

Jeffrey Frankel, Harvard Kennedy School

Forthcoming in *Natural Resources, Finance and Diversification: Diagnostics and Policies*, edited by Rabah Arezki and Raouf Boucekine. This chapter is based on the second half of a keynote address, High Level Seminar, *Natural Resources, Finance and Growth*, sponsored by the Bank of Algeria, Algiers, May 28-29, 2016.

Abstract

What monetary regime should commodity-exporting developing countries adopt? On the one hand, it is desirable to let the currency appreciate (depreciate) in response to positive (negative) terms of trade shocks. Such accommodation is precluded if the exchange rate is fixed or if the CPI is targeted literally. On the other hand, countries need some sort of nominal anchor. Monetary policy can be made automatically more counter-cyclical, judged by the criterion of currency appreciation in reaction to positive terms-of-trade shocks, under either of two regimes. Peggers can add the export commodity to a currency basket (CCB, for “Currency-plus-Commodity Basket”). Others can target Nominal Income instead of the CPI.

AEA subject codes: E, F, G, O.

Keywords: agriculture, commodities, currency basket, minerals, monetary, oil.

The US Federal Reserve and some other of the most important central banks may have given up, at least for the time being, on the attempt to communicate monetary policy intentions in terms of a single variable, even via forward guidance, let alone via an explicit target. The presumption, however, is still in favor of transparency and simple clear communication. Many still feel the need to announce a specific target or anchor. Most developing countries, in particular, need the reinforcement to credibility.¹ 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 a fixed exchange rate and more suited toward some form of floating so that the exchange rate can accommodate terms of trade shocks.

One good criterion for judging whether monetary policy in a commodity-exporting country is counter-cyclical is whether the currency is allowed to appreciate in the face of a positive terms-of-trade shock and depreciate in the face of a negative terms-of-trade shock. By this criterion, a fixed exchange rate is acyclical, by definition. By other criteria, a currency peg can actually be *pro-cyclical*: Commodity booms are associated with money inflows, rapid credit expansion, an overheated real economy, inflation in non-traded goods and services, and bubbles in real estate and other assets. Conversely, commodity busts are associated with balance of payments deficits, loss of reserves, credit shortage, recession, and currency or financial crises.

1. Floating

Flexible exchange rates allow accommodation of trade shocks and therefore a counter-cyclical monetary policy. Under free floating, when the global price of the export commodity rises, threatening overheating, the currency automatically appreciates to mitigate the problem. When the global price of the export commodity falls, threatening external balance difficulties and recession, the currency automatically depreciates to mitigate those problems.

¹ Fraga, Goldfajn, and Minella (2003).

Examples of “commodity currency” countries include Australia, Canada, Chile, New Zealand and South Africa, among others.² Empirically, floating delivers a high correlation between the exogenous price of the export commodity and the real effective exchange rate, thus accommodating terms of trade shocks, while fixing does not. 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), Céspedes and Velasco (2012) and Berg, Goncalves and Portillo (2016). Céspedes and Velasco, for example, look across 107 major-country commodity boom-bust cycles, and find that the output loss from a given price decline is smaller, the more flexible is the exchange rate.

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

2. Price index targeting

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

One point is not widely enough considered: Regardless which variation, 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 (otherwise the domestic price of food will rise, violating the CPI target); 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 (for the same reason). This is backwards. It exacerbates terms-of-trade shocks rather than accommodating them. A short-term CPI target produces pro-cyclical monetary policy rather than counter-cyclical. It is like the currency peg in this regard, but more so.

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

² Cashin, Céspedes, and Sahay (2004); Chen and Rogoff (2003); Frankel (2007). .

wants, and not when the price of the *import* commodity falls which is what a CPI target does.³ Unfortunately, nobody has tried out the proposal to target the GDP deflator.

3. The Currency-plus-Commodity Basket proposal

An alternative, especially for countries like Kuwait that currently target a basket of major currencies such as the dollar and euro, is to add the export commodity to the basket. I call this proposal a Currency-plus-Commodity Basket (CCB). 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. Among Gulf countries, swings in external balance and in internal balance during 2001-16, are attributable to the inability of their exchange rates to adjust to the ups and downs in oil prices in a way that the proposal for a Currency-plus-Commodity Basket (CCB) would deliver automatically.⁴ The argument in favor of CCB is that, for a commodity-exporting developing country, it delivers the best of floating – automatic accommodation of trade shocks – together with the best of fixed rates – a stable and transparent anchor.

