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Factors Behind the Rise in Global Rice Prices in 2008

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Abstract

Global rice prices rose to record highs in the spring of 2008, with trading prices tripling from November 2007 to late April 2008. The price increase was not due to crop failure or a particularly tight global rice supply situation. Instead, trade restrictions by major suppliers, panic buying by several large importers, a weak dollar, and record oil prices were the immediate cause of the rise in rice prices. The 2007-08 rice price increase followed price spikes for major agricultural commodities such as wheat, corn, and soybeans. The primary cause of the rise in prices for these commodities from 2006-08 was rising global incomes, dietary changes, increased use of biofuels, tight grain supplies, and increased participation in futures markets by nontraditional investors. Because rice is critical to the diet of about half the world's population, the rapid increase in global rice prices in late 2007 and early 2008 had a detrimental impact on those rice consumers' well-being. Although rice prices have dropped more than 40 percent from their April 2008 highs, they remain well above pre-2007 levels.

Keywords: Rice, rice prices, exports, biofuels, food inflation, trade restrictions, global stocks, energy prices, futures markets, financial crisis, global supply, food prices

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Introduction

In 2000/01, global rice prices—not adjusted for inflation—were the lowest since the early 1970s, primarily due to a huge buildup in global rice stocks in the second half of the 1990s. China accounted for almost all of the buildup in global rice stocks. Beginning in 1999/2000, China implemented grain policies to reduce its excessive stocks. By early 2004, with global stocks at a more normal level relative to use, global rice prices began to slowly increase.

Starting in early 2006, global commodity prices, already moving upward, began rising at a faster pace as energy price increases accelerated and the value of the dollar began declining more quickly. However, rice price increases lagged behind price increases for most other major agricultural commodities—primarily corn, wheat, and soybeans—and was the last of these four major global agricultural commodities to experience a price increase. From January 2006 to October 2007, global corn and wheat prices more than doubled, while rice prices increased just 12 percent.

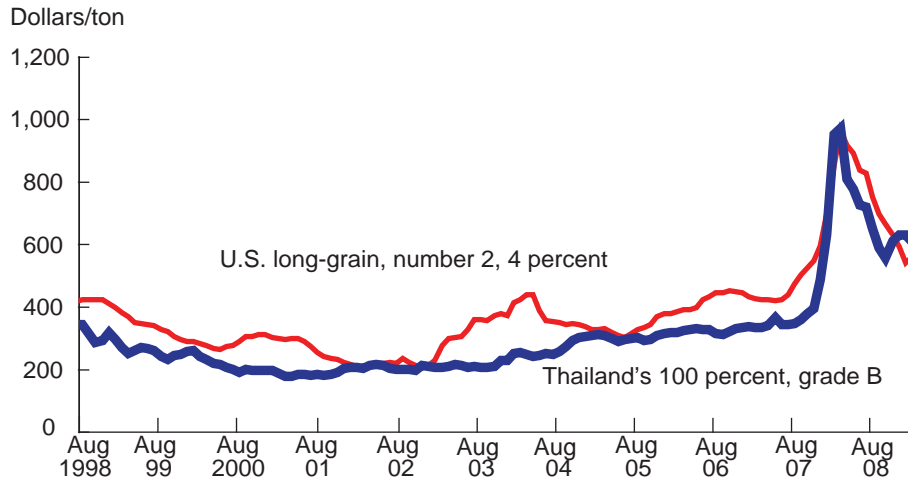
In Asia, where 90 percent of global rice consumption occurs, a long-term shift to more diverse diets among high- and middle-income consumers has caused per capita rice consumption to decline. This decline slowed the pace of price increases for rice. In contrast to rice, per capita meat and dairy consumption has been boosted by rising incomes in Asia. This change in consumption contributed to the sharp rise in feed grain and oilseed prices in 2006 and 2007. Additionally, growth in biofuels added to the boost in feed grain and oilseed prices. For wheat—a major food grain—adverse weather in several primary growing areas in 2006/07 and 2007/08 resulted in below-normal global production. The lower production levels contributed to the sharp increase in global wheat prices in 2007 and early 2008. Macroeconomic factors, such as the declining dollar and a shift of funds from equities and real estate into commodities also contributed to rising global commodity prices.

Then, in late October 2007—following trade restrictions implemented by Vietnam and India, two major rice-exporting countries—rice prices began to move upward at a faster pace. By late December 2007, global rice prices had risen 10 percent in just 2 months. U.S. and global rice prices rose sharply to record highs in the spring of 2008. Rice prices rose when the export restrictions were extended and additional exporters, including Cambodia and Egypt, announced restrictions. Thailand's high-quality 100 Percent Grade B long-grain milled rice—a benchmark for global trading prices—exceeded \$1,000 per ton in late April 2008, more than double the prices in early February and triple the prices of November 2007. U.S. prices soared as well, with U.S. long-grain milled rice for export quoted at a record \$948 per ton in late April 2008, up more than \$400 per ton from early February and more than double November 2007 prices. U.S. and global prices remained at record levels for nearly a month before beginning to decline (fig.1). Despite the decline, prices remain well above pre-spike levels.

After remaining at record levels for about a month, global and U.S. rice prices began to decline in late May and early June 2008, as panic buying ceased and Vietnam announced it would resume making commercial sales by the end of June. By mid-December 2008, Thailand's trading prices had

Figure 1

Thailand's rice prices nearly tripled from November 2007 to May 2008



Note: April 2009 prices are mid-month.

Sources: Thailand's price quotes, U.S. Embassy (Bangkok, Thailand) agricultural counselor, *Weekly Rice Price Update*; U.S. price quotes, *Creed Rice Market Report*.

dropped more than 45 percent from the April-May records and U.S. prices had declined about 33 percent. From late December 2008 through mid-March 2009, Thailand's prices strengthened—largely due to government policies—while U.S. prices continued to decline.

Rice is critical to the diet of about half the world's population, so the rapid increase in global rice prices in late 2007 and early 2008 had a detrimental impact on those rice consumers' well-being. The majority of these rice consumers live in developing countries, with many spending at least half of their income on food. The sharp increase in rice prices led to panic buying by importers, who feared even higher prices in the future, and contributed to food riots in developing countries across the globe.

This report will:

- look at the rice price increase in relation to historic movements in rice prices and to price movements for major traded crops
- discuss the immediate factors that drove rice prices to record highs in late 2007 and early 2008
- look at the long-term factors that set the stage for the rice price increases
- explain the factors that are likely to keep rice prices during the next decade at levels above those reported for 2000/01-2006/07
- outline the effects of higher rice prices on consumer well-being in developing food-importing countries
- describe rice price movements since the price spike
- provide ideas for avoiding price spikes in the future.

Both Long- and Short-Term Factors Caused the Increase in Rice Prices

The rapid increase in rice prices that occurred in late 2007 and early 2008 was not due to poor harvests, an increase in demand, or a tight global supply situation. In fact, global rice production in 2007/08 was the highest on record, and the 2008/09 global crop is estimated to be even larger. Total rice supplies—although not the highest on record—increased in both years as well (fig. 2). In addition, global ending stocks actually increased in 2007/08, and are projected to rise another 10 percent in 2008/09.

The 2007/08 global rice stocks-to-use ratio—a general indicator of market conditions—was 18.3 percent, up from a year earlier and the highest since 2003/04. The 2008/09 global stocks-to-use ratio is projected to increase to almost 20 percent (fig. 3). For most importers and exporters, the stocks situation did not indicate tight supplies. Among the major rice importers, only Bangladesh had an especially tight supply situation in 2007/08, largely due to a crop shortfall. In the Philippines, although ending rice stocks had declined about 15 percent from the 2005/06 record, the 2007/08 stocks-to-use ratio was still almost 34 percent.

