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The Investment Engineers

WHITE PAPER

Hunger pains

Unraveling the impact of food inflation in Asia

Experts in duurzaam beleggen van
ROBECOSAM

Contents

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Marketing material for professional investors, not for onward distribution.

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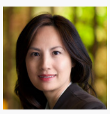

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Holistic supply chain analysis

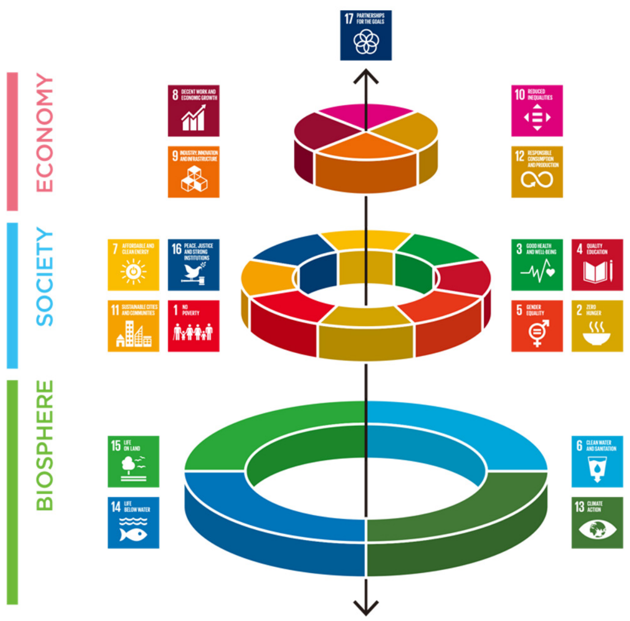
The Covid-19 pandemic has resulted in increasing concern about manufacturing supply chain vulnerabilities and brought increasing efforts to mitigate them. However, we believe that the repercussions on supply chains are much wider than just the manufacturing base. Rather, they are intricately woven throughout our ecosystem, society and the economy.

We have found the Sustainable Development Goals (SDGs), when organized as illustrated, a helpful way to integrate fundamental analysis with our sustainability assessment. In the following article, our fundamental sovereign strategist Philip McNicholas and our SI specialist Laura Bosch have worked together to explore how sustainability factors impact our near-term assessment of financial markets, and the longer-term solutions that can help increase economic resilience.

The diagram shows that the fundamental building blocks of our economy are built around natural resources, provided by ecosystem services. SDGs 13, 14 and 15 aim to enhance and maintain those ecosystem services. Much of the ongoing research into the importance of biodiversity is focused on ascertaining the benefits we receive from such services provided by nature within our biosphere.

In this article, we highlight the interaction between how the impact of climate change and higher gas prices resulting from the Russia-Ukraine conflict has impacted fertilizers prices and placed upward pressure on food inflation. This would have a meaningful impact on society, as seen in SDGs 1, 2 and 3 in the areas of hunger, poverty, and health and well-being. It could also result in higher interest rate policies, as inflationary pressures build together with fiscal pressures, which in turn could impact on the economy in SDGs 8 and 9, as funding costs for infrastructure rise.

All of this can impact companies in various ways, from rising funding costs to increasing wage pressures. So, we focus on the likely macro impact on China, India, Indonesia and Thailand. Each faces different macroeconomic, political and social consequences from these evolving dynamics, with potentially underappreciated ramifications that could extend beyond their respective domestic markets.



Hunger pains

After Covid-19 disruptions heightened awareness of vulnerabilities stemming from taut supply chains, Russia's invasion of Ukraine prompted markets to adopt a laser-like focus on energy costs and their implications for industry. Long-term energy supply contracts and limited direct linkages to Russia have muted the inflation response in Asia thus far. Yet, markets' focus on disrupted and/or costlier industrial energy obfuscates a far more concerning prospect: food shortages.

Food security, defined as the accessibility of adequate nutrition at affordable prices, is seen as so critical that it forms the basis of achieving the first three of the UN's Sustainable Development Goals (SDGs). Politically, however, food security is often conflated with self-sufficiency. This assumes a shorter and better controlled supply chain reduces vulnerabilities to disruption that could lead to shortages and/or famine. News of low Rhine and Mississippi river levels, both of which are critical to the passage of goods, and particularly foodstuffs, re-enforce the point.
The desire to avoid food shortages has driven wars of conquest since time immemorial. Moreover, many of history's best-known political revolutions stem in some way from periods of poor harvests and the resulting inflationary/real income shocks. This trend has (and, in some cases, continues) to prompt authoritarian governments to prize agricultural surpluses.

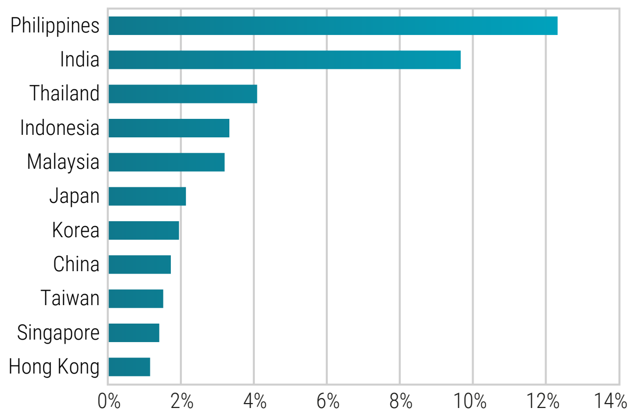
Since the 1960s, income growth and technological advancements has brought about a general reduction in poverty that seemed to eliminate fear of a Malthusian trap . This heralded a multi-decade era of broad political stability, enabling markets to emphasize cost structures around human energy. Greater attention was paid to non-labor factors affecting industrial activity, with a particular focus on oil prices.

