"How to Cope with Volatile Commodity Export Prices: Four Proposals"

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Introduction

Countries where exports are relatively concentrated in oil, gas, minerals and agricultural commodities experience terms of trade that are highly volatile.   This volatility is one of the possible explanations for the famous Natural Resource Curse.[1]

My aim in this keynote address is to offer four policy proposals for helping manage commodity volatility and thereby helping make sure that commodity wealth is a blessing rather than a curse.   Two of the ideas fall in the area of microeconomic policy: specific financial contracts structured so as to hedge risk.   Two of the ideas fall in the area of macroeconomic policy institutions: ways to make fiscal and monetary policy counter-cyclical rather than pro-cyclical.

It is always hard to make policy proposals that are convincing and at the same time are original. I will try to strike a balance between being convincing and being original. Of the four ideas, two are tried and tested. Two have not been tried much. The question then becomes: why not?

Many other policies and institutions for dealing with commodity volatility have been proposed and tried in various countries, some successful, some much less so. Many of the ideas that tend to work poorly can be described as seeking to suppress price volatility rather than manage it. I see them as akin to King Canute commanding the tide not to come in. I am thinking, for example, of price controls, commodity marketing boards, and controls on exports. Better to accept fluctuations in demand and supply as a fact of life, and to devise policies and institutions to equip the economy to cope with them.

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[1] Brueckner and Carneiro (2016), Blattman, Hwang, and Williamson (2007), Hausmann and Rigobon (2003), (Mendoza, 1997) and Poelhekke and van der Ploeg (2007). Terms of trade volatility hurts growth in the presence of investment irreversibilities and credit constraints (Aghion, Angeletos, Banerjee & Manova, 2010).   Frankel (2012a) surveys the Natural Resource Curse.

1. **First idea for financial hedging: Options**

Hedging allows for efficient sharing of risk. Of my two suggestions for ways to hedge against fluctuations in the world price of the export commodity, one having to do with derivatives has been tried and proven successful. I have in mind the options market, in particular. Mexico annually buys contracts for put options on a large scale to protect itself against a decline in the dollar price of oil.[2] This strategy proved especially useful when global commodity prices fell abruptly in 2009 and 2014-15.

Why not use the futures or forward market? Ghana has apparently tried this for cocoa, with some success.[3] But the futures strategy has a major potential drawback, which might be described as an incentive compatibility problem. The minister who sells the commodity forward is likely to get meager credit if the dollar price of the commodity goes down, but lots of blame if the price goes up. Better to use options to eliminate the downside risk while keeping the upside potential (although of course one must pay a price for the latter).

A possible limitation in practice for both futures and options contracts is that they are not always readily available for some commodities, particularly at the long-term horizons needed to hedge development of new oil or mineral resources. This observation leads to proposal number 2.

2. **Second idea for financial hedging: Linking debt to the commodity price**

For those countries that borrow, e.g., a West African country that is developing new deposits of iron ore or offshore oil, I propose linking the terms of the loan, not to dollars nor to the local currency, but to the price of the commodity itself.[4] Then debt service obligations are matched to revenues: they automatically rise and fall with the value of the exports. When debt crises hit Indonesia, Russia and Ecuador in 1998, one reason was that low dollar prices of their oil exports had driven up their debt service ratios. This would not have happened if their debts had been indexed to the oil price.

This idea has been around for a long time, but has very seldom been put into practice. Why not? Potential issuers worry that there is not enough demand for such commodity bonds. Who would want to take the other side of the trade? It seems obvious who the ultimate

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[2] Duclaud and García (2011).

[3] IMF SPRD and World Bank PREM (2011, p.47).\

[4] Frankel, "Barrels, Bushels and Bonds: How Commodity Exporters Can Hedge Volatility," *Project Syndicate*, October 2011.

potential customers are.   Airlines and power utility companies have reason to go long in oil, steelmakers have reason to go long in iron ore, chocolate makers to go long in cocoa, etc.

It must be that bonds denominated in a particular kind of oil and carrying the credit risk of a particular country are too specialized a niche to generate the necessary liquidity to make a viable market. But then the World Bank might be able to make the market: It would lend to interested oil-producing countries in terms of oil in place of lending to them in dollars. It would then offset its collective exposure to oil market conditions by selling to investors a World Bank bond denominated in a standard oil price index. Similarly with iron ore, cocoa, gold, coffee, and other commodities.

