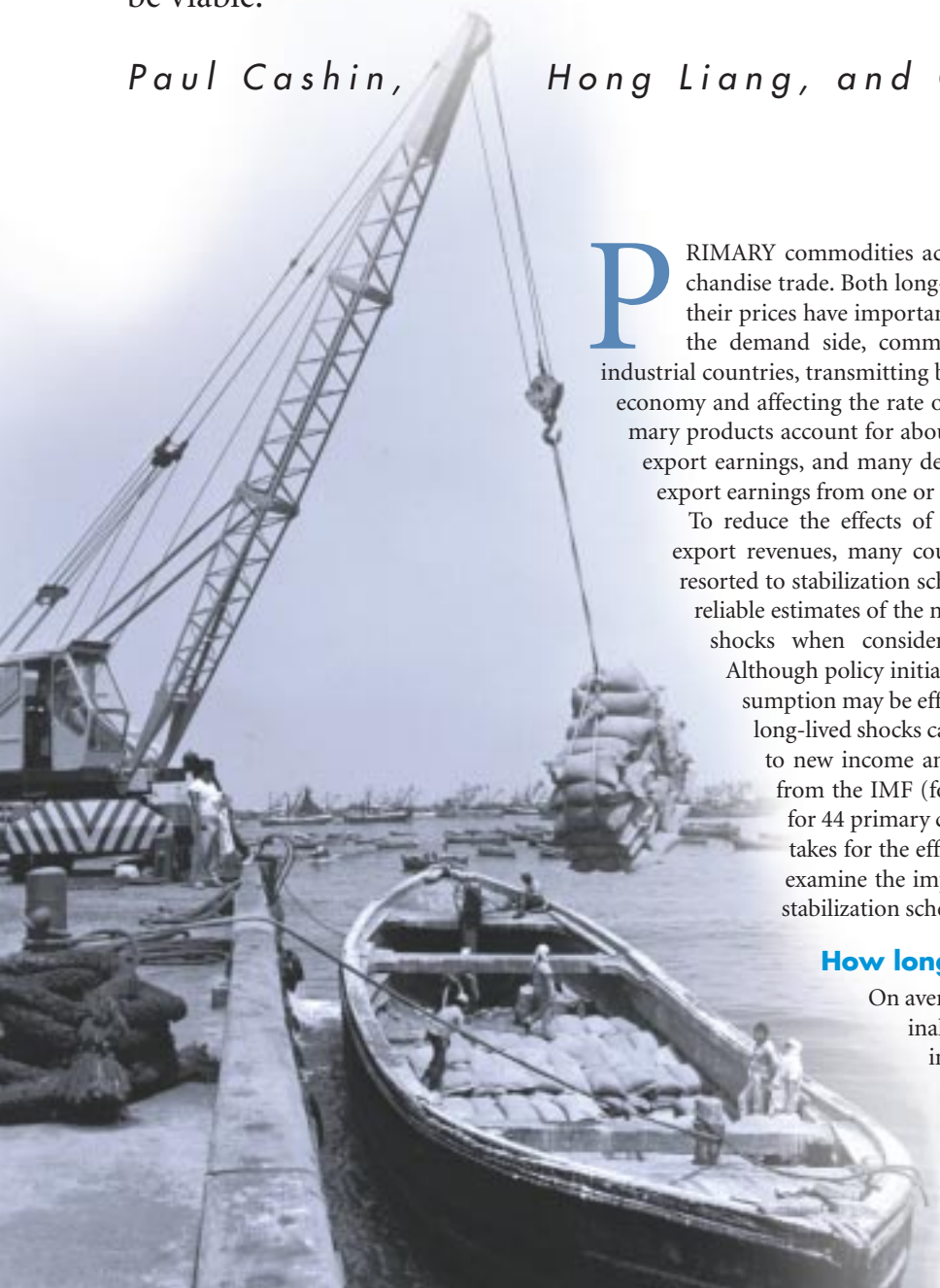# Do Commodity Price Shocks Last Too Long for Stabilization Schemes to Work?

Shocks to world commodity prices can have a profound impact on the economies of both exporting and importing countries. However, the longer it takes for a price shock to reverse itself, the less likely it is that price stabilization schemes will be viable.

