
Food price volatility and its consequences: introduction

1. Background to the special issue

Commodity prices are in the news. Oil prices have dropped 65% since June 2014. Metal prices are also down substantially, albeit they have declined more gradually since 2011 on account of slower growth from emerging markets that account for more than half of global metal consumption. In this special issue, we focus on food prices, which have in many ways a wider impact than oil prices. While international food prices are also down (see Fig. 1), this might not be all good news for consumers. One key difference between food and other commodities is that the share of food production that is effectively exported is relatively small. In other words, most food production is consumed domestically. This implies that international food prices may not translate closely into domestic food prices.

Just how important are the links between international and domestic prices is a central theme in this special issue. Several papers in the issue deal with this question by documenting the ‘weak links’ between international and domestic food prices. For example, Furceri *et al.* present econometric evidence of very limited pass-through both in advanced and emerging markets. The median long-term pass-through of a 1% food price shock to domestic food prices is 0.18% in advanced economies and 0.34% in emerging economies. They argue that as a significant fraction of domestic food production is consumed domestically, it is domestic agricultural and weather conditions that are the more influential, rather than global market developments. Other factors behind the incomplete pass-through include the significant local component in the production of food, including market structure, taxes, and subsidies.

Coping with (domestic) food price fluctuations is indeed high on the minds of people and policy makers. The ‘weak links’ between international and domestic prices ensure that we need to understand the sources of food price volatility within countries. In that vein, this special issue devotes considerable space to the understanding of the dynamic of domestic prices, including the emergence of bubbles (Araujo Bonjean and Simonet) and seasonality (Kaminski *et al.*). The potential importance of high domestic food prices is shown by their possible linkage to riots (van Weezel) and the impact of seasonality on poverty outcomes.

While many of the papers in this special issue have as their policy background the food prices hikes over the period 2008–11, longer-term policy issues are important. Food prices remain volatile and weather conditions are creating mounting challenges for many countries around the world, particularly in Africa and Asia. Ethiopia is experiencing one of the worst droughts in decades. Strikingly, the two main rainy seasons supply over 80% of

Food Prices

US dollars per metric ton deflated using US GDP deflator

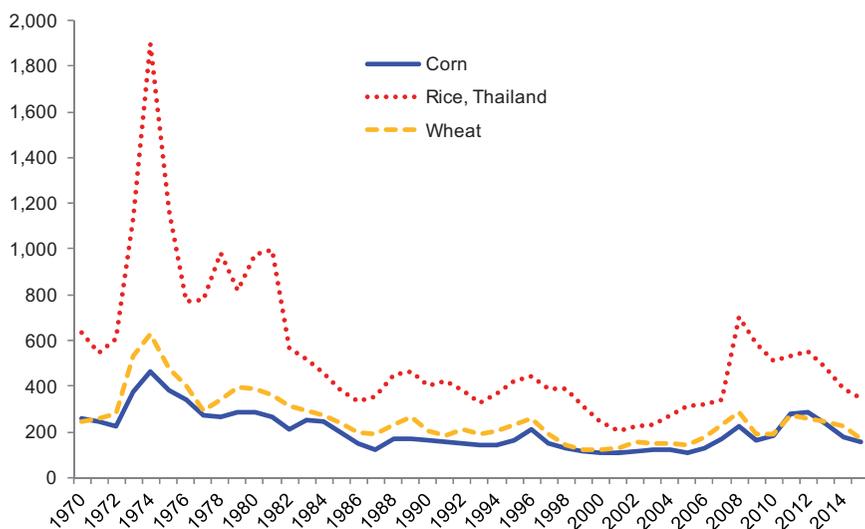


Fig. 1. International food prices.

Sources: IMF Primary Commodity Price System and World Economic Outlook.

Ethiopia's agricultural yield and employ 85% of the workforce. The lack of rainfall and subsequent drought exacerbated by the El Niño weather phenomenon have caused a massive spike in humanitarian needs, which are expected to continue through much of 2016 (see [Government of Ethiopia and Humanitarian Partners, 2016](#)). Beyond Africa, the impact of the 2015–16 El Niño in Asia could be even more severe in certain locations, such as the uplands of Cambodia, central and southern India, eastern Indonesia, central and southern Philippines, central and northeast Thailand, Papua New Guinea, and other Pacific island countries. In India, severe floods have already been reported in several parts of Tamil Nadu during November and December 2015, inundating most areas of Chennai (see [UNESCAP, 2015](#)).