Robeco's 2022 multi-asset 5-year Expected Returns report, 'The Age of Confusion', casts doubt on such assumptions. Food production, the primary and original energy source for all humanity, faces several obstacles that suggest risk of scarcity, translating into higher prices, if not famine, in certain parts of the world. Climate change factors that are impacting growing conditions for key crops are a significant long-term risk factor that, at the time of writing, Asian markets may not be incorporating. This is understandable given that bumper rice and wheat harvests in prior years have allowed Asian economies to build inventories that might withstand 1-2 years of poor harvests.

2023 stands as a potential inflection point for Asian inflation prospects, driven by the key cereal crop for regional diets: rice. Robeco estimates that cereal grains account for 5.4% of regional CPI baskets when weighted by population (simple average: 3.9%, GDP-weighted average: 2.8%). Within that, rice accounts for half of total grain consumption. While broadly commensurate with the diets of India and China, in south-east Asia, rice accounts for around 75% of annual grains consumption. This centrality ensures this extremely demanding crop, which requires significant labor, management and water resources to thrive, is a critical foodstuff in Asia.

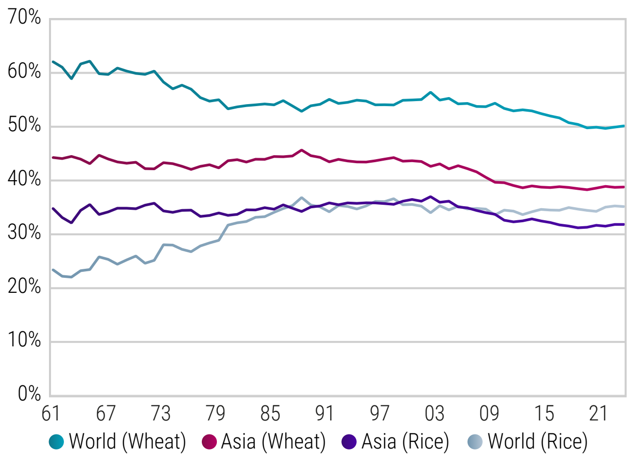
> *“ Underappreciating food's centrality to economic, political and social stability can be costly*

Cereals weight in headline CPI Basket



Source: National statistical agencies, Robeco

Share of average person's grains consumption



Source: USDA, Robeco

Climate factors aggravate agricultural yields outlook

Climatic factors raise concern over the 2022/23 crop, the bulk of which was harvested in the fourth quarter. India and China's mid-2022 heatwaves affected key rice-growing regions, causing delays to sowing as well as heightening the importance of irrigation to maintain adequate growing conditions. Subsequent rains caused flooding in parts, which risks washing away or drowning crops in India and Thailand. These factors prompted the US Department of Agriculture (USDA) to cut rice production forecasts for the 2022/23 crop.

Long-term changes in temperature and precipitation patterns are more likely to shift crop seasons and crop cultivation suitability, and increase the incidence of disease and pests affecting crop yields, production and food markets. As a result, climate change is expected to bring greater fluctuation in crop production, food supplies, and market prices, sparking greater food insecurity and poverty in the region, especially in south Asian countries, adversely affecting the livelihoods of millions.

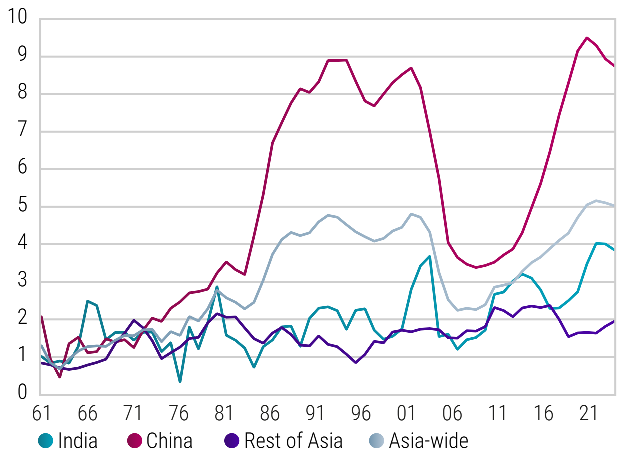
The aforementioned inventories may limit near-term price impacts. Yet, a comprehensive risk assessment requires consideration of who holds those stocks, and the divergent (often autarkic) interpretations of food security involved. Impacts on China, India, Indonesia and Thailand are the focus of this paper. They are home to 90% of emerging Asia's population, 93% of rice consumption and 96% of production. These markets supply 74% of the world's rice, with India and Thailand accounting for 67% of global exports. Such concentrated supply chains, amid heightened political focus on food security, makes understanding the rice-specific dynamics and implications in these markets a particularly critical factor for investors.

Stockpiles aren't the buffer they seem

In aggregate, Asia has stockpiles of rice to cover five months of consumption (assuming appropriate storage). China dominates this, and is thought to hold inventories equal to nearly nine months of its consumption (on a par with post-Mao historical norms) and two-thirds of Asia's total inventory. An increasingly isolationist mindset among mainland Chinese policy rhetoric, exemplified by the 'Dual Circulation' policy and emphasis on security, suggests stocks are unlikely to be shared with neighbors if a poor harvest occurs. This, in turn, could cascade through regional food supply networks if other economies opt to implement similar export restrictions to ensure domestic supply. India, which is home to a further 20% of regional rice stocks, also maintains stockpiles predominantly for domestic food security, and so also seems unlikely to be prepared to alleviate strains elsewhere in Asia.

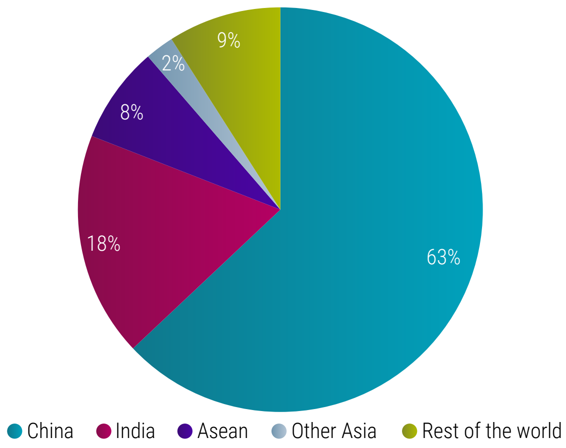
In contrast, stockpiles of two months' consumption are the norm in the rest of Asia, in line with 50-year averages, but a touch below levels of the last decade. Delving deeper, inventory levels have trended higher in north-east Asia over the last decade, while south-east Asia saw consumption coverage erode. The Philippines was an exception in Asean markets, but remains among the least buffered against an output shock.