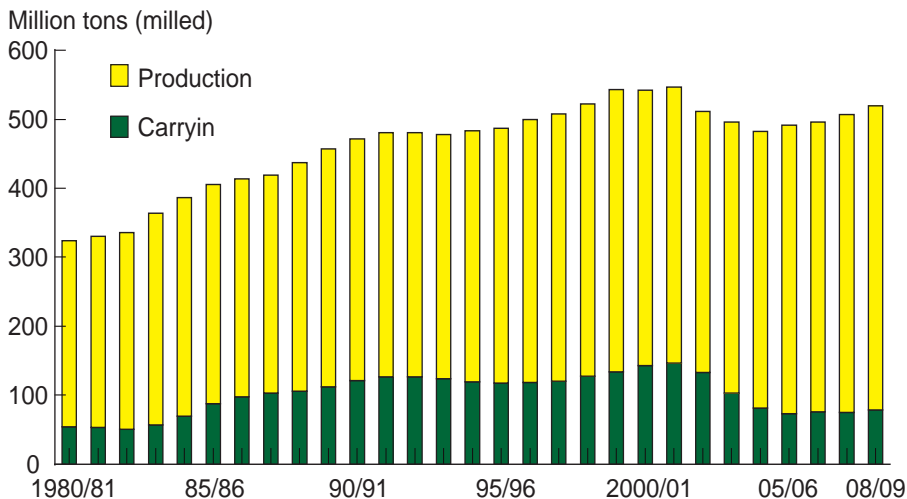
Among exporters, India's rice stocks rose 14 percent in 2007/08, increasing the stocks-to-use ratio more than 1 percentage point to 14.3 percent. India's ending stocks have increased each year since 2004/05, with a further increase projected for 2008/09. With record production in 2007/08, Vietnam's ending stocks increased 45 percent to a record 2 million tons, yielding a stocks-to-use ratio of 10.3 percent, the highest since at least 1995/96 when USDA first reported stocks for Vietnam. The stocks-to-use ratio for Thailand—which did not restrict exports—was 23 percent in 2007/08. Thailand's ending stocks have changed little over the last decade. Egypt's ending stocks of 0.67 million tons were up 80 percent from a year earlier, yielding a 14.0 percent stocks-to-use ratio, well above 11.3 percent a year earlier.

Both short-term and long-term factors were responsible for the increase in global rice prices to record highs in the winter and spring of 2008. The short-term (temporary) factors were:

- temporary export bans and restrictions implemented by several major and mid-level rice exporters
- panic buying by several large rice importers
- weather-related problems in specific growing areas
- a sharp decline in the value of dollar in fall 2007 and winter 2008
- a shift of funds into commodities from stocks and real estate in 2007 and early 2008 that added to price volatility and may have temporarily boosted prices.

Figure 2

Global rice supplies have increased each year since 2005/06

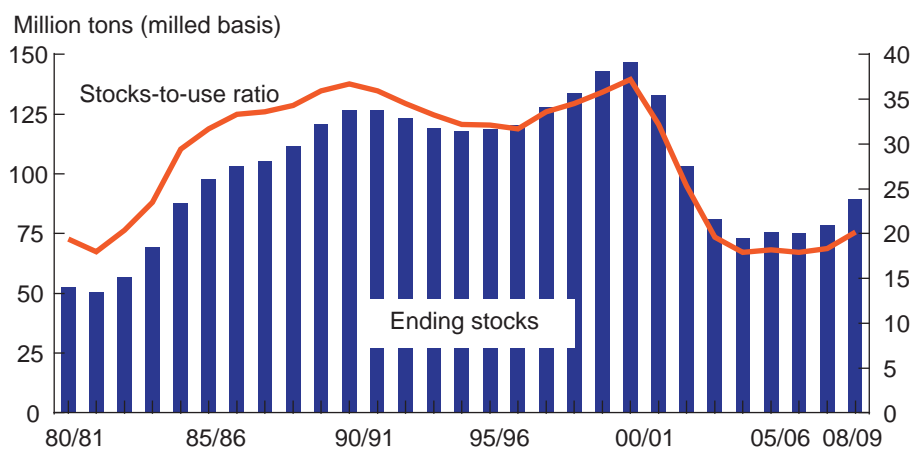


2008/09 numbers are estimates.

Source: USDA, Foreign Agricultural Service, Production, Supply, and Distribution database, www.fas.usda.gov/psdonline/psdhome.aspx/.

Figure 3

Global rice ending stocks are projected to increase 10 percent in 2008/09



2008/09 numbers are estimates.

Source: USDA, Foreign Agricultural Service, Production, Supply, and Distribution database, www.fas.usda.gov/psdonline/psdhome.aspx/.

The long-term (more long-lasting) factors that set the stage for the rice price increase included:

- sharply rising incomes in developing Asian countries
- very high prices for other foods
- extremely high nominal fuel and fertilizer prices
- the elimination of excess global rice stocks
- negligible yield growth for rice over the past decade
- a massive increase in the production of biofuels in recent years.

These factors are expected to keep rice prices above 2000/01-2006/07 levels over the next decade.

Export Bans and Restrictions Were Among Short-Term Factors

Export bans, restrictions, and taxes implemented by several major rice-exporting countries beginning early in the fall of 2007 were significant factors behind the rice price spike in the winter and spring of 2008. In late September 2007, Vietnam—typically the second-largest rice-exporting country—placed a ban on commercial sales. By mid-summer 2007, Vietnam was already overcommitted for calendar 2007 in the global export market. Additional sales by Vietnam in 2007 would have reduced the amount of rice available for its large domestic market to a level deemed by Vietnamese policymakers to be too low (see table 1 for a list of major exporters, concerns, and policy responses).

Then, in early October 2007, facing rapidly rising food prices, India—typically the third-largest rice-exporting country—announced a minimum export price (MEP) for all categories of rice except for its premium basmati rice (a high-quality aromatic rice). India exports most of its basmati rice. Earlier that summer, except for parboiled rice, India was making few sales of non-basmati rice. At an initial \$425 per ton, the MEP was an effective ban on non-basmati exports, which typically account for about two-thirds of India's total rice exports. India repeatedly raised its MEP in the fall of 2007 to restrict non-basmati exports.

However, neither country totally banned exports. Vietnam continued to allow government sales to regular buyers—primarily the Philippines and Cuba. In addition to continued sales of its premium basmati rice, the Government of India allowed exporters to sell large amounts of non-basmati rice to Bangladesh—typically India's largest export market for non-basmati rice—and to sell smaller amounts of non-basmati rice to certain other food-deficit countries, mostly in Sub-Saharan Africa. Despite the porous nature of the export bans and restrictions, by November 2007 global rice prices—already rising along with prices of other commodities—began to increase at a much faster pace as global exportable supplies tightened.

Table 1

Rice-exporting countries, concerns, and policy responses

Country	Concern	Response
Vietnam	Rising food prices	Banned commercial sales
India	Rising food prices, tight supplies of wheat	Minimum export price followed by a ban on non-basmati sales
Cambodia	Rising food prices	Banned exports
China	Rising food prices	Eliminated VAT ¹ export rebate, instituted an export tax
Pakistan	Rising food prices	Minimum export price
Thailand	Most private exporters halted making new sales	Announced penalties for hoarding
Burma	Damage from Cyclone Nargis	Temporary export ban
Australia	Prolonged drought	Water restrictions sharply reduced rice acreage
United States	Increased demand for exports by some nontraditional buyers	No export restrictions

¹VAT = Value added tax.