Such volatility in food prices or outright food shortage has a crucial impact for the most basic aspect of welfare in poor countries, namely survival. As shown in [Table 1](#), the share of food consumption in the overall consumption basket is dramatically high for many low-income countries (LICs). It is even higher for fragile states such as Guinea and Burundi. For middle-income countries (MICs), the share is somewhat lower but still significant, reaching up to about 50% of total consumption. Thus, food price volatility or outright food shortages can cause enormous distributional challenges within and between countries.

Many countries are food insecure. Existing indices of food insecurity (see [Fig. 2](#)) show that Africa is most subject to such food insecurity, but that pockets of vulnerability also exist in Asia, and Central and South America. These vulnerabilities have led governments to devote much attention to policies to stabilize food prices and food security remains a frequently stated objective of governments in poor countries (Gouel *et al.*, and McCorrison and MacLaren).

Table 1. Share of food and beverages in total consumption, 2010

Top 20 countries	Share
Guinea	71.1%
Burundi	71.0%
Congo, Democratic Republic	69.5%
Papua New Guinea	68.4%
Chad	68.3%
São Tomé and Príncipe	67.8%
Tanzania	66.9%
El Salvador	65.5%
Ukraine	64.2%
Malawi	63.6%
Madagascar	62.7%
Albania	62.0%
Tajikistan	60.7%
Kyrgyz Republic	58.9%
Kazakhstan	58.7%
Ethiopia	58.6%
Gambia, The	58.4%
Afghanistan	58.0%
Honduras	57.7%
Mauritania	57.2%
Upper-MIC average	36.6%
Lower-MIC average	49.5%
LIC average	56.6%
Fragile states average	57.4%

Sources: World Bank Global Consumption Database and IMF staff calculations.

As recent events have shown, much price volatility is unanticipated; thus, policy makers are faced with challenges of how to respond to an unanticipated crisis. The papers in this special issue offer the opportunity to see these problems in a longer-term context, and provide insights into how policy can be better informed and prepared for the next bout of volatility. They also illustrate the wide range of empirical methods that economists are now using to address these issues.

We have organized the papers in this special issue into three groups. The first group addresses issues related to the links between food prices and inflation and the long-run determinants of food prices. The second group presents papers covering the causes of price bubbles, the effects of seasonality, and food price hikes as a possible cause of civil unrest in Africa. The final group considers policies for price stability in poor countries. We hope all these papers offer new insights into old, but very current, questions.

2. Food prices, inflation, and incomes

Whether or not food prices do link to general inflation is a key policy question for both developed and developing countries, and is investigated in the first paper of this special issue,