Rice stocks, cover of monthly consumption



Source: USDA, Robeco

Distribution of global rice inventories



Source: USDA, Robeco

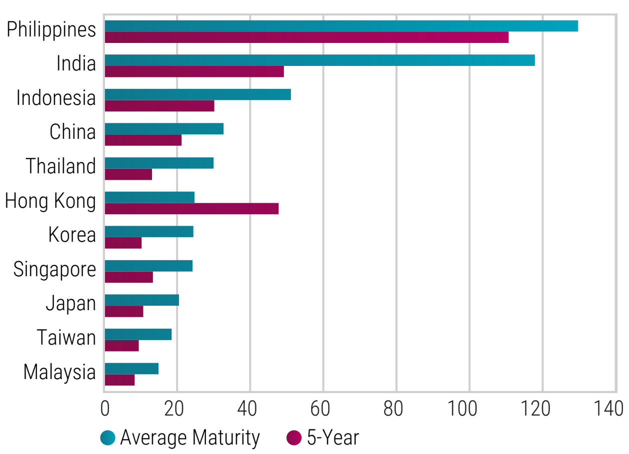
Relatively thin inventory buffers and building climatic challenges suggests Asean economies, where consumer basket weightings to grains are among the highest, look the most vulnerable to a surge in rice prices. With this in mind, we look to the 2023/2024 crop and beyond, with a particular focus on inputs, cost structures, fiscal implications and, ultimately, the consequences for borrowing costs.

Sanctions imposed on Russia and Belarus following the invasion of Ukraine curtailed future global fertilizer supply, causing prices to spike. As fertilizer needs for 2022/2023 were already sourced, price hikes are more likely to weigh on subsequent crops. Since the prices of natural gas, a key ingredient for nitrogen-rich fertilizers, have also surged and face a prolonged supply squeeze that may not relent until 2025/2026, this shock is likely to persist. Consequently, agricultural producers may face a multi-year cost structure increases that, even after price increases to end-consumers, erodes real income growth.

Markets are less prepared than they think

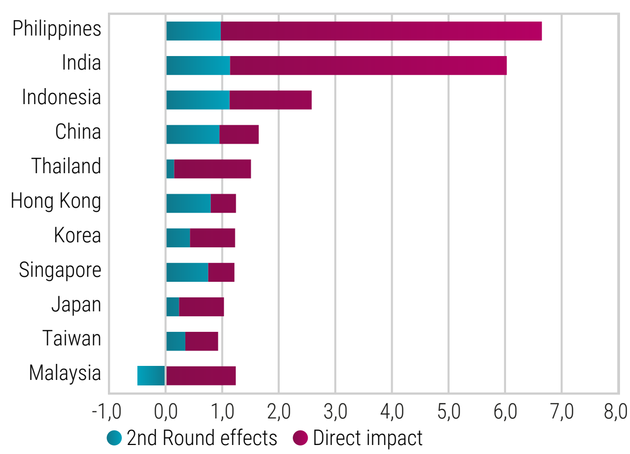
Robeco estimates that fertilizer-led higher cost structures risk a further 4% decline in rice production in the 2023/2024 harvest season. While seemingly small, this could spur rice prices 40% higher in US dollar terms in 2023. Current FX forwards translate this to a 1.4 percentage point uplift in Asia-wide headline inflation on a GDP-weighted basis. Incorporating second round effects and assuming flat energy prices, a one-off, one-year shock could raise inflation forecast baselines by 2.2 percentage points. In turn, this imbues a 44 bps uplift to regional 5-year yields and a 25 bps rise in average government yields. Effects on the region differ, depending on development level and the institutional structures around rice. Aside from Malaysia, policymakers are reluctant to subsidize rice prices. This likely reflects the staple's role as a critical source of rural income and modest urbanization, making such distortions politically problematic. Yet, rice's dietary centrality has meant Robeco finds Asia's headline CPIs to be 2.5 times more sensitive to shifts in grains than the broader food component.

Estimated Yield Impact – From 4% decline in global rice crop in 2023/2024 harvest, basis points



Source: USDA, National statistical agencies, Robeco

Impact on headline CPI – From 4% decline in global rice production for 2023/2024 harvest, percentage points



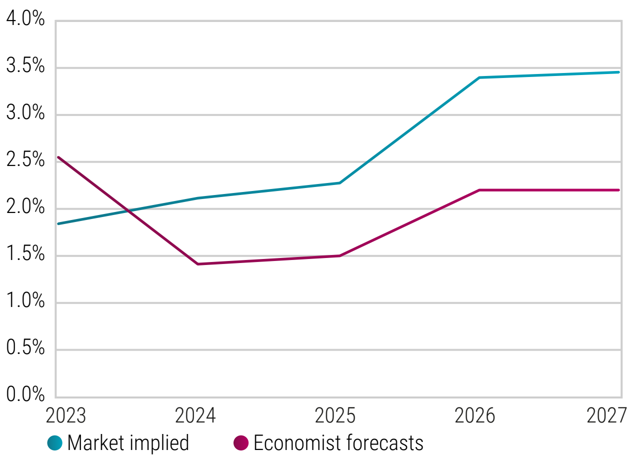
Source: USDA, National statistical agencies, Robeco

China – Many mouths to feed

North-east Asia, where incomes are higher and spending on foodstuffs is a smaller share of the consumer basket, may appear better positioned to withstand such a shock. Nonetheless, our estimates suggest that mainland China, which imports about 4% of its rice consumption, could see inflation prints rise by 1.8 percentage points. Second-round effects drive this, accounting for 56% of the potential inflation surprise. Assuming it is a one-off shock, this could lift the average CGB yield by 23 bps and push 5-year yields 35 bps higher. Fiscal impacts are modest, with the resulting 33 bps rise in weighted average coupon widening the deficit by only 5 bps of GDP relative to baseline estimates.