Source: USDA, Economic Research Service.

In December 2007, China—the sixth-largest rice-exporting country—announced a 10-percent tax on rice exports and rescinded a value-added-tax rebate for rice exports. Despite these restrictions, China continued to export rice and make new sales. Egypt—a mid-level exporter—announced a voluntary ban on rice exports in January 2008. Global rice prices increased nearly 30 percent from December 2007 through February 2008. The export restrictions were a major factor behind the rapid increase in global rice prices from late 2007 through the spring of 2008.

Unlike Vietnam and India, which export only long-grain rice, Egypt ships almost exclusively medium- and short-grain rice. China and the United States export long-, medium-, and short-grain rice. Long-grain accounts for about three-fourths of global rice trade. Fragrant rice and combined medium- and short-grain rice each account for 10-12 percent of global rice trade.

In late March 2008, the pace of the rice price increase accelerated when Vietnam reimposed its ban on commercial sales from April through June, despite a bumper 2008 winter-spring harvest. Although the ban on commercial sales was reimposed, the Government of Vietnam continued to make sales. Also in late March 2008, India converted its MEP on non-basmati exports into an outright export ban. In January 2009, the Government of India announced it would allow limited sales of non-basmati rice to four countries in Sub-Saharan Africa—Nigeria, Senegal, Ghana and Cameroon—through the State Corporation of India. As of early April 2009, restrictions on sales of non-basmati to other markets remain in effect.

Three additional exporters announced trade restrictions in early spring 2008 as well, primarily in response to rising food prices. First, in late March, the Government of Egypt changed its voluntary export ban to an official ban on sales through October 2008. Then, in June, Egypt extended the ban until at least April 2009. Second, the Government of Cambodia announced a ban on export sales in late March 2008. However, the ban lasted less than 2 months. The Government of Cambodia allowed some sales to Vietnam even when the export ban was in effect. Cambodia is a small-to-mid-sized exporter. Vietnam purchases most of Cambodia's rice exports, which are all unmilled (or rough-rice). The imported rice is milled in Vietnam.

Finally, in late-April 2008, Pakistan—typically the fifth-largest rice-exporting country—announced minimum export prices for various types and grades of rice. However, Pakistan's initial MEPs were below actual trading prices, thus having no impact on sales. Despite a bumper harvest in 2007, Pakistan was unable to expand exports in early 2008, primarily due to logistical problems. In August 2008, when Pakistan's MEPs exceeded global trading prices which were declining, the government terminated the MEPs.

Thus, by early May 2008, among the top six global rice exporters only Thailand and the United States were not officially restricting sales. Despite adequate supplies and no restrictions, exporters in Thailand were making few sales, speculating that prices might rise even more. The Government of Thailand warned exporters not to hoard rice in anticipation of higher prices and announced sharp penalties for offenders.

In addition to boosting trading prices, the lack of sales by the largest exporting country made price discovery—already difficult and costly in the thinly traded global rice market—even more opaque and costly. U.S. rice exporters—with several of their competitors out of the market—picked up additional sales to the Middle East, Sub-Saharan Africa, Oceania, and Southeast Asia.

Altogether, the countries with effective export bans and restrictions in place typically account for 33-40 percent of global rice exports. These export-prohibiting policies had several harmful effects. First, they drove trading prices—already on the rise—to record highs, which reduced trade and led to panic buying by major importers. The high prices also reduced the purchasing power of consumers, especially in the poorest food-deficit countries. Second, in the exporting countries, the lack of sales limited increases in their domestic prices, thereby limiting the economic incentives to pull more acreage into rice production. Finally, rice-importing countries—facing record high prices in the global market—expanded the use of marginal lands and boosted input use to increase production to reduce import needs (fig. 4 and fig. 5).

Export Bans and Restrictions Were Implemented To Control Rising Domestic Inflation

The export bans, restrictions, and taxes were implemented to ensure affordable domestic prices for rice, a food staple in most of Asia. They were put into place in an environment where rising prices—especially for food—were eroding the purchasing power of consumers. Inflation rates were particularly high in Vietnam, India, and China, the three fastest growing economies in Asia, where food and fuel prices increased at the fastest rates.

In most of developing Asia, rice is a wage-good, primarily because it accounts for a large share of the diet of most consumers. So rising rice prices typically lead to demands for higher wages, which further boosts inflationary pressures. By banning or restricting rice exports, the governments were making more rice available for the domestic market in an attempt to stabilize domestic food prices and limit overall inflation rates.

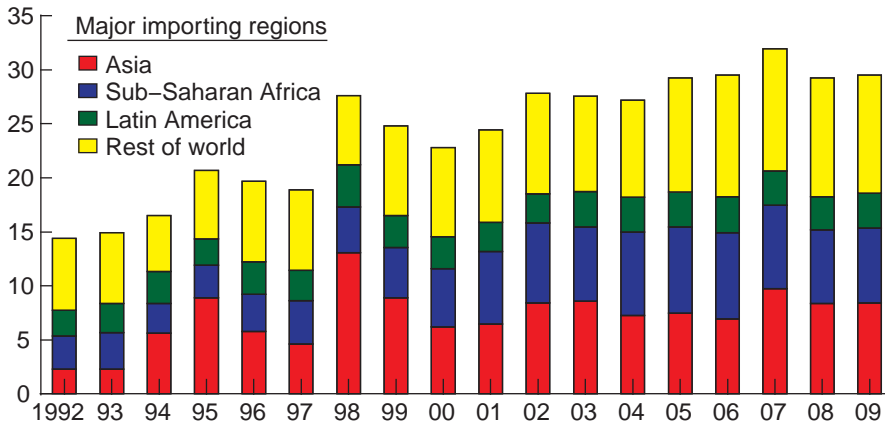
In India, the restrictions and ban on non-basmati rice exports were also a response to large imports of wheat in 2006/07 and 2007/08. India was an exporter of wheat from 2000/01-2005/06, importing very little wheat. However, with wheat crop shortfalls in 2006/07 and 2007/08, the Government of India curtailed wheat exports and imported several million tons of wheat to meet domestic demand.

By the fall of 2007—when India began restricting rice exports—the government wanted to avoid importing any more wheat, given the record high prices that internationally traded wheat reached that August. The Government of India, which purchased most of the imported wheat and subsidizes the price of flour sold to its poorest consumers through its Public Distribution System, was concerned about rising government expenditures. In South Asia, consumers often shift between wheat-based and rice-based products based on prices. This substitution is not common in most other parts of Asia. So, the reduction in domestic rice prices resulting from India's ban on exports of non-basmati rice likely encouraged some consumers to shift from wheat-based foods to rice-based ones.

Figure 4

Global rice trade dropped 8 percent in 2008; little growth projected in 2009

Million tons (milled)



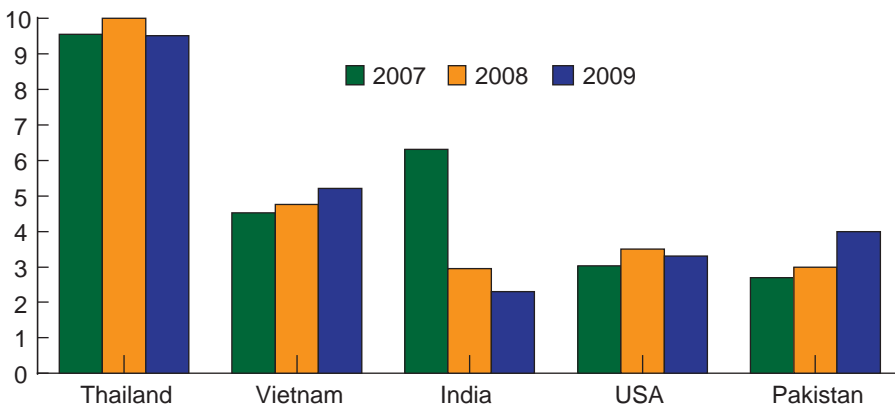
2008/09 numbers are estimates.