OVERALL SCORE

Score 0-100, 100=best environment

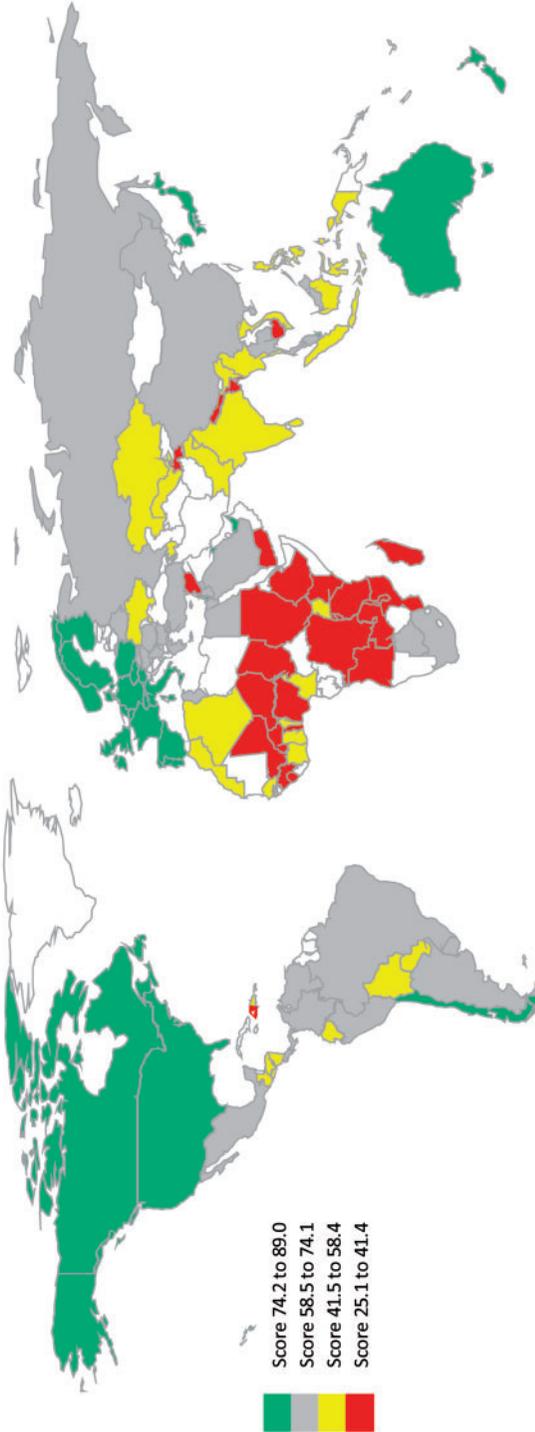


Fig. 2. Food insecurity around the world.

Source: Economist Intelligence Unit, Global Food Security Index 2015 workbook. <http://foodsecurityindex.eiu.com/Downloads>.

Notes: Countries are grouped into quartiles, so that the best-scoring 25% (i.e. top 28 countries) are placed into the first group ('Best environment'), the next 25% are placed into the second group ('Good environment'), the next 25% are placed into the third group ('Moderate environment'), and the worst scoring 25% are placed in the fourth group ('Needs improvement'). Where countries have equal scores, the number of countries in each group will not always be exactly the same because of the ties.

'Global food prices and domestic inflation: some cross-country evidence', by Davide Furceri, Prakash Loungani, John Simon, and Susan M. Wachter (pp. 665–687). Taking a longer-term view, the next paper—by John Baffes and Xiao Li. Etienne, 'Analysing food price trends in the context of Engel's law and the Prebisch–Singer hypothesis' (pp. 688–713)—addresses what the causes of long-run trends in such prices are.

Furceri *et al.* argue that there is a link from food prices to inflation, but it differs across countries with different income levels and also there is clear evidence that the relationship has changed over time. It is far from obvious that there is any necessary link from rises in food prices to general inflation. Furceri *et al.* introduce their paper by providing a review of the debate between those who argue for such a link—many of them prominent in discussions of the cause of the inflations that characterized, and continue to characterize, South American economies—and those who see the focus on food prices as a confusion of relative price changes with changes in the overall price level, which is due to monetary policy and excess demand.

That food prices and commodity prices more generally are a key part of explaining inflation in developed countries is argued, for example, by [Blinder \(1982\)](#), who sees the initial impetus for accelerating inflation in 1978 coming mainly from the food sector. He famously concluded that 'the 1970s really were different, and I fail to see why a theory of inflation is more scientific if it ignores this fact'.

The Furceri *et al.* paper does indeed support this view, as it finds the impact of food prices on inflation has declined over time and become less persistent. The paper also finds that recent global food price shocks since 2000 have had a much bigger impact on emerging than on advanced economies. This could reflect the larger share of food in consumption baskets in emerging economies. The paper provides evidence that inflation expectations are more anchored in advanced than in emerging economies, contributing to a smaller impact in advanced economies from a sudden burst in inflation due to global food price shocks.

The next question addressed in the second paper of this special issue, by Baffes and Etienne, is: what are the causes of long-run trends in such prices? One possible explanation that has been offered for the boom in food prices seen over the period to 2008 is that income growth in rapidly growing developing countries was increasing the demand for food. An explanation that, if correct, would lead us to expect permanently higher food prices with success at poverty reduction. In fact, the paper by Baffes and Etienne shows the opposite: across almost all of the specifications they test, they find that income has a highly significant and *negative* effect on real food commodity prices.