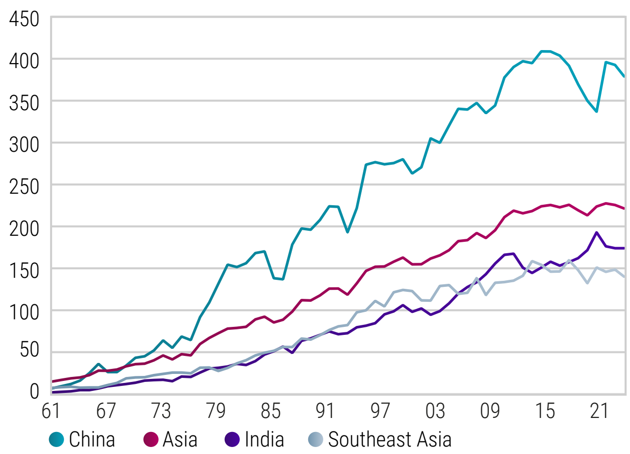
Chinese authorities, while reluctant to incur an explicit fiscal cost via subsidies, do show awareness of the potential inflationary threat. Chinese farmers apply 80% more fertilizer per hectare of rice paddy than the regional average, but this yields only 40% more output. With global natural gas supply curtailed, impacting nitrogen-based fertilizer production, China has restricted phosphate exports to ensure domestic supplies and maintain production. Unfortunately, this likely pushes regional agricultural production cost structures higher, heightening risks to farm incomes and output.

China expected annual average inflation, YoY



Source: Bloomberg, Robeco

Fertilizer use in rice paddy, kg per hectare



Source: USDA, Robeco

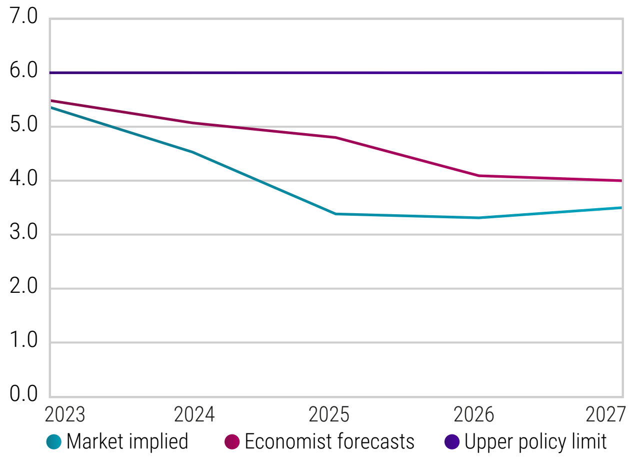
Robeco estimates that China rates markets are priced for 2.0% average inflation through to 2025 , well below the 3% pace officials aim for, but in keeping with still sluggish domestic demand and moderating energy prices. Moreover, as this implies that China has one of Asia's least problematic inflation outlooks, this further emboldens calls for looser, more stimulatory policy action. Thus, a rice price spike could leave markets flat-footed, leading to a more jarring upswing in Chinese yield curves than models suggest.

India – Heightened sensitivity

India, while also priced for prudent inflation management, is considerably more vulnerable to cereals-led inflation shocks. Analysis hints that headline CPI could rise by 6.2-percentage points amid such a shock, double pricing-implied inflation projections for the coming 12 months and lifting 5-year yields by 120 bps. Despite recent inflation data, market pricing alludes to lingering complacency and scope for further substantial repricing in both rates and FX. Moreover, Robeco's scenarios indicate the government's average funding cost may rise 30 bps, widening the fiscal deficit by 15 bps of GDP. While alarming, the Indian government's likely responses to food security concerns make it unlikely the domestic context will reach such extremes.

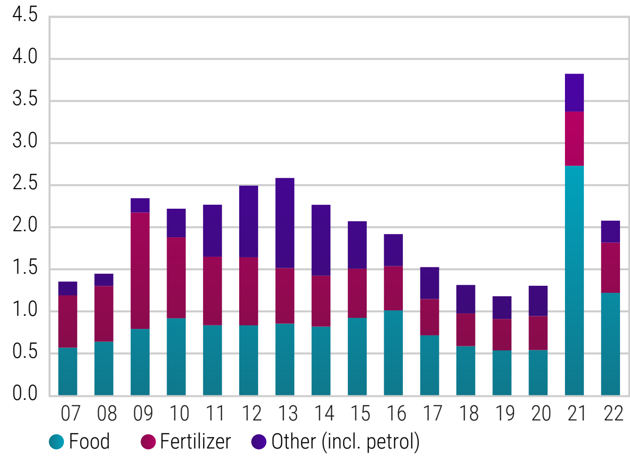
Some 80% of the estimated inflation impact comes from direct pass-through of price increases. As a major wheat and rice producer (and exporter), officials can (and often do) address the issue at several points along the supply chain. Firstly, fertilizer subsidies support agricultural production, suggesting climatic conditions are a more likely cause of production shortfalls if and when they occur.

India expected annual average inflation, YoY



Source: Bloomberg, Robeco

India fiscal sybsidy spending, % of GDP



Source: Bloomberg, Ministry of Finance, Robeco

Normally, these subsidies cost 40-60 bps of GDP per annum but, in the current environment of surging natural gas prices and reduced fertilizer availability, that could easily double. These upstream, supply-side enhancing subsidies help alleviate potential negative externalities in India and elsewhere. Our models suggest that if rice farmers reduce fertilizer use by 33%, as unsubsidized Filipino farmers did in 2008, India might swing to become a net importer, leading to a 10-fold increase in international rice prices that causes a more substantial inflationary shock and, potentially, global famines. Thus, while counter to orthodox economic theory, the provision of such subsidies is markedly better than the alternative.

