.5**	**6.0**	**16.5**	**9.7**	**6.0**	**15.7**
Production, Construction and Mining Workers	**6.3**	**7.3**	**13.6**	**6.2**	**6.8**	**13.0**
Total	**46.7**	**53.3**	**100.0**	**46.6**	**53.4**	**100.0**

Table A.2. Households by Area and Sex of the Household Head, Percent

	2019			2021		
	Municipal area	Non-municipal area	Total	Municipal area	Non-municipal area	Total
Male	28.1	33	61.1	27.5	31.5	58.9
Female	18.6	20.3	38.9	19.1	21.9	41.1
Total	**46.7**	**53.3**	**100**	**46.6**	**53.4**	**100**

Table A.3. Households by Area and Age Distribution of Household Head, Percent

	2019			2021		
	Municipal area	Non-municipal area	Total	Municipal area	Non-municipal area	Total
0-14	0	0	0	0	0	0
15-19	0.3	0.2	0.5	0.2	0.1	0.3
20-24	1.4	0.6	2.1	1.3	0.5	1.8
25-29	2.1	1.4	3.6	2.3	1.1	3.4
30-34	2.8	2.1	4.8	2.8	1.7	4.5
35-39	3.6	2.9	6.6	3.5	2.9	6.4
40-44	4.2	4.1	8.3	4.4	3.8	8.1
45-49	5.3	5.5	10.7	4.8	5.7	10.5
50-54	5.6	6.8	12.4	5.4	6.7	12.1
55-59	5.4	7.3	12.7	5.6	7.6	13.2
60-64	5.1	6.6	11.7	5	6.9	11.9
65-69	4.5	6	10.5	4.4	5.8	10.3
70-74	2.8	3.9	6.7	2.9	4.6	7.5
75-79	1.8	2.8	4.6	1.9	2.9	4.8
80+	1.9	2.9	4.8	2	3	5.1
Total	**46.7**	**53.3**	**100**	**46.6**	**53.4**	**100**

Table A.4. Average Monthly Income Per Household and Debt by Education of Household Head

	2019			2021		
	Total monthly income (Baht)	**Average amount of debt per household (Baht)**	**Debt as proportion of income**	**Total monthly income (Baht)**	**Average amount of debt per household (Baht)**	**Debt as proportion of income**
Pre-primary and primary education	19,243	96,717	5	20,214	120,584	6
Lower secondary education	25,749	145,757	5.7	25,979	190,383	7.3
Upper secondary education	29,842	180,736	6.1	29,654	229,432	7.7
Vocational or technical and post-secondary education	36,712	246,185	6.7	36,698	305,456	8.3
University/bachelor degree level/ Postgraduate/master/ doctoral degree level	53,114	482,005	9.1	54,284	537,074	9.9
Other education	17,330	222	0	17,443	1,924	0.1
Total	**26,018**	**164,055**	**6.3**	**27,352**	**205,679**	**7.5**

Annex II. Technical Assumptions

This annex summarizes various technical assumptions used in the paper.

*Share of food, energy, and other items in total expenditure***.** Expenditure on food is calculated as food and beverages minus tobacco. Expenditure on energy is taken as the total of electricity, cooking gas, gas for other purposes, charcoal and wood, kerosene and unleaded gasoline, gasohol, NGV gas, LPG gas, diesel, biodiesel, other type of alternative fuel. Energy does not include transportation items. Food and beverages account for about 40 percent of households' consumption basket while energy accounts for about 15 percent of the consumption basket.

*Baseline, food, and energy scenarios***.** The baseline scenario is defined as 2022 inflation for Thailand which equals 6.1 percent. Food inflation was at 6.9 percent in 2022, and the food scenario constitutes a doubling of food inflation keeping constant the other commodities in the consumption basket at their 2022 level. Energy inflation was 25 percent in 2022 and the energy scenario is a doubling of energy inflation keeping constant the inflation in other commodities at their 2022 level. Food and energy scenario comprises a doubling of both food and energy inflation in 2022 while keeping all other commodity inflation constant. The table below shows the overall inflation for each scenario. The overall inflation for each scenario is used to calculate fiscal cost and increase in poverty. All numbers are in percent.

	Weights	**Baseline**	**Food scenario**	**Energy scenario**	**Food and energy scenario**
Food Inflation	40.4	6.9	13.8	6.9	13.8
Energy Inflation	12.4	25.0	25.0	50.0	50.0
Other Inflation	47.2	0.5	0.5	0.5	0.5
Overall Inflation	100	6.1	10.0	9.7	13.1

*Increase in poverty due to rising inflation***.** Two measures of poverty are used in the paper. The 2019 national poverty line (NPL), defined as 2,763 baht per month per person and the World Bank's upper middle income poverty line defined as $5.5 per person per day, 2011 PPP terms. Households are considered as poor if their monthly per capita income is lower than the given poverty line. The percentage of households who fall below the poverty line is computed by reducing the income of every household by inflation rates under the baseline and the different scenarios.