This is an important finding, as it is relevant for a long-running dispute within economics as to how the terms of trade for primary products behave in the long run. Early in this discussion, it was argued that in order for commodity-dependent countries to mimic the growth path of rich nations, they must transfer resources from the agriculture and mining sectors to manufacturing industries. Much of this discussion focused on relating the terms of trade to time trends and asking if that long-term trend was negative. It was a contentious issue with important implications for policy. This paper advances this discussion by asking what the cause of any change in the relative price of food might be and how it is related to income. The analysis in the paper also shows that income impacts on the deflator rather than the nominal price of food. The conclusion of the paper is that other factors, not income, are the underlying causes of the rises in prices seen in the period before 2008, the price of oil being one of the most important.

3. Price bubbles, seasonality, the price of food, and civil unrest

Food price volatility finds one of its most dramatic manifestations in the kind of price hikes seen in poor countries where the ability to store food is limited and where there may be limited price integration across markets in different regions of a country. Such limited storage may mean that seasonality continues to play a major role in price formation, with consequences for consumption by the poor, whose expenditure is dominated by expenditure on food. In this issue, we consider the following: why price hikes occur, using data from Niger, in an article by Catherine Araujo Bonjean and Catherine Simonet, 'Are grain markets in Niger driven by speculation?' (pp. 714–735); how important seasonality remains in determining consumption using data from Tanzania, in 'Seasonality in local food markets and consumption: evidence from Tanzania' by Jonathan Kaminski, Luc Christiaensen, and Christopher Gilbert (pp. 736–757); and whether price hikes cause civil unrest using data drawn from a large number of African countries, in Stijn van Weezel's article, 'Food imports, international prices, and violence in Africa' (pp. 758–781).

So why do we see sudden spikes in prices? The paper by Araujo Bonjean and Simonet seeks to discriminate between several possible explanations for these hikes. A straightforward explanation for price increases in local grain markets is that they are the consequence of negative supply shocks. Niger, which is located in the Sahel region of West Africa, is regularly confronted by big weather shocks, which generate instability in agricultural production. Non-competitive markets could explain the apparent discrepancies between prices and grain availability. Traders are often considered as responsible for price increases, and are blamed for taking advantage of their monopsony power and for speculative stockholding.

Another explanation, which is investigated in the paper, is whether the price hikes were rational or irrational bubbles. It could be that prices rose dramatically because stockholders had over-optimistic price expectations, which led to excessive accumulation of inventories. Such 'irrational exuberance' is common on stock markets, which are regularly plagued by speculative bubbles responsible for large and persistent price deviations relative to fundamentals. Alternatively, bubbles might be rational, resulting from self-fulfilling beliefs based on information that is not related to market fundamentals.

Millet price exuberance was the most widespread in 2005, the year of the big food crisis. After that date, episodes of price explosiveness were far fewer. An important conclusion in this paper is that this decline in volatility may be due to the tremendous development of information and communication technologies, which has allowed investors to base their expectations on a more reliable and timely information set, keeping prices closer to fundamentals.

Price spikes are a particularly dramatic form of price volatility. Of equal potential importance for the poor in agriculturally dependent economies is the role of seasonality. This is the subject of the paper by Kaminski *et al.* They argue that the disappearance of seasonality from Africa's development debate may well be premature and cite evidence that the welfare consequences of food price seasonality can be substantial, in particular for food security and nutrition. Policy responses likely also differ from those appropriate to surprise food price spikes. Their paper revisits the extent of seasonality in African livelihoods.

Wholesale maize prices are estimated to be 27% higher than those during the troughs (on average across the 20 wholesale markets). The seasonal gap is about half as large for rice (15%), which is partly irrigated and more widely traded. Seasonality explains between

7% and 13% of overall price volatility (for rice and maize, respectively), highlighting that many other sources of domestic food price volatility remain. Nonetheless, seasonal variation is 2.5–3 times larger than on the international reference markets (SAFEX for white maize and Bangkok for rice). This suggests substantial scope for improved access to secure storage and other measures to reduce seasonality, even more so when targeted to those markets displaying the highest seasonal gaps. Across markets in the country, they vary between 13% and 46% for maize and between 3% and 22% for rice, indicating substantial heterogeneity in food price seasonality across the country.

Third, there appears price-induced seasonality in caloric intake (controlling for other seasonal factors), though not for everyone. When taken on average across the country, seasonality in food prices induces only a 3.2% seasonal gap in caloric intake. However, the extent of this seasonal variation varies substantially across households. Two groups suffer most: poorer urban households and rural net food sellers. Both see seasonal swings in caloric intake of about 10%, linked to seasonality in maize and rice prices. These variations occur at low levels of caloric intake and do not account for intra-household distribution. Substantial detrimental effects on child malnutrition from food price seasonality cannot be excluded. Rural net food-buying households, who form the largest group in the country, appear to be able to largely smooth their caloric intake across the crop year.