Source: USDA, Foreign Agricultural Service, Production, Supply, and Distribution database, www.fas.usda.gov/psdonline/psdhome.aspx/.

Figure 5

India's rice exports have dropped sharply since 2007

Million tons (milled)



2008 and 2009 numbers are estimates.

Note: These 5 countries account for more than 80 percent of global rice exports.

Source: USDA, Foreign Agricultural Service, Production, Supply, and Distribution database, www.fas.usda.gov/psdonline/psdhome.aspx/.

Also, major elections in India are scheduled for April-May 2009, with the government fully aware of the sensitivity of consumers to high food prices. While India has a substantial and growing middle class, it is still home to several hundred million people earning \$2 per day or less. For these consumers, rising food prices—especially for the grain-based staples that are the bulk of their diet—can have a major detrimental impact on their economic well-being.

Panic Buying by Major Importers Further Boosted Prices

It was not just the exporters that were responding to the rapid rise in food prices. By early spring 2008, several major rice importers, primarily the Philippines and big buyers in the Middle East and Africa, were in the market for extremely large quantities of rice. They were attempting to lock in prices for several months of supplies before prices rose even further in order to assure their consumers of adequate supplies, and dampen domestic food price increases (see table 2 for a list on major rice importers, domestic concerns, and policy responses).

In mid-April 2008, the Government of the Philippines attempted to purchase about 500,000 tons of rice. The Philippines, the world's largest rice importer, was unable to purchase such a huge amount and tried again in early May to buy an even larger amount (675,000 tons) on the global market. The Philippines withdrew the second tender after only one supplier responded.

The governments of Nigeria, Bangladesh, and Iran were also in the market for major purchases in the spring of 2008. Each country was experiencing substantial increases in food prices. These importers typically spread their purchases of rice out more evenly over the year, reducing the impact on global prices. This panic buying by major buyers contributed to even faster price increases. In Haiti, the prime minister was forced to resign over rising food prices.

In early 2008, many countries experienced food riots caused by widespread anger over the rapid rise in food prices. Egypt had its most severe food riots since the late 1970s. The Philippines, Bangladesh, and much of West Africa experienced substantial food riots as well. For many of these countries, entering the global market for large purchases of rice was seen as a viable means to calm consumer concerns over food availability and to lower the price of a critical food staple.

By late June 2008, the panic buying subsided. Early that month, Vietnam and Thailand announced they would make numerous rice sales to the Philippines over the next several months. In late June, the Government of Japan

Table 2

Rice-importing countries, concerns, and policy responses

Country	Concern	Response
Philippines	Rising food prices, supply concerns	"Panic" buying, record imports
Mexico	Rising food prices	Eliminated restrictions on non-U.S.-origin rice
Nigeria	Rising food prices	Reduced import tariffs
Bangladesh	Crop damage from floods and Cyclone Sidr	Reduce tariffs, boosted imports
Iran	Rising food prices, supply concerns	Reduced tariffs
Indonesia	Rising food prices, supply concerns	Reduced tariffs
Ghana	Rising food prices, supply concerns	Reduced tariffs
Malaysia	Rising food prices, supply concerns	Price ceiling on domestic sales, boost imports

Source: USDA, Economic Research Service.

announced it would sell up to 200,000 tons of stored rice to the Philippines in the coming months. (As of early April 2009, Japan had not sold any rice to the Philippines.) Because of these government-to-government commitments, by mid-summer 2008 the Philippines halted making massive global tenders and announced it would spread its purchases out more evenly over the rest of the year. The Philippines harvested a record crop in 2007/08 and the 2008/09 crop is estimated to be even larger. Although the Philippines has increased rice production almost 40 percent over the last decade, substantial post-harvest losses due to spoilage and pests during long-term storage in hot, humid conditions remain a major problem for the rice sector in the Philippines.

In addition to the panic buying, several major importers, including Nigeria, Bangladesh, Iran, Indonesia, and Ghana, lowered or sharply eliminated tariffs on rice imports in early 2008 to boost supplies and moderate domestic food-price inflation. In late March 2008, India authorized duty-free imports of rice. Despite eliminating tariffs on rice, India has not imported any rice. In April 2008, the Philippines lifted restrictions on commercial rice imports, but maintained its import tariff on government-purchased rice. Although the United States supplies almost all of Mexico's imported rice, now duty-free under the terms of the North American Free Trade Agreement, the Government of Mexico opened a tariff-free 250,000-ton rice import quota for other suppliers in May 2008. However, to date, Mexico has not purchased rice from any source other than the United States.

Cyclone Damage in Bangladesh and Burma, Cold Snaps in China and Vietnam Fueled Price Increases

Although global rice production in 2007/08 was the largest to date, isolated weather problems in some key growing areas contributed to the sharp rise in prices in the winter and spring of 2008. First, and most importantly, severe flooding during the summer of 2007 and the effects of Cyclone Sidr in late December 2007 reduced Bangladesh's 2007/08 crop more than 1 percent from a year earlier. These were major factors behind the threefold increase in Bangladesh's rice imports in calendar year 2007 and the large purchases the country made in early 2008. Although Bangladesh has had substantial success in boosting rice production over the last decade, mostly through higher yields, it remains a major importer. Bangladesh must harvest a record crop each year to avoid sharply increasing imports.

Second, abnormally cold weather in January and February 2008 in southern China and northern Vietnam created concerns over potential crop losses in these two rice-exporting countries. Despite the severity of the cold snap, crop damage in both countries turned out to be minimal. In China, the cold snap occurred prior to the planting of the early indica (long-grain) crop. In Vietnam, the bulk of its winter-spring crop—harvested in March and April—is grown in the south. Although actual crop damage in China and Vietnam ended up to be very small, initial concerns over effects of the cold snap likely further boosted global trading prices last spring.

Third, within days of the global rice price spike in late April 2008, Cyclone Nargis struck southern Burma in early May with devastating force. Although most of Burma's 2007/08 crop was already harvested, a substantial amount

of stored rice was destroyed by the cyclone. In addition, the combination of salt-water intrusion, lack of seeds and other inputs, and severe infrastructure damage, is estimated to have reduced Burma's 2008/09 production. The extent of the actual crop damage and storage loss in Burma is still not fully known.

Burma is a mid-level exporter, shipping 400,000-500,000 tons of low quality long-grain rice each year. The cyclone halted any additional exports until the fall of 2008, temporarily reducing global exportable supplies. Burma even imported a small amount of rice, mostly in the form of food aid. Burma's domestic rice supplies have recovered significantly since Cyclone Nargis hit in May 2008. The Government of Burma lifted its ban on rice exports, instituted immediately after the cyclone, in September 2008 and in the following months resumed rice exports of outstanding sales made prior to the cyclone. In October 2008, the ban on rice border trade with China, Bangladesh and Thailand was lifted as well.

Finally, Australia's 2007/08 rice crop (harvested in April-May 2008) was severely impacted by drought, virtually taking this mid-level exporter of medium-grain rice out of the global market. Australia's plantings and production in 2007/08 were the smallest in more than 70 years, a result of extremely low water-reservoir levels. Although Australia increased rice plantings in 2008/09, production will still be too small for Australia to export any significant amount of rice.