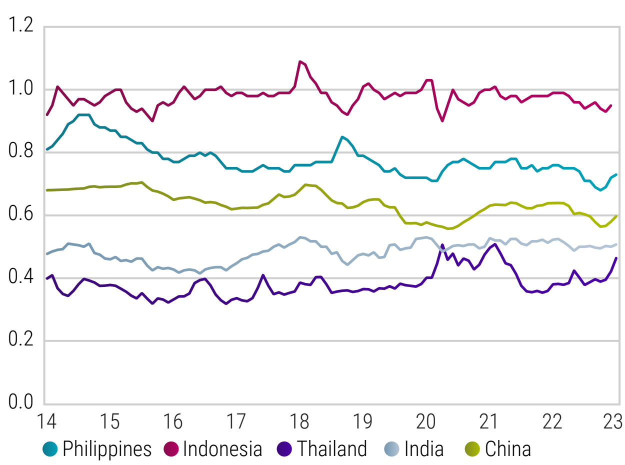
India's other common policy reaction is export restrictions to ensure domestic consumer access and affordability. While this may address domestic demand/supply imbalances, capping bond yields, the reduction in output available for export makes international prices more likely to overshoot, ratcheting regional inflation pressures higher, as happened in 2008.

Indonesia – Adaptation amid doubt

Prior surges in international rice prices and its status as a marginal net importer have re-enforced Indonesia's pre-existing bias for a self-sufficiency based definition of food security. State logistics firm Bulog has long implemented price floors for farmers and ceilings for consumers of domestic rice. This is complemented by a fertilizer subsidy program akin to India's, and has served to limit impacts on headline inflation while supporting rural incomes at relatively modest fiscal cost.

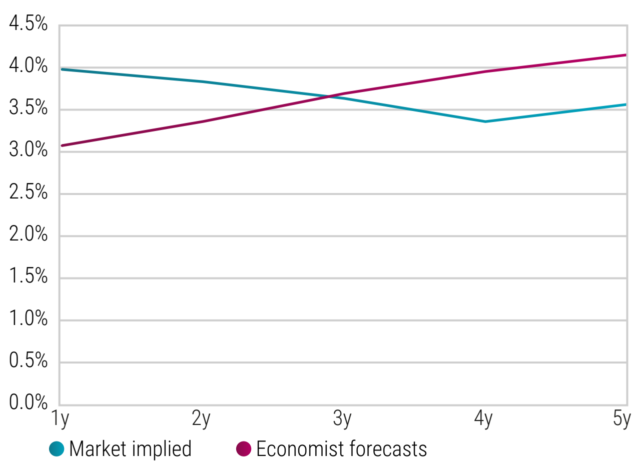
Despite efforts to bolster production, inroads toward rice self-sufficiency were delivered largely via the diversification of diets. Annual per capita rice consumption in Indonesia has fallen from 154 kg in 2008 to 127 kg in 2021. That Indonesians pay nearly twice as much for rice compared to regional peers may also have influenced this.

Rice price, USD per kilogram



Source: United Nations, Robeco

Indonesia real yield, % p.a.



Source: Bloomberg, Robeco

Even with this dietary shift, however, rice still accounts for over 70% of the grains consumed by the average Indonesian. Thus, it is unsurprising that Indonesian inflation dynamics, as in India, are most affected by the direct impact of higher rice prices. Robeco estimates this could be 1.7-percentage points out of a 3.0-point jump in headline CPI. The magnitude of this shock, in addition to structural financing vulnerabilities stemming from a small domestic investor base, suggests 5-year yields may rise by more than the 60 bps estimated. Low government debt, a 9-year average maturity and a relatively favorable financing profile indicates aggregate interest costs might only rise by 10 bps of GDP despite a 33 bps increase in average market yields, limiting pressure for spending cuts to adhere to fiscal deficit rules.

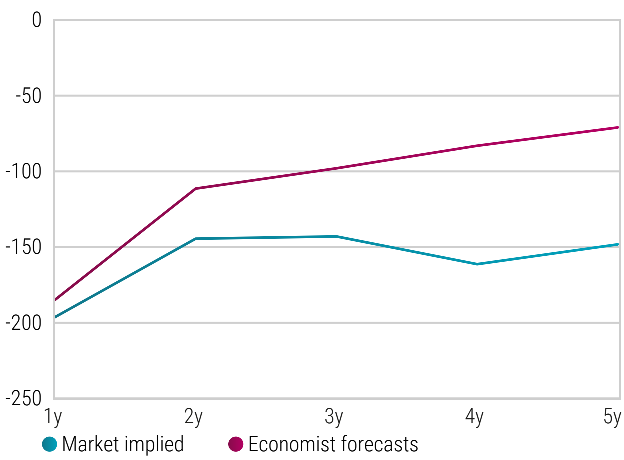
Following their now-customary early-year rally, Indonesian bonds appear complacent about the potential of a sustained inflation uptrend. Our analysis of the curve implies Bank Indonesia (BI) policy expectations should deliver about 3% inflation per annum (below the 4% upper limit of the target range) over the next five years. The bulk of this success is front-loaded, with 2023 and 2024 inflation diving lower from current levels intimating limited pressure on BI's inflation management. As a result, yields may prove more sensitive to our inflation shock scenario than models.

Thailand – Thinking through the issue

Thailand, unlike the other markets mentioned, appears well placed to benefit from higher international rice prices. The USDA base case for 2023 allocates 40% of its production for export, compared to 25% for Vietnam and 15% for India, removing self-sufficiency as a cause for concern. Moreover, it hints at benefits for the rural sector, which employs 40% of the labor force, in such a scenario. Thus, one might think Bank of Thailand (BoT) faces stronger aggregate domestic demand from a rice price-induced headline inflation shock. Analysis suggests more nuanced outcomes, however.