3. Institutions to overcome pro-cyclical fiscal policy in commodity-exporting countries.

The third area is fiscal policy. Government spending has historically been notoriously pro-cyclical in commodity-exporting countries. Governments have tended to increase spending during the boom and have then been forced to cut back when commodity prices go back down. Many authors have documented this historical pro-cyclicality.[5]   An important cause of procyclical spending is that government receipts from taxes or royalties rise in booms, and the government cannot resist the temptation or political pressure to increase spending proportionately, or more than proportionately, as if the boom will last forever.   Two large budget items that account for much of the increased spending from oil booms are investment projects and the government wage bill.[6]

It is not enough to observe that policy-makers should follow wiser policies. What is wanted are institutions that make it more likely that fiscal policy will be counter-cyclical, or at least less pro-cyclical, even when carried out by officials who suffer from the common political and human frailties.

Some commodity-exporting developing countries managed after 2000 to overcome this historical pattern of pro-cyclicality. They achieved fiscal counter-cyclicality: taking advantage of the 2002-08 expansion to strengthen their budget balances, which then gave them the "fiscal space" to ease up when the global recession hit in 2009. Which countries managed this

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[5]   Cuddington (1989), Gavin and Perotti (1997), Tornell and Lane (1999), Kaminsky, Reinhart, and Vegh (2004), Talvi and Végh (2005), Alesina, Campante and Tabellini (2008), Mendoza and Oviedo (2006), Ilzetski and Vegh (2008), Medas and Zakharova (2009), Arezki, Hamilton and Kazimov (2011), Erbil (2011), and Avellan & Vuletin (2015)..

[6] Gelb (1986) and Medas and Zakharova (2009), respectively.

achievement?   Generally those with "good institutions" such as the rule of law.[7]

What institutional innovations, more specifically, can a country adopt to fight fiscal pro-cyclicality?   The conventional answer is budget rules, for example legally entrenched ceilings on budget deficits. But such rules alone won't do the job, as the failures of Europe's Stability and Growth Pact has amply demonstrated. To being with, fixed ceilings on budget deficits operate pro-cyclically: when the economy is hit by a recession and so the budget is hit by a loss in tax revenue, a budget balance rule may force the government to cut spending or raise tax rates. Phrasing the target in cyclically adjusted terms helps solves that problem in theory. But most such rules are violated in practice, even more so for EM countries than for advanced countries. One major reason is overly optimistic forecasts by official agencies.[8]

For the annual Bank of Chile conference I attended in 2010, I examined Chile's successful fiscal institutions.[9] I concluded that the key feature is the delegation to independent committees of the responsibility to estimate the long-run trends in the copper price and GDP, thus avoiding the systematic over-optimism that plagues official forecasts in most other countries and concluded that this could be a useful model for others to emulate.

4. Monetary policy

The Fed and some other of the most important central banks may have, for the time being, given up on the attempt to communicate monetary policy intentions in terms of a single variable even via forward guidance, let alone an explicit target. The presumption is still in favor of transparency and simple clear communication, however. Many still feel the need to announce a specific target or anchor. Most developing countries, in particular, need the reinforcement to credibility.[10]   Monetary policy-makers in emerging market and developing countries often have more need for credibility than those in advanced countries due to high-inflation histories, absence of credible institutions, or political pressure to monetize big budget deficits. But announcing a target that one can expect often to miss does little to enhance credibility.

Commodity-exporting countries have bigger terms of trade shocks than industrialized countries. As has long been understood, terms of trade volatility makes a country less suited to

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[7] Céspedes and Velasco (2014) and Frankel, Végh and Vuletin (2013).

[8] Frankel and Schreger (2013).

[9] Frankel (2013). Summarized in "Chile's Countercyclical Triumph," *Foreign Policy*, June 2012.

[10] Fraga, Goldfajn, and Minella (2003).

a fixed exchange rate and more suited toward some form of floating, so that the exchange rate can accommodate terms of trade shocks. When the global price of the export commodity falls, threatening trade balance difficulties and recession, the currency automatically depreciates to mitigate those problems. When the global price of the export commodity rises, threatening overheating, the currency automatically appreciates to mitigate the problem.

Examples of "commodity currency" countries include Australia, Canada, Chile, New Zealand and South Africa, among others.[11] A variety of empirical studies confirm that floating works better for countries exposed to volatility in the world prices of their export commodities: Broda (2004), Edwards and Levy-Yeyati (2005), Rafiq (2011), and Céspedes and Velasco (2012).

Of course the advantages of fixing are still likely to dominate for a very small very open economy (or for very low-income countries that lack developed financial markets). Examples among oil exporters include Bahrain, Brunei, Cameroon, and Trinidad.

If the exchange rate is not to be the anchor for middle-sized middle-income commodity-exporting countries, what is? The popular choice since the 1990s has been Inflation Targeting (IT), meaning the announcement of a targeting for the CPI in some form. Variations include targeting the level of the CPI vs. rate of change, headline vs. core, and forecasted inflation vs. actual.