Australia has suffered from severe drought this century. In the 1990s, Australia typically exported 500,000-650,000 tons of rice a year, virtually all medium/short-grain. Since Australia's 2007/08 crop was planted in October 2007, the extremely small harvest in April-May 2008 was likely already factored into prices and buyers expectations regarding available supplies in 2008 and likely had little impact on the 2008 price increase.

Declining Value of the U.S. Dollar Boosted Global Trading Prices

The sharp drop in the value of the U.S. dollar in the fall of 2007 and winter of 2008 was also a major factor behind the rice price increases. Because the bulk of rice traded globally is bought and sold in U.S. dollars, when the value of the dollar declines, traded prices for rice increase. In addition, because the weaker U.S. dollar makes dollar-denominated traded goods cheaper in foreign currencies, demand typically increases and this further raises the dollar-denominated trading price.

The U.S. dollar began the 21st century virtually on par with the euro, and by November 2000 the dollar was about 15 percent stronger than the euro. However, from December 2000 until early 2004, the dollar declined in value compared with euro. The dollar-euro relation was relatively stable from mid-2004 until mid-2006. But, beginning in late 2006, the dollar began a steady fall. The fastest rates of decline occurred in September-November 2007 and in February-March 2008. In February and March 2008, the decline in the dollar was especially sharp, reaching an historic low compared with the euro by late March 2008. The dollar further declined in April 2008, reaching a new low. This is exactly when global rice prices spiked. The dollar

strengthened slightly in May and June 2008, but declined again to another record low in relation to the euro in mid-July (fig. 6).

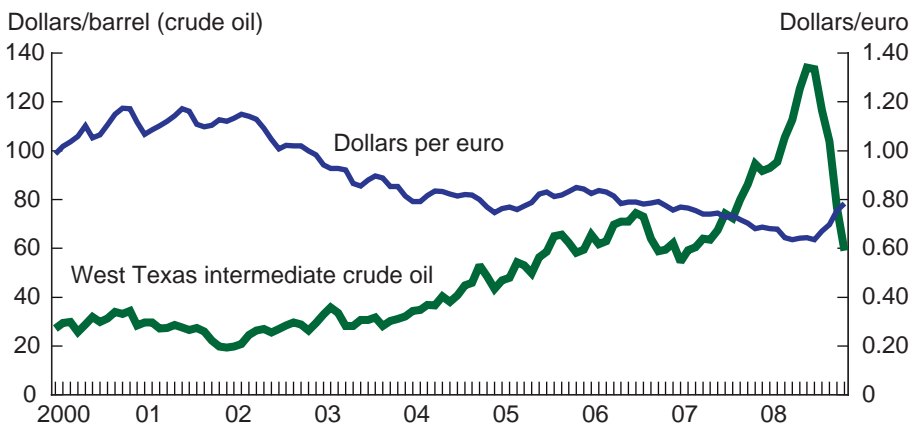
In late July 2008, the dollar began to strengthen in relation to the euro, a period when global rice prices declined. By late September 2008, the dollar-euro relation was about the same as it had been in January and February, just prior to the 2008 rice price spike. In October 2008, the dollar rose sharply in relation to the euro, and by the end of the month was at its strongest level in 2 years, likely contributing to the substantial decline in global rice prices that month. The dollar further strengthened in November and December and rice prices declined. The dollar's strengthening in the late-summer and fall of 2008 coincided with the onset and deepening of global financial crisis. As the global liquidation deepened last fall, investors steered back into the U.S. dollar because of its safe haven status. Also, because many U.S. investors had exposure abroad, when they cut their risky trades, they repatriated their funds back into U.S. dollars, boosting the value of the dollar.

Financial Crisis, Speculation in Commodity Futures Markets Contributed to Price Volatility

Another short-term factor that may have contributed to the rise in global commodity prices in 2007 and early 2008 was the increased investment in commodity futures by hedge funds, pension funds, index funds, and sovereign wealth funds. Beginning in 2006, these nontraditional investors (or outside speculators) became more involved in agricultural commodity markets, as returns to equities and real estate became less attractive and more risky (Trostle, 2008).

In addition, destabilizing influences from financial markets, including indiscriminate lending and real estate speculation, led to a financial crisis in the United States in early 2008, which also encouraged greater investment in food commodities. Financial speculators, seeking quick returns and safer

Figure 6
The value of the U.S. dollar dropped sharply from 2002 to early 2008



Sources: Exchange rates, Pacific Exchange Rate Service, University of British Columbia, Sauder School of Business, <http://fx.sauder.ubc.ca/data.html>; Monthly crude oil prices, Economicmagic.com, www.economicmagic.com/em-cgi/data.exe/var/west-texas-crude-long#Data/.

investments, removed trillions of dollars from equities and mortgage bonds, some of which was then invested into food and raw materials (Timmer, 2009).

The investors in these funds were not so much interested in agricultural commodities as they were in using commodities to diversify their financial portfolios, particularly to move out of stocks and the housing market. These funds held an increasingly large percentage of open interest in the futures market for agricultural commodities, as well as in nonagricultural commodities such as metals and energy. These investors only had a financial interest in the markets and did not intend to take delivery of the agricultural commodities.

When the average prices for corn, wheat, soybeans, and rice approached their peaks in the spring of 2008, the total open interest on U.S. futures markets for each of these commodities peaked. Also, the share of noncommercial long positions, as a percent of total open interest, peaked last spring as well. Then, as the market prices for these crops declined from late-spring 2008 through the fall of 2008, total open interest and noncommercial long positions began to decline. During the second-half of 2008, nearly 70 percent of the noncommercial long positions were liquidated. In the first week of December 2008, noncommercial long positions and market prices for crops both declined (Chicago Trading Futures Corporation, 2008).

The impact of outside speculators in commodity price formation has been debated for decades. A 2009 study by the International Food Policy Research Institute statistically tested whether speculative activity in the futures market contributed to the sharp rise in agricultural prices for corn, wheat, soybeans, and rice in 2007 and 2008. The results indicated that speculative activities may have influenced prices, but the evidence was far from conclusive. Results varied by commodity, time, and causation factor examined (Robles, 2009).

The movements in crop prices and futures market participation may be nothing more than an interesting correlation. The links between financial markets and commodity markets are neither simple nor stable. Much more research is needed to understand the short-run and long-run linkages between financial markets and agricultural commodity markets (Timmer, 2009).

Historically, increased liquidity and depth in the commodity futures markets have been considered as forces of stability, and therefore have positive long-term impacts for users and sellers of grains (McPherson, 2008). This implies that the greater participation in futures markets by commercial and noncommercial investors did not lead to inefficiency. However, computerized trend-following trading practices—index trading—employed by many of these funds likely increased the short-term volatility of agricultural prices. Index traders generally replicate a commodity index by establishing long futures positions in a mix of commodity markets and then rolling these positions forward from commodity future to commodity future using a fixed methodology. Hence, most of these traders hold long-only positions (Trostle, 2008).

For rice, the impact of increased activity by nontraditional investors in the futures market on price is even less clear than for other major agricultural commodities such as corn, wheat, and soybeans. Several factors account for this greater ambiguity. First, the rice futures market is quite small compared with futures' markets for major U.S. agricultural commodities such as corn,

wheat, and soybeans. The rice futures market is described as thin—as only a small share of production and use is actually traded in futures markets. Financial speculation likely played no or only a small role in the increase in rice prices in late 2007 and early 2008, partly due to the thinness of the rice futures market (Timmer, 2009).

Also, most types of rice—which is a commodity highly differentiated product—are not traded on the futures market at all. In fact, in the United States, there is a futures market only for long-grain rough rice in the South (Wright, 2009). Thus, while there may have been an influence on some commodity prices and their volatility, for rice the impact of nontraditional investors is less apparent.