The final paper in this group, by van Weezel, investigates another possible effect of food price hikes, namely civil unrest. This paper extends work in this area by examining the effect of food price fluctuations on violence in Africa, using international food prices as a source of exogenous shock weighted by a country's import pattern of major food commodities to create a country-specific food price index. While the analysis in the paper does show some link between price hikes and unrest, it appears other factors may well matter more.

4. Policies for price stability in poor countries

Given the evidence for the volatility of food prices and their impact on the poor, clearly the next question is appropriate policies to enhance the stability of prices and to limit fluctuations in consumption. This topic is the subject of the three final papers in this special issue. The first paper—'Implications of food subsistence for monetary policy and inflation', by Rafael Portillo, Luis-Felipe Zanna, Stephen O'Connell, and Richard Peck (pp. 782–809)—looks at how monetary policy should respond towards inflation in developing countries. The second—'Managing food price volatility in a large open country: the case of wheat in India', by Christophe Gouel, Madhur Gautam, and Will Martin (pp. 811–835)—looks at how food price volatility has been managed for wheat in India. The third—'Food security, welfare, and partial de-regulation of parastatals', by Steve McCorrison and Donald MacLaren (pp. 836–856)—tackles a more general question, namely when partial privatization of parastatals does lead to welfare improvement.

Differences across economies with different income levels and economic structures suggest that monetary policy towards inflation may need to differ across different types of economies, including between developed and developing countries. This is an issue taken up in the paper by Portillo *et al.*, who consider the implications for policy in economies where many in the population are at subsistence levels. They note the major change in policy towards inflation targeting. The key aspect of this policy is to anchor inflationary expectations and a recognition of the need to distinguish between the inflationary implications of 'sticky' prices and 'flexible' ones. As food prices are among the most

flexible, the implication of this line of analysis is that fluctuations in such prices need not be of concern and should be accommodated. Central banks should therefore concern themselves with the policy objective of stabilizing a narrower inflation measure rather than the broader consumer price index. Indeed, recent experience in the UK has shown that the central bank did not seek to raise interest rates when, for a long period, inflation was well above its target.

The procedure in their paper is to build a model that encompasses the USA and a group of African countries by matching the pair of income per capita and food share in these countries, thus permitting them to model the very different relationship between the relative price of food and inflation in these economies. About 50% of the volatility of inflation in LICs is accounted for by changes in the relative price of food compared with 3% in the USA. They introduce subsistence requirements in food consumption into a model with flexible food and sticky non-food prices, thus allowing consideration of how policies may need to change as economies undergo a process of structural transformation leading to a decline in the importance of food in consumption. They derive a welfare-based loss function for the monetary authority and show that optimal policy calls for complete (in some cases near-complete) stabilization of sticky-price non-food inflation, despite the presence of a food subsistence threshold. The implication of their analysis is that subsistence amplifies the welfare losses of policy mistakes, thus raising the stakes for monetary policy at earlier stages of development.

The paper by Gouel *et al.* documents how India has aggressively pursued food security for many years, particularly for wheat and rice. To protect poor consumers from high prices, and to lower the cost of food in normal times, a public distribution system provides food to low-income consumers at concessional prices. To protect producers from low prices, a pre-announced minimum support price places an effective floor on domestic prices, defended by the government's accumulation of staple food stocks. India also pursues an active trade policy to insulate the domestic market from fluctuations in world prices of these staples. While these policies have stabilized domestic prices, concern has grown over the mounting costs, potential inefficiencies, and the stark juxtaposition of large and growing public stocks with rising food prices.

This study looks at alternatives to address some of the challenges facing policy makers in these situations. Based on the assumption that policy makers seek to maximize social welfare, and specifically taking into account their dislike for price volatility, the study assesses current policies for wheat in India and then examines alternatives. Beyond the analysis of current and alternative policies for wheat in India, the study contributes to the literature on the design of food price stabilization policies more generally. It augments the modelling undertaken for previous studies by considering the case of a large country. Modelling a large-country case makes it possible to assess the effect of counter-cyclical policies on the world market, a very contentious issue since the 2007–08 spikes in food prices, which were partially precipitated by widespread use of export restrictions.