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PRIMARY commodities account for about 25 percent of world merchandise trade. Both long-term trends and short-term fluctuations in their prices have important consequences for the world economy. On the demand side, commodity markets play an important role in industrial countries, transmitting business cycle disturbances to the rest of the economy and affecting the rate of growth of prices. On the supply side, primary products account for about half, on average, of developing countries' export earnings, and many developing countries derive the bulk of their export earnings from one or two commodities (Table 1).

To reduce the effects of price fluctuations on domestic prices and export revenues, many countries that export primary products have resorted to stabilization schemes (Box 1). However, policymakers need reliable estimates of the magnitude and duration of commodity price shocks when considering countercyclical stabilization policies. Although policy initiatives that smooth national income and consumption may be effective in the face of short-lived price shocks, long-lived shocks call for policies that enable countries to adjust to new income and consumption levels. Using monthly data from the IMF (for the period 1957–98) on the price indices for 44 primary commodities, we calculate the time it usually takes for the effects of price shocks to dissipate (Box 2) and examine the implications of these results for the efficacy of stabilization schemes.

How long do shocks last?

On average, shocks to real commodity prices (nominal commodity price indices deflated by indices of manufactured exports of developed countries) are very long-lasting (Table 2). Although the duration of shocks to 34 of the 44 price indices we

Table 1
Countries dependent on a single primary commodity for export earnings
(annual average of exports, in dollars, 1992–97)

	For 50 percent or more of export earnings	For 20–49 percent of export earnings	For 10–19 percent of export earnings
Middle East			
Crude petroleum	Bahrain, Islamic Rep. of Iran, Iraq, Kuwait, Libya, Oman, Qatar, Saudia Arabia, Rep. of Yemen	Syrian Arab Rep., United Arab Emirates	Egypt
Aluminum			Bahrain
Africa			
Crude petroleum	Angola, Rep. of Congo, Gabon, Nigeria	Cameroon, Equatorial Guinea	Algeria
Natural gas		Algeria	
Iron ore		Mauritania	
Copper	Zambia		Dem. Rep. of Congo
Gold		Ghana, South Africa	Mali, Zimbabwe
Timber (African hardwood)		Equatorial Guinea	Central African Rep., Gabon, Ghana, Swaziland
Cotton		Benin, Chad, Mali, Sudan	Burkina Faso
Tobacco	Malawi	Zimbabwe	
Arabica coffee	Burundi, Ethiopia	Rwanda	
Robusta coffee	Uganda		Cameroon
Cocoa	São Tomé and Príncipe	Côte d'Ivoire, Ghana	Cameroon
Tea			Kenya, Rwanda
Sugar		Mauritius	Swaziland
Western Hemisphere			
Crude petroleum	Venezuela	Ecuador, Trinidad and Tobago	Colombia, Mexico
Copper		Chile	Peru
Gold			Guyana
Cotton			Paraguay
Arabica coffee			Colombia, El Salvador, Guatemala, Honduras, Nicaragua
Sugar		Guyana, St. Kitts and Nevis	Belize
Bananas		Honduras, St.Vincent	Costa Rica, Ecuador, St. Lucia
Fishmeal			Peru
Rice			Guyana
Europe and Asia and the Pacific			
Crude petroleum		Azerbaijan, Brunei Darussalam, Norway, Papua New Guinea, Russia	Indonesia, Kazakhstan, Vietnam
Natural gas	Turkmenistan		
Aluminum		Tajikistan	
Copper		Mongolia	Kazakhstan, Papua New Guinea
Gold		Papua New Guinea	Uzbekistan
Timber (Asian hardwood)		Lao PDR, Solomon Islands	Cambodia, Indonesia, Myanmar, Papua New Guinea
Timber (softwood)			Latvia, New Zealand
Copra and coconut oil	Kiribati		
Cotton		Pakistan, Uzbekistan	Azerbaijan, Tajikistan, Turkmenistan

Source: International Monetary Fund.

studied was finite, the reversion of prices to their mean typically took an extremely long time. In contrast with earlier studies, which claimed that, because of the finite duration of shocks, commodity stabilization schemes could succeed in reducing fluctuations in export revenues, we found that shocks, although finite, could be very long-lived, leading us to doubt the efficacy of such schemes.