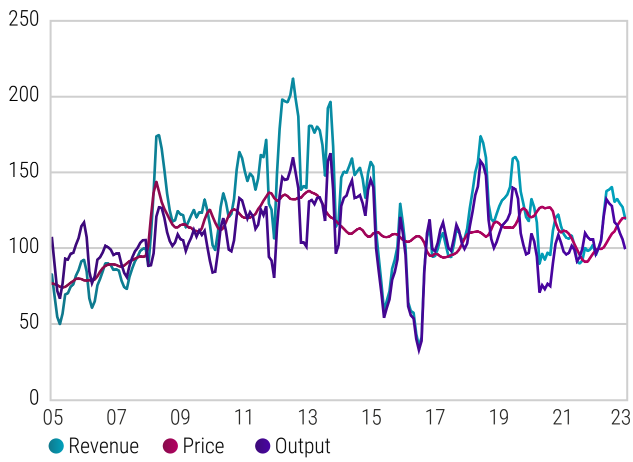
Robeco's modeling of a 40% rise in international rice prices points to a 1.7-percentage point lift to headline inflation, with only 20 bps derived from second round effects on core inflation. This is commensurate with a 34 bps rise in the 5-year yield and a 15 bps increase in average government bond yields. With a weighted average tenor of 11.4 years, budgeted interest costs may rise less than 10 bps of GDP, other things remaining equal.

Thailand real yield spread to US, basis points



Source: Bloomberg, Robeco

Farm income components, seasonally-adjusted (3mma, 2021=100)



Source: Bloomberg, Robeco

Market pricing indicates the BoT may overshoot its 1.0-3.0% inflation target by end-2025. Moreover, expectations are for policy to be consistently looser than in the US and among the most accommodative in Asia. Should it materialize, this would mark a considerable turnaround from the last decade where rates were tighter than regional norms and growth was sub-par. In light of this, one suspects markets are too cautious on Thailand's prospects, and thus primed for a rebound.

The main factor that gives pause on that assessment is the net impact on farmer incomes from the structural shift in costs. Studies of Thai rice production suggest fertilizer costs are normally around 15% of revenues, while net income margins range from 10-20%. Although rice prices have been flat to down over the last year, Thai fertilizer prices rose 90% in 2022, and fuel costs were up an estimated 30%. This portends to a more substantial real income shock for Thai rice farmers than urban consumers, with multi-year repercussions.

While agriculture is no stranger to income volatility, adverse income shocks can weigh heavily on investment and production decisions. Farm income pressures appear to be leading to a smaller 2023/2024 Thai rice harvest which, amid a policy-induced reduction in Indian supply, is already pushing international rice prices higher with scope for the rise to extend further and remain elevated. The subsequent multi-year inflation shock, as well as the political instability risks it could imbue, does not appear priced in by Asian FX and rates markets. Oddly, the food importers, and especially net rice importers in North Asia, appear most complacent.

Adapt or starve: Agricultural adaptation in a changing climate

Currently, climate adaptation initiatives receive only 7% of climate-related investment. Yet, they deserve far greater public and private investment. A changing climate could increase the volatility of crop yields across Asia, potentially causing further price spikes in the long run. Climate impacts alone are expected to lead to reductions in global rice supply of up to 15% by 2050, and it is forecasted that by 2050, rice prices could increase between 32% and 37%.

In the absence of agricultural adaptation measures to climate change, south Asia alone could lose an equivalent of 1.8% of its annual GDP by 2050 and 8.8% by 2100. Solutions aren't lacking, but the focus now needs to be on increasing their affordability and scalability. Companies that facilitate these solutions will be able to strengthen food systems in a changing climatic environment whilst tapping into growing business opportunities.

Activities that improve soil quality can improve resilience to climate change. Many promising biotechnology companies have invested in improving soil health through enzymes produced by microbes. Increased uptake of advanced genetics has led to the introduction of perennial rice crops, which are being researched and successfully tested in different regions across Asia. Perennial rice can reduce soil erosion as the root systems hold soil in place and stabilize the hillside terraces. Reducing the frequency of tillage could allow soil structure to recover, improving the water-holding capacity, microbial community and rooting depth of rice fields.

Another consequence of climate change will be the severe stress upon freshwater availability. Both the length and variability of droughts in rice-growing areas that only receive water from rain may impact rice production, as yields reduce by 17–40% during droughts. Currently, conventional flooded rice paddies release around 20% of methane gas emissions globally, accelerating the global warming trend. Thus, finding ways to grow rice with less freshwater is key to mitigating and adapting to climate change.

Drip irrigation solutions to cultivate rice are being implemented in several Asian countries. Producing a ton of rice with drip irrigation needs 70% less water and reduces methane emissions close to zero. If only 10% of paddy rice farmers switch to drip, the drop in emissions will be equivalent to taking 40 million cars off the road. Sustainable land management practices such as agroforestry and cropping system optimization contribute to climate change adaptation. Integrating trees into rice production landscapes has been shown to help reduce temperatures and improve infiltration of water into the soil, store more carbon and diversify farm production, which lowers both climate and market risks. This adds up to greater adaptability and resilience not only for individual farmers and communities but also their environments.

Addressing climate change requires both mitigation and adaptation, and we believe the latter can represent a significant opportunity for the public and private sectors. Ultimately, investing in agricultural climate adaptation measures will result in significant preparation for an unpredictable future.

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Additional information for investors with residence or seat in Austria

This information is solely intended for professional investors or eligible counterparties in the meaning of the Austrian Securities Oversight Act.

Additional information for investors with residence or seat in Brazil

The Fund may not be offered or sold to the public in Brazil. Accordingly, the Fund has not been nor will be registered with the Brazilian Securities Commission (CVM), nor has it been submitted to the foregoing agency for approval. Documents relating to the Fund, as well as the information contained therein, may not be supplied to the public in Brazil, as the offering of the Fund is not a public offering of securities in Brazil, nor may they be used in connection with any offer for subscription or sale of securities to the public in Brazil.