One important conclusion of the analysis is that it endorses the broad approach adopted by India of using a combination of trade and storage policies to target price stability. A second important conclusion is that this combination of policies could be fine-tuned to significantly increase India's total welfare and significantly reduce its storage costs by adopting a more rules-based food policy. As price stabilization policies do not directly target the underlying market failures, which are often thought to be related to economic agents' lack of capacity to cope with shocks, they are not regarded as first-best policies. Yet

price stabilization policies hold considerable appeal for many policy makers who have clearly exhibited a dislike for price volatility and certain market failures may prevent the first-best policy options from achieving their goals.

The final paper in this special issue, by McCorriston and MacLaren, takes a broad approach to an issue of importance for many countries in their policies to achieve price stability: the use of parastatal to control prices. While complete de-regulation of parastatals is often advocated as a desirable reform, it is usually opposed by vested interests and by those who perceive that the de-regulated market can be dominated by a small number of private firms. In practice, however, reform and de-regulation of parastatals is typically partial in nature. This paper shows that in this second-best world, partial de-regulation does not necessarily enhance food security and the paper identifies the determinants of that outcome.

5. Conclusion

A wide range of policy questions have been addressed in the papers in this special issue. They include how inflation targeting needs to be adjusted to the volatility shown by commodity prices, how inflation policy may differ across countries with different shares of food in consumption, and how domestic policy can more effectively be targeted at preventing food price hikes. The papers have also contributed to debates in economics as to the long-run trends in food prices and their causes, and the links between food prices and general inflation. The policy questions have direct links to the empirical findings in the papers.

It is an important general finding in empirical work in economics that heterogeneity matters. In this context, the empirical papers point to differences in relationships both across countries and over time. For example, Furceri *et al.* find that recent global food price shocks since 2000 have had a much bigger impact on emerging than on advanced economies and that inflationary expectations are more anchored in advanced than in emerging economies. Such findings point to the need not to generalize as to how price shocks may impact on an economy. They also suggest follow-up questions to which we need to know the answers. What are the factors that break the link from world to domestic food prices? What ensures inflationary expectations are more firmly anchored in some countries than others? When can central banks allow a period of above-target inflation without this setting off a wage price spiral? Such questions are not answered in these papers, but their findings highlight their importance.

The empirical findings also point to the need to look at, and explain, longer-term trends. The widely expressed view that the food price boom in the decade up to 2008 was due to the unprecedented growth of LICs and MICs, and that this was the dawn of a new era with permanently higher food prices, does not stand up to econometric scrutiny. Indeed, one of the most striking findings in this special issue is that income has a highly significant and *negative* effect on real food commodity prices (Baffes and Etienne).

When prices spike in poor countries, traders are often blamed and their (alleged) hoarding becomes a source of political unrest. As the paper analysing price hikes in Niger (by Araujo Bonjean and Simonet) shows, it is hard to distinguish different hypotheses as to what the cause of these price hikes may be. It is possible that bubbles are rational, although the possibility that an element of monopoly power is important cannot be ruled out. The complexity of the problem emphasizes the need to link policy to careful empirical analysis. Better price information enabling traders to be better informed may be a much better policy intervention than an expedient of seeking direct controls on trading.

Other papers in the special issue discuss other frequently adopted options in this area, namely public storage (Gouel *et al.*) and public price setting by means of parastatals (McCorriston and MacLaren). The first of these papers points to the potentially high costs of storage and the limited success achieved in meeting policy objectives; the second to the complexity of using a single instrument to meet different policy goals. Not covered in these papers are the political economy issues of how such public sector interventions may be used for purposes that were not originally intended. The papers highlight the need for a much greater focus on the link between stated objectives and the means to meet them.

Does seasonality in food prices increase poverty? Do food price hikes cause violence? Both questions have been addressed in this special issue and evidence presented that the answer is yes to both, at least in the countries analysed. Such results serve to show that while food price inflation may no longer be in the headlines, the policy issues that arise from the volatility of such prices need a much fuller understanding. We hope the papers in this special issue have taken a step to addressing both the causes and the consequences of such volatility.

Rabab Arezki, Karim El Aynaoui, and Yaw Nyarko, Guest Editors
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