Shocks lasted less than five years, on average, for only 17 commodities, of which just 7 experienced shocks lasting less than one year. Shocks were permanent for 10 of the 44 commodities. Although policymakers need to determine their own level of tolerance for the influence of the typical duration of shocks on the efficacy of schemes to stabilize the prices of their countries' main commodities, for the sake of exposition, we have arbitrarily chosen a generous shock duration (a half-life of 60 months) as the cutoff point beyond which the costs of maintaining any stabilization scheme (which typically involves storage, financing, and output reduction) would be likely to become prohibitive. Using this benchmark, we see that 17 commodities experienced price shocks that, although finite, lasted longer than 60 months. For these 17 commodities and the 10 commodities that experienced permanent shocks, the costs of maintaining a stabilization agreement would probably be greater than the consumption-smoothing gains that could be derived from price stabilization.

As shown in Table 2, shocks to tea prices last from 7 to 21 months, whereas shocks to rubber prices last 18 months

Stabilization schemes

Many developing countries have limited recourse to domestic and external financing in the face of fluctuations in world prices for their commodity exports. They have therefore focused their efforts on smoothing commodity export earnings, typically through one or more of the following:
- stabilization of world commodity prices through the exercise of market power by a monopolistic producer or producer cartel or through international commodity agreements;
- stabilization of producer revenues through the use of risk-management instruments;
- stabilization of government revenues through precautionary savings funds;
- compensatory financing; and
- stabilization of domestic producer and consumer prices through variable export taxes or tariffs, agricultural marketing boards, or domestic stockpiles and stabilization funds.

Measuring the duration of commodity price shocks

Table 2 presents the estimated average and associated range (in months) of the duration of price shocks to 44 commodities. The measure used to quantify duration is the half-life of a shock—the number of months until the effect of a shock to the commodity price series is half its original magnitude. We also calculate the range (exact confidence interval) surrounding the estimated average duration of shocks, as a measure of the variability of the duration of shocks.

The average (median) duration denotes that half of the shocks will be shorter than the estimated average, and half of the shocks will exceed it. The range (90 percent confidence interval) indicates the span of months that accounts for 90 out of 100 realizations of the duration of shocks. In the majority of cases (27 of the 44 price indices studied), it took more than five years, on average, for a shock to dissipate to half its initial magnitude. Moreover, the range surrounding the average duration of price shocks was rather wide, indicating that the duration of shocks is quite variable.

or more. Five percent of the time, shocks to tea will last longer than 21 months, while 5 percent (or more) of the shocks to rubber will be permanent. Thus, a stabilization scheme for tea is much less likely to collapse than one for rubber. Assuming that the maximum length for the sustainability of any stabilization scheme is 60 months, then for only five commodities—tea, sugar (European Union), bananas, hides, and lamb—will 95 percent of the price shocks affecting them last less than this sustainability limit. While these results do not entirely rule out the success of stabilization schemes for the 39 other commodities, they highlight the risk that such schemes will confront long-lived shocks and may therefore not be financially sustainable.

Implications for stabilization schemes

Clearly, both short-run volatility and long-run trend movements in commodity prices present serious challenges for

many developing countries because of their large impact on both the balance of payments and government budgetary positions. At the domestic level, governments may establish institutional arrangements such as agricultural marketing boards or hold stocks of key commodities to control supplies, thereby reducing the potential for price fluctuations. At the international level, commodity agreements and compensatory financing from organizations such as the IMF have been used to minimize and smooth, respectively, the effects of world commodity price shocks.

Domestic price stabilization. Traditionally, governments in developing countries have assumed a major role in smoothing the domestic effects of fluctuations in world commodity prices, typically by buying stocks of important commodities—known as buffer stocks—when prices are low and selling them when prices are high. Aside from the issue of whether governments are better than private agents at managing commodity price shocks, the success of market inter-