One point is not widely enough considered: The CPI is a bad choice for targeted variable with respect to terms of trade shocks. Assume a country that exports oil and imports food. If interpreted literally, a CPI target prevents the central bank from responding to a fall in the dollar price of oil with easy enough money to depreciate the currency; and it requires the central bank to respond to a rise in the dollar price of imported food by tightening enough to appreciate the currency. This is backwards. If the authorities are going to target inflation, the price index should be one that leaves the import commodity out of the basket, but includes the price of the export commodity, something output-based, rather than designed to reflect the consumption basket. If the Bank of Algeria were to target the GDP deflator, it would automatically respond to declines in the world price of oil with monetary policy easy enough to depreciate the dinar, which is what one wants, and not when the price of the *import* commodity falls which is what a CPI target does.[12] Nobody has tried out the proposal to target the GDP deflator.

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[11] Cashin, Céspedes, and Sahay (2004); Chen and Rogoff (2003); Frankel (2007). .

[12] Frankel (2011, 2012b).

An alternative, especially for countries such as Kuwait that currently target a basket of major currencies such as the dollar and euro, is to add the export commodity to the basket. If the Kuwaiti dinar were pegged to a basket that gave one-third weight to the dollar, one-third to the euro, and one third to oil, the value of the currency would again automatically move up and down with the value of a barrel of oil.[13] This proposal, too, has yet to be tried.

A more familiar recommendation is to target nominal GDP.[14] It has the same advantages as targeting the nominal GDP deflator (accommodating shocks to the terms of trade better than a CPI target), and has other advantages as well: It also beats CPI-targeting in case of supply shocks.

I am not alone in proposing NGDP targeting; many other economists have done so. The other supporters have almost always been thinking of major central banks like the Federal Reserve or the Bank of England. In the 1980s NGDP targeting was proposed by Meade (1978) and Tobin (1980) and supported by many others. The point of announcing an explicit target at that time was to get expectations of inflation down. In recent years the proposal has been revived (e.g., by Woodford, 2012, plus a school that calls itself Market Monetarists). The point nowadays has been to get expectations of inflation *up*. Either way, the argument in favor of phrasing the monetary stance in terms of NGDP is that this formulation is robust with respect to supply shocks

One can show that if the ultimate objective is to achieve price stability and output stability, as represented by a quadratic loss function, then a NGDP target will give a better outcome in the presence of shocks than an inflation target unless the supply curve is very steep or the loss function puts extraordinarily high weight on stabilizing the CPI.

Under certain simplifying assumptions, the necessary condition for Nominal GDP Targetiong (NGDPT) to dominate Inflation Targeting (IT) is:

$$a < (2 + b)b;$$

where $a \equiv$ the weight on the price stability objective in the loss function,
and $b \equiv$ elasticity of output with respect to unexpected inflation (i.e., inverse slope of Aggregate Supply curve).

The difference in welfare is especially large if supply shocks are especially large. There is good reason to think that supply shocks (like terms of trade shocks) are larger for commodity producers and other developing countries, due to more strikes and social instability, greater

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[13] Frankel (2008).

[14] Frankel (2014); summarized in "Nominal GDP Targeting for Developing Countries," *VoxEU,* Aug.2014.

vulnerability to severe weather events such as droughts and windstorms and other natural disasters such as earthquakes, and bigger productivity shocks.[15]

Does the inequality condition hold? It does if the Aggregate Supply (AS) relationship is flat, as compared to the slope of the loss function lines. To simplify even further, consider two examples.

• Example 1:   The condition holds if **b**>**a** .

• Example 2:   It also holds if **a** = 1 (as in the original Taylor rule) and the AS slope $1/\textbf{b} < (1+\sqrt{2}$) = 2.414.

So NGDP targeting dominates unless Aggregate Supply is very steep (relative to the weight on price stability). I have estimated the AS slope for a few middle-size middle-income countries where I could think of plausible instruments for Aggregate Supply shocks and Aggregate Demand shocks. A good one is Kazakhstan, over the period 1993-2012. (The exogenous supply shocks are oil price fluctuations. Exogenous demand shocks are changes in income of major trading partners and military spending.) The estimated AS slope is 1.66; it is statistically less than 2.41. The implication is that the condition required for NGDPT to dominate IT apparently holds.   I conclude that middle-size middle-income commodity-exporting countries should consider using nominal GDP as their target, in place of the CPI.

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[15] During a boom, the country does not know in real time whether rapid productivity growth is permanent (it is the next Asian Tiger) or temporary -- the result of a transitory fluctuation. (Aguiar and Gopinath, 2007.) Because exogenous productivity shocks are hard to measure, extreme weather events and commodity price fluctuations are more useful as instrumental variables.

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