However, despite the fact that the U.S. rice futures market is quite thin and exists only for long-grain rough rice in the South, many contracts by mills to purchase rice from farmers are based on the futures price. A greater understanding the impact of nontraditional investors on the agricultural commodity markets would likely be useful to policymakers and market participants.

Long-Term Factors Included High Income Growth in Asia

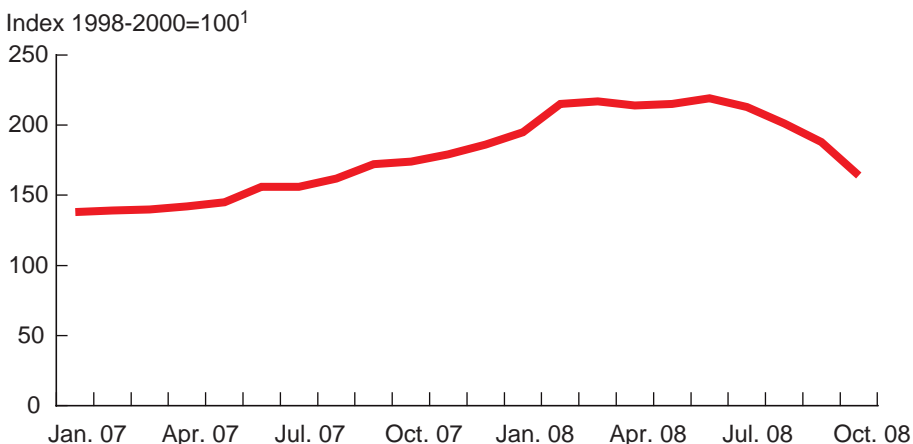
Rapid price inflation is a major concern across developing Asia, with food-price inflation particularly important. Food commodity prices rose sharply from early 2007 to early 2008. The food commodity price index compiled by the United Nations Food and Agriculture Organization—which tracks global prices for 55 food commodities—jumped more than 50 percent in April 2008 from a year earlier (fig. 7).

An important long-term factor behind the rapid food price inflation was rising incomes in much of developing Asia, which accounts for about half the world's population. This has allowed consumers to shift from primarily low-priced traditional grain-based diets to more diverse but higher priced diets that include more meats, fish, dairy products, fruits, and vegetables. The big increase in consumption of these higher priced foods by a large share of Asia's population has had a major impact on global food-price inflation.

Because food accounts for a large share of consumers' expenditures in developing Asia, rapidly rising food costs have a major impact on regional inflation rates. In the United States, food accounts for only about 10 percent of an average consumer's annual expenditures. So rising food prices have a much smaller impact on the overall U.S. inflation rate than in developing Asia.

This sharp rise in demand for meat and dairy products across developing Asia raised prices for feed grains and oilseeds, both heavily used in animal feeds. With prices for corn and soybeans on the rise, any increase in food grain acreage—with wheat and rice being the dominant food grains worldwide—was limited. This was especially true in the southern United States and southern areas of South America, where rice often competes for acreage with soybeans and—to a lesser extent—with feed grains.

Figure 7
FAO food commodity price index increased almost 50 percent from April 2007 to April 2008



¹Export-weighted price index of 55 commodities, 1998-2000 = 100.

Source: United Nations, Food and Agricultural Organization, www.fao.org/.

Developing Asia is likely to see continued strong income growth over the next decade, despite a recent slowdown from record levels. This will continue to push more consumers into the middle class. Thus, global food prices will continue to be supported by the strong worldwide demand for feeds largely driven by diet diversification in Asia. Although rice is an inferior good in much of Asia, rice prices will continue to be pressured by higher overall food prices and strong competition for land.

High Oil Prices, Increased Biofuels' Production Contributed to Higher Food and Feed Prices

Rising oil prices between 2002 and 2007 contributed to the conditions that resulted in the 2008 increase in rice prices. High oil prices impact nearly every aspect of farming—production, processing, marketing, and transportation. Worldwide, rice growers are disproportionately hurt by the high fuel prices because irrigation pumps typically run on diesel. In addition, in most countries—especially in East Asia—rice growers use a substantial amount of fertilizer, which is necessary to achieve the high yields associated with the modern varieties. Because modern fertilizers are petroleum-based, high oil prices boost fertilizer prices.

Also, because most developing Asian countries subsidize fuel and fertilizer prices for farmers, producers typically do not reduce their use of these inputs in the face of rising global prices for fuel and fertilizer. This further boosts input prices since Asia is a big importer of both oil and fertilizer.

High oil prices sharply boosted transportation costs as well. The combination of high oil prices and a backlog in global shipbuilding further raised trading prices and reduced global rice trade (until ships currently being constructed are available). From December 2005 until March 2008, global freight rates nearly tripled. High transportation costs may encourage importing countries to provide incentives and subsidies for their producers to expand production to avoid or reduce imports. Over the long-term, if high fuel prices reduce trade growth, then the share of the global rice production produced by the low-cost Asian exporters will decline and the share produced by importers with higher production costs will increase.

Oil prices began a long-term increase in early 2002, after dropping below \$20 per barrel in late 2001. The rate of price increase was rather modest until August 2005, when oil prices began to increase sharply, partly due to the effects of two severe hurricanes that struck the U.S. Gulf Coast late that summer and early fall. After nearly stabilizing for almost a year, oil prices began to increase at a rapid pace in summer 2007. By March 2008, prices exceeded \$100 per barrel for the first time. This was the same time that global and U.S. rice prices were spiking. Oil prices reached record levels in July 2008—with some spot prices quoted at more than \$150 per barrel (fig. 6).

Much of the price increase for oil was due to strong demand from developing Asian countries, especially China and India. In contrast, previous oil price spikes were relatively short-term, primarily driven by supply shocks, often caused by political turmoil in the Middle East. Although economic growth in the developing Asian nations has slowed from recent record rates—and has

contributed to the decline in oil prices since late July—income growth still remains at historically high rate for most of those countries, and is expected to resume stronger growth over the next decade.

The recent big increase in the use of corn and oilseeds in biofuels has further raised prices for these commodities and has diverted use of these crops away from feed use. Because feed is a major input in livestock production, the expanded use of corn in ethanol has pushed feed costs higher, reducing profits for livestock operations, causing livestock production to decline, and thus pushing meat and dairy prices higher. In addition, the higher feed and oilseed prices gave signals to growers worldwide to shift their growing area to corn and oilseeds for fuel use, and away from food grains.

In the U.S., about 30 percent of the 2008/09 corn crop is expected to be used for ethanol, up from just 10 percent in 2002/03. Rice is not grown for fuel use. Expanded corn acreage in 2007 in the Mississippi Delta likely reduced rice acreage, a factor behind the increasing U.S. rice prices in 2007/08. In 2008, expanded soybean acreage in the Mississippi Delta limited the increase in rice acreage, despite record high U.S. rice prices at planting. This competition for land for fuel, food, and feed crops is expected to continue.

Removal of Excess Global Rice Stocks Eliminated Price Cushion

When the rice prices increased in the spring of 2008, global ending stocks of rice stocks were sharply lower than the record levels accumulated in 2000/01. In fact, at 78.5 million tons, ending stocks in 2007/08 were just slightly more than half those carried 7 years earlier. At the turn of the 21st century, global rice stocks were excessive, with a stocks-to-use ratio exceeding 37 percent. Although global ending stocks of rice declined 50 percent from 2000/01 to 2004/05, stocks began increasing in 2005/06 and had increased more than 7 percent by 2007/08.