*Fiscal cost due to rising inflation***.** The fiscal cost is defined as the total amount in baht that would be required to compensate all households who fall below the poverty line due to the income erosion they face following rising inflation. It can be thought of as the monetary compensation the government would provide to households for their income loss due to inflation, covering all households that fall below the poverty line. Given that the Thailand Household Socioeconomic Survey 2021 is nationally representative, the fiscal cost is scaled from the survey level to the population level. The survey comprises of 46,840 households and the Thai population is about 70 million.

Consumption, income, and wealth channels.

Let's assume that W^h represents household wealth, Y^h household income, C^h household consumption, π represents inflation while α represents income growth. Therefore, any household's wealth dynamic can be written as:

$$W^h_{1,\pi>0} = Y^h_{1,\pi>0} - C^h_{1,\pi>0} + \frac{W^h_0(1 + i_{\pi>0})}{1 + \pi}$$

with some intermediate calculations, the equation below shows the variation in household's wealth between two periods:

$$W^h_{1,\pi>0} - W^h_{1,\pi=0} = \left[\frac{Y^h_0(\alpha_{\pi>0} - \pi)}{1 + \pi}\right] + \left[\frac{C^h_0(\pi - \pi_h)}{1 + \pi}\right] + \left[\frac{W^h_0(i_{\pi>0} - \pi)}{1 + \pi}\right]$$

The first term in the right-hand side represents the income channel, the second the consumption channel, and the third term the wealth channel.

Nominal income and adjusted nominal income are used to calculate the *income channel*. Nominal income equals to the sum of wage/salary, business profit, farming profit, pension, work compensations/terminated payment, external assistance income, elderly disability income, house/land/property rent, interest on stocks/bonds/shares, lending income, and other sources of income. Nominal incomes are also adjusted by their growth rates.

Nominal adjusted income equals the sum of all sources income considering their growth rates. Wage/salary increases by 5 percent, corresponding to the increase in the minimum wage in 2022. We assume that business and farming profits grow at 2.6 percent corresponding to Thailand's GDP growth for 2022. We assume zero percent growth in pensions because they are not inflation indexed in Thailand and similarly no growth for elderly disability income, set at baht 1,000 in 2021. It is also assumed that other sources of income do not grow given that they are often transitory and unanticipated in nature. We assume that external assistance income and work compensations grow by 2.6 percent (Thailand's GDP growth for 2022 as proxy), rental income from house/land/property contracts by 0.155 percent (Real Residential Price Index as proxy) and yields on stocks/bonds/deposits by 0.28 percent (deposit yields in Thailand as proxy). Finally, lending income grows by 5.5 percent (commercial loan rates as proxy).

Consumption expenditure is used to calculate the *consumption channel*. This channel can be thought of as how the household's purchasing power is affected relative to the broader population. It is an inframarginal effect compared to the average inflation in Thailand. If the household has faced inflation lower than the average for Thailand, they will have a positive consumption effect. Each household specific level of inflation is calculated using the share of food, energy, and other expenditure as weights, which differ for each quintile.

Net nominal position and adjusted net nominal position are used to calculate the *wealth (Fisher) channel*. Net nominal position of the household equals their liquid assets minus their total debt. Adjusted net nominal position equals to households' liquid assets adjusted by the average yield on deposit accounts in Thailand minus their total debt. Physical assets are not included into the analysis because they are not typically used to absorb shocks such as the effects of inflation through quick liquidation. Moreover, as they are associated with high transaction costs and are lumpy, change in the value of physical assets is typically not associated in

making the household feel richer or poorer with respect to their consumption decisions.[12] We do not make any adjustments to debt for the next year because it is assumed that debt repayments are constant in nominal terms for the household (as compared to liquid assets where the household may earn returns/yields). Finally, we winsorize both liquid assets and total debt at the upper bound level, given the fat right tail of their distributions. We choose 90th percentile as our upper bound cutoff.

Households by primary source of income. Given the rich household survey data, we know the different sources of income for each household. We classify households to a certain income/occupation category based on their primary source of income. For example, if a household has three different sources of income through salary, disability assistance and agricultural profits, we find out which source of income contributes the highest share to their total income. We then categorize the household into that particular income/occupation category. Therefore, if a household has been categorized as being under 'Salary/Pension', then salaries/pensions contribute the most to the income stream of that household. Finally, to calculate total income for that household, we sum all sources of income.

[12] However, real assets (e.g., properties) may lead to significant distributive effects. See Pico-Mejia et al., 2024 for example.

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