Additional information for investors with residence or seat in Brunei

The Prospectus relates to a private collective investment scheme which is not subject to any form of domestic regulations by the Autoriti Monetari Brunei Darussalam ("Authority"). The Prospectus is intended for distribution only to specific classes of investors as specified in section 20 of the Securities Market Order, 2013, and must not, therefore, be delivered to, or relied on by, a retail client. The Authority is not responsible for reviewing or verifying any prospectus or other documents in connection with this collective investment scheme. The Authority has not approved the Prospectus or any other associated documents nor taken any steps to verify the information set out in the Prospectus and has no responsibility for it. The units to which the Prospectus relates may be illiquid or subject to restrictions on their resale. Prospective purchasers of the units offered should conduct their own due diligence on the units.

Additional information for investors with residence or seat in Canada

No securities commission or similar authority in Canada has reviewed or in any way passed upon this document or the merits of the securities described herein, and any representation to the contrary is an offence. Robeco Institutional Asset Management B.V. relies on the international dealer and international adviser exemption in Quebec and has appointed McCarthy Tétrault LLP as its agent for service in Quebec.

Additional information for investors with residence or seat in the Republic of Chile

Neither Robeco nor the Funds have been registered with the Comisión para el Mercado Financiero pursuant to Law no. 18.045, the Ley de Mercado de Valores and regulations thereunder. This document does not constitute an offer of or an invitation to subscribe for or purchase shares of the Funds in the Republic of Chile, other than to the specific person who individually requested this information on their own initiative. This may therefore be treated as a "private offering" within the meaning of Article 4 of the Ley de Mercado de Valores (an offer that is not addressed to the public at large or to a certain sector or specific group of the public).

Additional information for investors with residence or seat in Colombia

This document does not constitute a public offer in the Republic of Colombia. The offer of the fund is addressed to less than one hundred specifically identified investors. The fund may not be promoted or marketed in Colombia or to Colombian residents, unless such promotion and marketing is made in compliance with Decree 2555 of 2010 and other applicable rules and regulations related to the promotion of foreign funds in Colombia. The distribution of this Prospectus and the offering of Shares may be restricted in certain jurisdictions. The information contained in this Prospectus is for general guidance only, and it is the responsibility of any person or persons in possession of this Prospectus and wishing to make application for Shares to inform themselves of, and to observe, all applicable laws and regulations of any relevant jurisdiction. Prospective applicants for Shares should inform themselves of any applicable legal requirements, exchange control regulations and applicable taxes in the countries of their respective citizenship, residence or domicile.

Additional information for investors with residence or seat in the Dubai International Financial Centre (DIFC), United Arab Emirates
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Additional information for investors with residence or seat in France
Robeco Institutional Asset Management B.V. is at liberty to provide services in France. Robeco France is a subsidiary of Robeco whose business is based on the promotion and distribution of the group's funds to professional investors in France.

Additional information for investors with residence or seat in Germany
This information is solely intended for professional investors or eligible counterparties in the meaning of the German Securities Trading Act.

Additional information for investors with residence or seat in Hong Kong
The contents of this document have not been reviewed by the Securities and Futures Commission ("SFC") in Hong Kong. If there is any doubt about any of the contents of this document, independent professional advice should be obtained. This document has been distributed by Robeco Hong Kong Limited ("Robeco"). Robeco is regulated by the SFC in Hong Kong.

Additional information for investors with residence or seat in Indonesia
The Prospectus does not constitute an offer to sell nor a solicitation to buy securities in Indonesia.

Additional information for investors with residence or seat in Italy
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Additional information for investors with residence or seat in South Korea
The Management Company is not making any representation with respect to the eligibility of any recipients of the Prospectus to acquire the Shares therein under the laws of South Korea, including but not limited to the Foreign Exchange Transaction Act and Regulations thereunder. The Shares have not been registered under the Financial Investment Services and Capital Markets Act of Korea, and none of the Shares may be offered, sold or delivered, or offered or sold to any person for re-offering or resale, directly or indirectly, in South Korea or to any resident of South Korea except pursuant to applicable laws and regulations of South Korea.

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Additional information for investors with residence or seat in Malaysia
Generally, no offer or sale of the Shares is permitted in Malaysia unless where a Recognition Exemption or the Prospectus Exemption applies: NO ACTION HAS BEEN, OR WILL BE, TAKEN TO COMPLY WITH MALAYSIAN LAWS FOR MAKING AVAILABLE, OFFERING FOR SUBSCRIPTION OR PURCHASE, OR ISSUING ANY INVITATION TO SUBSCRIBE FOR OR PURCHASE OR SALE OF THE SHARES IN MALAYSIA OR TO PERSONS IN MALAYSIA AS THE SHARES ARE NOT INTENDED BY THE ISSUER TO BE MADE AVAILABLE, OR MADE THE SUBJECT OF ANY OFFER OR INVITATION TO SUBSCRIBE OR PURCHASE, IN MALAYSIA. NEITHER THIS DOCUMENT NOR ANY DOCUMENT OR OTHER MATERIAL IN CONNECTION WITH THE SHARES SHOULD BE DISTRIBUTED, CAUSED TO BE DISTRIBUTED OR CIRCULATED IN MALAYSIA. NO PERSON SHOULD MAKE AVAILABLE OR MAKE ANY INVITATION OR OFFER OR INVITATION TO SELL OR PURCHASE THE SHARES IN MALAYSIA UNLESS SUCH PERSON TAKES THE NECESSARY ACTION TO COMPLY WITH MALAYSIAN LAWS.

Additional information for investors with residence or seat in Mexico
The funds have not been and will not be registered with the National Registry of Securities or maintained by the Mexican National Banking and Securities Commission and, as a result, may not be offered or sold publicly in Mexico. Robeco and any underwriter or purchaser may offer and sell the funds in Mexico on a private placement basis to Institutional and Accredited Investors, pursuant to Article 8 of the Mexican Securities Market Law.