In previous price spikes—1987/88, 1993/94, and 1997/98—large global stocks limited the level and duration of the price increase caused by adverse weather. In 2007/08, this cushion did not exist in the major exporting countries, a factor that partly contributed to the large size of the price spike (fig. 3).

Global rice stocks began to sharply increase in 1983/84, expanding 22 percent that year. Stocks continued to increase over the next 17 years, reaching a record 146.7 million tons in 2000/01 and accounting for a record 37 percent of total disappearance. China—the world’s largest producer and consumer of rice—accounted for most of the buildup in global rice stocks. Global stocks actually declined in 1993/94 and 1994/95, mostly due to smaller production in China. From 1995/96 to 2000/01, the buildup in global rice stocks was especially strong, with China accounting for nearly all of the buildup.

China’s grain policy in the second half of the 1990s was designed to promote production and allow China to remain virtually self-sufficient in rice. In addition to expanded production, declining per capita disappearance supported the buildup in stocks in China in the second half of the 1990s. By the end of the 1990s, with its rice stocks the highest on record, China reversed its grains policy to discourage production and reduce excess stocks.

In early 2004, with global stocks at a more normal level, China’s policy was no longer aimed at reducing stocks. For 2004/05, the Government of China encouraged farmers to expand rice area, and by 2007/08 China stocks began to increase again.

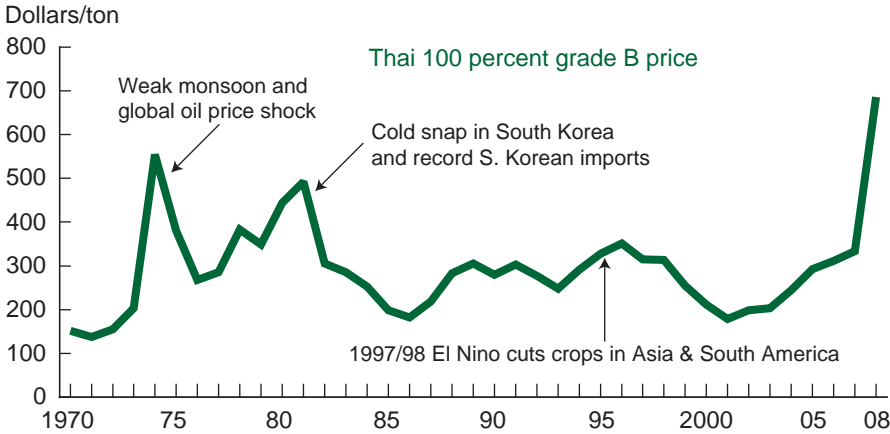
When a weak monsoon in 1987 cut India’s crop by 6 percent, trading prices increased 50 percent from September 1987 to February 1988. But by March 1988, prices were on the descent and declined all spring. In 1987/88, global beginning stocks exceeded 103 million tons, up 5.6 million from a year earlier. The increase in beginning stocks virtually offset the decline in global production in 1987/88, and was a major factor in the quick decline in price (fig. 8).

In October 1993, when Japan was harvesting its weakest rice crop since World War II, global prices began a 5-month rapid increase. Yet, by March 1994, global prices began declining and dropped to pre-spike levels by summer. Global beginning stocks in 1993/94 were 123.3 million tons, or more than one-third of total use that year. This allowed Japan to import a record 2.2 million tons of rice in early 1994, while only temporarily boosting global prices.

Even in 1997/98, when a severe El Nino weather pattern devastated rice crops in much of Southeast Asia and South America and drove trade to a then-record high, global prices increased just 10 percent. In fact, by late summer 1998, global prices were declining. In 1997/98, global beginning stocks were 120.3 million tons. This allowed Indonesia to import almost 6.0 million tons—about six times its normal import requirements and the largest amount of rice ever imported by a single country—without driving global prices substantially higher.

The Asian financial crisis that began in the summer of 1997 also limited the price increase caused by El Nino. As several Asian countries, starting with Thailand, devalued their currencies, the value of the U.S. dollar increased, lowering the dollar-denominated price of traded rice. Because the price in domestic currencies increased, demand likely declined.

Figure 8
Global trading prices for rice dropped quickly in previous price spikes



¹Calendar year simple average of weekly price quotes. 2008 through November only.
 Source: U.S. Embassy (Bangkok, Thailand) agricultural counselor, *Weekly Rice Price Update*.

Lack of Yield Growth, Difficulty in Expanding Growing Areas Supported Higher Rice Prices

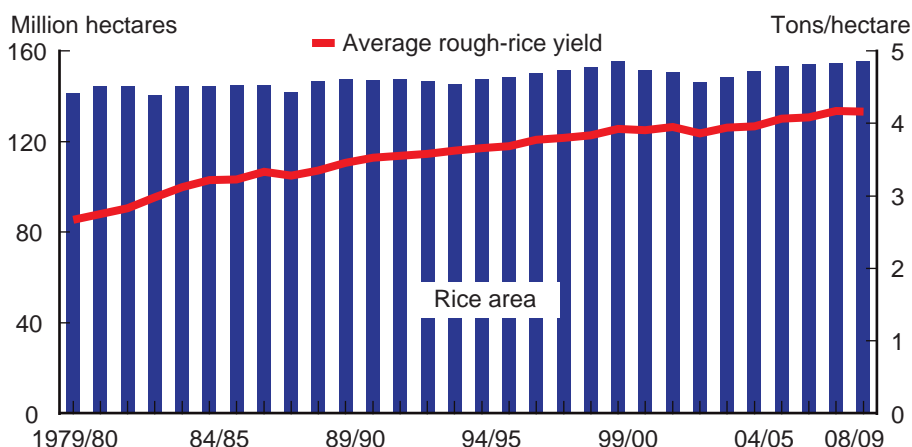
Lack of any significant yield growth so far this century also has contributed to higher rice prices. In fact, the rate of yield increase started declining in the 1990s. Yields increased more than 13 percent in the 1970s and about 26 percent in the 1980s, but increased only 11 percent in the 1990s. From 1966/67 to 1999/2000, global rice production increased almost 130 percent, with rising yields accounting for more than three-fourths of the increase. Most of this yield increase was due to the adoption of the modern high-yielding varieties on irrigated fields in Asia, and to a lesser extent in Latin America (fig. 9).

Since 1999/2000, global production has increased just 8 percent. If global yields had continued increasing at the same rate that they did from 1970 to 1989, global rice production in 2007/08 would have been 485 million tons, or 10 percent larger than the actual crop. (This figure likely overstates potential production from stronger yield growth, as higher yields would have reduced prices which would have resulted in smaller plantings.) The slowdown in yield growth contributed to the removal of excess stocks in the 21st century.

Several factors account for the slower yield growth in the 1990s and the stagnant yields so far this century. First, nearly all land that can easily adopt the modern high-yielding varieties, which require irrigation, is already used to grow them. Much of the yield growth in the 1970s and 1980s was due to a shift in area to the modern high-yielding varieties from the lower yielding traditional varieties. As the share of rice area sown to modern varieties increased, average yields increased.

The modern varieties are bred to be short-stature and stiff to prevent lodging. Lodging is the tendency for plants to fall over or bend. This impedes efficient harvesting, thus reducing yield potential and lowering quality. The newer rice varieties require controlled irrigation to achieve the high yields associated

Figure 9
Increases in global rice yields have slowed since the 1990s



2008/09 numbers are estimates.

Source: USDA, Foreign Agricultural Service, Production, Supply, and Distribution database, www.fas.usda.gov/psdonline/psdhome.aspx/.

with substantial fertilizer use. High-yielding varieties have not been developed for the less favorable ecosystems such as those relying on natural flooding from river deltas, dry-land rice, or flood-prone areas that still grow traditional low-yielding varieties.