Table 2
Duration of commodity price shocks, January 1957–December 1998

Less than 12 months		12 to 48 months		48 to 96 months		96 to 216 months		Permanent
Bananas	2, (2–3)	Aluminum	29, (15–∞)	Beef	57, (20–∞)	Coffee (other milds)	150, (26–∞)	Cocoa beans
Heating oil	8, (4–∞)	Fishmeal	45, (18–∞)	Coconut oil	70, (22–∞)	Cotton	152, (26–∞)	Coffee (robusta)
Hides	11, (7–23)	Gasoline	44, (8–∞)	Copper	81, (23–∞)	Nickel	175, (26–∞)	Gold
Softwood (logs)	11, (5–∞)	Iron ore	32, (15–∞)	Groundnut oil	58, (20–∞)	Sugar (free market)	116, (25–∞)	Hardwood (logs)
Softwood (sawn wood)	8, (4–∞)	Lamb	14, (9–39)	Lead	64, (21–∞)	Rice	103, (24–∞)	Natural gas
Sugar (EU)	7, (5–10)	Rubber	43, (18–∞)	Maize	55, (20–∞)			Petroleum
Tea	10, (7–21)	Soybean meal	26, (14–∞)	Palm oil	64, (21–∞)			Hardwood (sawn wood)
		Soybean	30, (15–∞)	Phosphate rock	49, (19–∞)			Tin
		Sugar (U.S.)	27, (14–∞)	Soybean oil	51, (19–∞)			Tobacco
		Wheat	44, (18–∞)	Wool (coarse)	70, (22–∞)			Triple superphosphate
				Wool (fine)	57, (20–∞)			
				Zinc	94, (24–∞)			

Source: Authors' calculations.

Note: Estimated average duration (half-life) of price shocks (in months) is given by the first number in each relevant column and is followed by the range of duration in parentheses.

vention strategies hinges on the assumption that the commodity price shock is temporary and will reverse itself in the short run.

Many national commodity stabilization schemes, often involving countries with the power to influence world prices for particular commodities, were terminated during the 1980s and 1990s because they were financially unsustainable. The collapse of the Australian wool stabilization scheme in 1992 is a prominent example. This outcome is consistent with our findings for wool. Both coarse and fine wool typically experience long-lived price shocks, so neither commodity is a likely candidate for a successful price stabilization arrangement.

International price stabilization. Many international commodity agreements, typically using buffer stocks or export quotas as tools of market intervention to stabilize world commodity prices and raise returns to commodity producers, also failed in the 1980s and 1990s, as the cost of maintaining them became unsustainable. Those terminated include the International Sugar Agreement (commenced in 1954, lapsed in 1984 with the expiry of export quotas); the International Tin Agreement (commenced in 1954, collapsed in 1985 when the buffer stock scheme's resources were exhausted); the International Cocoa Agreement (commenced in 1972, suspended in 1988 when the buffer stock scheme could no longer be financed); and the International Coffee Agreement (commenced in 1962, suspended in 1989 after export quotas were allowed to expire). Only the International Natural Rubber Agreement continues to give rise to active market intervention, although its role is increasingly being questioned by countries that are major producers of rubber. Not coincidentally, the failed international stabilization schemes involved commodities typically subject to long-lived shocks (tin, cocoa, coffee, and sugar), while the one surviving agreement involves a commodity (rubber) that has experienced short-lived shocks.

Compensatory finance. An important example of compensatory financing is the IMF's Compensatory and Contingency Financing Facility (CCFF). The CCFF is designed to smooth the effects of a temporary, exogenously caused drop in a country's merchandise export receipts below the medium-term trend. It has traditionally been a major avenue for borrowings from the IMF—annual drawings under the CCFF averaged just under one-fifth (17.5 percent) of total credit extended by the IMF during 1963–98.

After a lull, there has been a resurgence of lending in the late 1990s by the IMF under the CCFF, largely to countries experiencing adverse supply shocks to important commodity exports. For example, both Pakistan and Azerbaijan have received funds under the CCFF (in December 1998 and January 1999, respectively) for temporary shortfalls in earnings from cotton exports because of poor harvests caused by bad weather. While these supply-based shocks to export earnings are clearly temporary, our empirical findings indicate that the case for providing compensatory finance for any shortfall in cotton export earnings arising from an adverse shock to cotton prices (given supply) would be much weaker. While cotton price shocks are of finite duration, they are typically very long-lived (the median duration is 152 months), and the associated range includes infinity. Accordingly, cotton (like many of the other commodities we studied) does not appear, on average, to experience price-based temporary shocks.

Conclusion

While short-lived booms and busts occur regularly in world commodity markets, shocks to the prices of many primary commodities are typically long-lasting. An adverse price shock to any given commodity is thus likely to depress prices for a long time. In such circumstances, government-supported price-stabilization activities and compensatory financing are likely to be ineffective, and external borrowing for consumption smoothing is likely to be unsustainable. Even when shocks to commodity prices are relatively short-lived, the likelihood that the benefits of smoothing the path of domestic prices (given world commodity prices) will outweigh the costs of operating stabilization schemes or servicing external borrowing remains open to question.

F&D

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