Additional information for investors with residence or seat in Peru
The Superintendencia del Mercado de Valores (SMV) does not exercise any supervision over this Fund and therefore the management of it. The information the Fund provides to its investors and the other services it provides to them are the sole responsibility of the Administrator. This Prospectus is not for public distribution.

Additional information for investors with residence or seat in Singapore
This document has not been registered with the Monetary Authority of Singapore ("MAS"). Accordingly, this document may not be circulated or distributed directly or indirectly to persons in Singapore other than (i) to an institutional investor under Section 304 of the SFA, (ii) to a relevant person pursuant to Section 305(1), or any person pursuant to Section 305(2), and in accordance with the conditions specified in Section 305, of the SFA, or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA. The contents of this document have not been reviewed by the MAS. Any decision to participate in the Fund should be made only after reviewing the sections regarding investment considerations, conflicts of interest, risk factors and the relevant Singapore selling restrictions (as described in the section entitled "Important information for Singapore Investors") contained in the prospectus. Investors should consult their professional adviser if you are in doubt about the stringent restrictions applicable to the use of this document, regulatory status of the Fund, applicable regulatory protection, associated risks and suitability of the Fund to your objectives. Investors should note that only the Sub-Funds listed in the appendix to the section entitled "Important information for Singapore Investors" of the prospectus ("Sub-Funds") are available to Singapore investors. The Sub-Funds are notified as restricted foreign schemes under the Securities and Futures Act, Chapter 289 of Singapore ("SFA") and invoke the exemptions from compliance with prospectus registration requirements pursuant to the exemptions under Section 304 and Section 305 of the SFA. The Sub-Funds are not authorized or recognized by the MAS and shares in the Sub-Funds are not allowed to be offered to the retail public in Singapore. The prospectus of the Fund is not a prospectus as defined in the SFA. Accordingly, statutory liability under the SFA in relation to the content of prospectuses does not apply. The Sub-Funds may only be promoted exclusively to persons who are sufficiently experienced and sophisticated to understand the risks involved in investing in such schemes, and who satisfy certain other criteria provided under Section 304, Section 305 or any other applicable provision of the SFA and the subsidiary legislation enacted thereunder. You should consider carefully whether the investment is suitable for you. Robeco Singapore Private Limited holds a capital markets services license for fund management issued by the MAS and is subject to certain clientele restrictions under such license.

Additional information for investors with residence or seat in Spain
Robeco Institutional Asset Management B.V., Sucursal en España with identification number W0032687F and having its registered office in Madrid at Calle Serrano 47-14º, is registered with the Spanish Commercial Registry in Madrid, in volume 19.957, page 190, section 8, sheet M-351927 and with the National Securities Market Commission (CNMV) in the Official Register of branches of European investment services companies, under number 24. The investment funds or SICAV mentioned in this document are regulated by the corresponding authorities of their country of origin and are registered in the Special Registry of the CNMV of Foreign Collective Investment Institutions marketed in Spain.

Additional information for investors with residence or seat in South Africa
Robeco Institutional Asset Management B.V. is registered and regulated by the Financial Sector Conduct Authority in South Africa.

Additional information for investors with residence or seat in Switzerland
The Fund(s) are domiciled in Luxembourg. This document is exclusively distributed in

Switzerland to qualified investors as defined in the Swiss Collective Investment Schemes Act (CISA). This material is distributed by Robeco Switzerland Ltd, postal address: Josefstrasse 218, 8005 Zurich. ACOLIN Fund Services AG, postal address: Leutschenbachstrasse 50, 8050 Zürich, acts as the Swiss representative of the Fund(s). UBS Switzerland AG, Bahnhofstrasse 45, 8001 Zurich, postal address: Europastrasse 2, P.O. Box, CH-8152 Opfikon, acts as the Swiss paying agent. The prospectus, the Key Information Documents (PRIIP), the articles of association, the annual and semi-annual reports of the Fund(s), as well as the list of the purchases and sales which the Fund(s) has undertaken during the financial year, may be obtained, on simple request and free of charge, at the office of the Swiss representative ACOLIN Fund Services AG. The prospectuses are also available via the website.

Additional information relating to RobecoSAM-branded funds/services
Robeco Switzerland Ltd, postal address Josefstrasse 218, 8005 Zurich, Switzerland has a license as asset manager of collective assets from the Swiss Financial Market Supervisory Authority FINMA. The RobecoSAM brand is a registered trademark of Robeco Holding B.V. The brand RobecoSAM is used to market services and products which entail Robeco's expertise on Sustainable Investing (SI). The brand RobecoSAM is not to be considered as a separate legal entity.

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Additional information for investors with residence or seat in Thailand
The Prospectus has not been approved by the Securities and Exchange Commission which takes no responsibility for its contents. No offer to the public to purchase the Shares will be made in Thailand and the Prospectus is intended to be read by the addressee only and must not be passed to, issued to, or shown to the public generally.

Additional information for investors with residence or seat in the United Arab Emirates
Some Funds referred to in this marketing material have been registered with the UAE Securities and Commodities Authority ("the Authority"). Details of all Registered Funds can be found on the Authority's website. The Authority assumes no liability for the accuracy of the information set out in this material/document, nor for the failure of any persons engaged in the investment Fund in performing their duties and responsibilities.

Additional information for investors with residence or seat in the United Kingdom
Robeco is deemed authorized and regulated by the Financial Conduct Authority. Details of the Temporary Permissions Regime, which allows EEA-based firms to operate in the UK for a limited period while seeking full authorization, are available on the Financial Conduct Authority's website.

Additional information for investors with residence or seat in Uruguay
The sale of the Fund qualifies as a private placement pursuant to section 2 of Uruguayan law 18,627. The Fund must not be offered or sold to the public in Uruguay, except under circumstances which do not constitute a public offering or distribution under Uruguayan laws and regulations. The Fund is not and will not be registered with the Financial Services Superintendency of the Central Bank of Uruguay. The Fund corresponds to investment funds that are not investment funds regulated by Uruguayan law 16,774 dated 27 September 1996, as amended.