Second, declining prices from the late 1990s until the early 2000s gave little incentive for public or private research organizations to invest in developing higher yielding seeds, as global rice stocks were already quite large and, for a while, rising. In fact, government policies in several producing countries—particularly Japan and Taiwan—have been designed for several decades to reduce the area devoted to rice production to lower overstocks of rice.

Third, for some countries, actual field yields on land growing the modern varieties are typically stagnant to declining, as continued production on the same land has reduced fertility. Also, ecological problems associated with repeated irrigations during the year—water logging and salinity—and mono-agriculture have reduced yields, especially in East Asia, a major rice-growing region.

Although global area has expanded about 4 percent since 2000/01, it is up only 1 percent from the previous record area planted in 1999/2000. Except for South Asia and parts of South America, few areas can significantly expand rice plantings without excessive costs. An exception is Burma, once the largest exporter. However, government policies in Burma prevent any significant expansion in rice plantings, despite abundant land perfectly suited for low-cost rice production. Cambodia, which experienced severe political turmoil in much of the 1970s, also has the potential to boost its rice-growing area. South American rice exporters have the land and water to significantly expand production if returns are high enough for several years to justify the investment. South Asia could expand production by greater use of planting and harvesting more than one crop from the same land each year.

Worldwide, expanded rice area requires substantial investment in irrigation facilities. Returns would have to be quite high for several years to justify such costly investments. Although rice prices are currently high, so are prices for fuel and fertilizer, two critical inputs. High input prices nearly offset the impact of high prices on net returns.

In addition, to profitably grow rice, producers need land that is level and can easily hold water, preferable with a hard-pan subsurface. Most of this land already grows rice. Availability of low-cost and abundant water is necessary as well. In most areas of the world, water is a high-priced commodity desired by multiple competing users. For these reasons, the ability to continue expanding global rice area is very limited, even with high rice prices.

Higher Food Commodity Prices Had Negative Effect on Developing Countries With Food Deficits

The substantial rice price spike in the spring of 2008 and continued historically high rice prices have critical implications for many low-income food-deficit countries. First, since the poorest consumers in developing countries spend at least half their disposable income on food, the substantial increase in the price of rice—the major staple in the diet of more than half the world's population—has sharply reduced their expenditures on most nonfood items.

In addition, many low-income rice-importing countries are experiencing severe balance-of-payment problems due to the much higher prices for most imports, especially food, fertilizer, and fuel. Prices for their exports have not increased as much.

Finally, global food aid agencies are unlikely to be able to meet their future needs for rice to use in their feeding programs without a substantial increase in funding. Food aid allocations are based on monetary values. When rice prices rise, the same amount of funding buys less rice.

Rice Prices Dropped as Import Demand Declined and the Global Financial Crisis Deepened

Global and U.S. prices began to decline in late May 2008. By the end of August 2008, global trading prices were about 30 percent below the April-May record and U.S. export prices were down about 16 percent. The decline in global rice prices from June to August 2008 was largely due to a reduction in panic buying by major importers (especially the Philippines), a renewal of commercial sales by Vietnam in late June, a stronger dollar, and a drop in overall food commodity prices that summer.

After peaking at more than \$147 per barrel in July in both Europe and the United States, oil prices dropped below \$120 per barrel in August 2008, mostly due to a slowing global economy. By late September, oil prices were just barely above \$100 per barrel as concerns over the global and U.S. economies heightened and the value of the U.S. dollar—which started strengthening in late July—continued to increase. Oil prices dropped to about \$75 per barrel in mid-October 2008, when the U.S. stock market plunged, and were below \$50 by late December. Prices dropped below \$40 per barrel in January and February 2009, but have since risen to around \$50.

Global rice prices also were pressured lower by reports of record plantings across most of Asia in the spring and summer of 2008. The forecast of a record global rice harvest in 2008/09—following a 2007/08 record crop—contributed to the reduction in panic buying, and is projected to sharply limit any growth in Asia's overall rice import needs in 2009. Strengthening of the dollar since July 2008 also lowered rice trading prices.

Both U.S. and global trading prices were quite stable in September 2008, as price-supporting policies in Thailand and hurricane damage to the southern U.S. crop offset a combination of weaker global demand and the continued strengthening of the U.S. dollar. Starting in July 2008, the Government of Thailand began purchasing rough-rice from the 2007/08 dry season crop from farmers at prices about 20 percent above market. Facing such favorable intervention prices, Thai farmers sold more than 2 million tons of the recently harvested dry-season rough rice to the government, which kept this rice off the market and help limit the decline in trading prices.

In early October 2008, both U.S. and global rice prices began falling again, as the global financial crisis intensified and prices for other commodities dropped sharply. In early November, the Government of Thailand began releasing some of the stored rice for export, which contributed to lower trading prices. In late 2008, the Government of Thailand began purchasing rough rice from

its 2008/09 main-season crop (fall-winter harvest) which halted the decline in Thailand's export prices by year-end. Thailand's prices actually began rising again in early 2009, making Thailand uncompetitive with major Asian competitors. On March 16, Thailand initiated a rough-rice purchase program for its 2008/09 dry-season crop at prices 10-30 percent above market.

Although Thailand's prices are currently about 40 percent below the 2008 record level, they are not expected to return to pre-2007 levels in the near term. The price outlook for global rice in the near term will be heavily influenced by the extent of the global economic downturn and financial crisis, the value of the U.S. dollar, prices for land-use competition with other agricultural commodity prices, and oil prices.

Conclusion

The rise in global rice prices in early 2008 coincided with a worldwide food crisis. However, the driving forces behind the increase in rice prices were not identical to the factors behind the global food crisis. For corn, wheat, and soybeans, the primary factors behind the price increases were increased use of biofuels, changing diets in China and India, major weather problems, and tight stocks-to-use ratios (Slayton, 2009). Increased participation in futures markets by nontraditional investors likely contributed to greater price volatility. However, it is unclear if greater speculative activity contributed to higher prices for these commodities (Abbot, 2008).

These factors had only indirect effects on global rice prices. In fact, the rice price rise occurred in a year of record global rice production, larger supplies, and a buildup in stocks. For rice, the most important factors behind the price increase in late 2007 and early 2008 were export restrictions by major suppliers, panic buying by several large importers, a weaker dollar, and record high oil prices (Slayton, 2009).

Several factors can sharply reduce the likelihood of future rice price spikes, including:

- limiting the use of export restrictions. By attempting to control domestic prices, those restrictions magnify the price effects of a market shock. Limiting them would reduce future price increases. To date, the World Trade Organization has not focused on limiting the use of export restrictions, but rather on opening import markets, eliminating export subsidies, and limiting producer support among its member nations.
- boosting global rice yields. Demand for rice is expected to continue rising and since rice growing area is not likely to expand, increases in supply will need to come from higher yields using existing growing areas. This will require a substantial investment in agricultural research for several decades. Efforts to boost global production likely would include research focused on developing new varieties that achieve higher yields with fewer inputs such as fertilizer and pesticides, and can be grown on less favorable ecosystems.
- re-examining current restrictions on genetically enhanced (GE) rice, using scientific analysis of risks and benefits. In light of the 2008 price increase, high input prices, and strong competition for land among various crop uses, such a review would be beneficial. The adoption of GE rice varieties could reduce water use, application and runoff of harmful pesticides, and boost yields. Current restrictions on GE rice by several major importers virtually eliminate any chance of adoption of this biotechnology by exporters.

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