Historical analysis⁵ of Saudi Arabia, Kuwait and smaller Gulf countries during the period 2001-16 identifies sub-periods when the existing exchange rate arrangements led to a currency that we label ‘undervalued,’ relative to the higher level it would have attained if the currency-plus-commodity basket proposal had been in place. The other sub-periods we label as having been ‘overvalued’ by this criterion.

The finding is that during the undervaluation sub-periods, the inflation rate tends to be high, a symptom of excess demand or overheating. During the overvaluation sub-periods, the inflation rate tends to be low, a symptom of excess supply or recession. Similarly, during the undervaluation sub-periods, accumulation of foreign exchange reserves tends to be high, while during the overvaluation sub-periods, reserve accumulation tends to be low. These findings support an important claim: if Gulf countries had followed the currency-plus-commodity basket proposal during the period 2001-16, their economies would have moved in the direction of external balance (a more stable balance of payments) and internal balance (greater stability in growth and inflation).

The research offers a practical blueprint for detailed implementation of the currency-plus-commodity basket proposal by any country’s monetary authorities that might be

³ Frankel (2011, 2012b).

⁴ Frankel (2008).

⁵ Frankel (2018), summarized in *Economic Research Forum Policy Brief* No. 26, June 2017 (Cairo).

interested in considering it. Four decisions would have to be made regarding the specific design details of the arrangement:

1. *Choice of major currencies to go into the formula*

For the Gulf countries, we assume it would be just the dollar and euro. But some countries might want to consider adding the currencies of other important trading partners, for example, the Russian ruble and Chinese yuan in the case of Kazakhstan.

2. *Oil price index to be used*

The daily settlement price for Brent crude oil set at 19:30 London time on the InterContinental Exchange could be used, as an objective and exogenous measure of the oil price. Another index could be chosen instead, so long as it is transparent.

3. *Computation of the coefficients on the major currencies and oil*

After identifying the major currencies and oil price index that are to enter the basket, the next step for the central bank is to compute and announce regularly (for example, once a year) the numerical weights that are to be assigned to each of these basket components.

4. *Frequency with which the coefficients would be revised*

A country operating a currency-plus-commodity basket regime might find in the future that it wishes to raise or lower the importance assigned to major trading partner currencies or to the oil objective. Governments that announce that their currencies will follow basket pegs often wish to preserve more flexibility than a permanent iron-clad commitment to the new regime would imply. The best way to do this is not to keep the formula secret, but rather to announce publicly and transparently the initial parameters as well as whatever subsequent changes are thought necessary.

4. Nominal GDP targeting

A more familiar-sounding recommendation is to target nominal GDP.⁶ 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.

Many prominent economists have proposed or studied NGDP targeting. 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.,

⁶ See Frankel (2014) and Bhandari and Frankel (2017), summarized in "Nominal GDP Targeting for Developing Countries," *VoxEU*, Aug. 2014.

by Woodford, 2012, plus a school that calls itself Market Monetarists). The point in recent years (in advanced countries) 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 Targeting (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 vulnerability to severe weather events such as droughts and windstorms and other natural disasters such as earthquakes, and bigger productivity shocks.⁷

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 $1/b < (1 + \sqrt{2}) = 2.414$.

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

⁷ 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 (Aguar and Gopinath, 2007). Because exogenous productivity shocks are hard to measure, extreme weather events and commodity price fluctuations are more useful as instrumental variables.

dominate IT apparently holds.

5. Conclusions

I conclude that middle-size middle-income commodity-exporting countries that currently favor targeting the CPI should consider using nominal GDP as their target instead. Commodity-exporting countries that currently peg their exchange rates to one or more major currencies should consider adding the export commodity to the basket to which they peg. In both cases the aim is to accommodate the trade shocks to which commodity-exporters are so often vulnerable, while at the same time providing stable and transparent monetary policy.

References

- Aguiar, Mark, and Gita Gopinath, 2007, "Emerging Market Business Cycles: The Cycle is the Trend," *Journal of Political Economy* 115, 1, February.
- Berg, Andrew, Carlos Goncalves and Rafael Portillo, 2016, "Another Disconnect Puzzle: Should Floaters Fix and Fixers Float?" (International Monetary Fund).
- Bhandari, Pranjul, and Frankel, Jeffrey, 2017, "Nominal GDP Targeting for Developing Countries," *Research in Economics* (Elsevier), vol.71, no. 3, pp. 491-506, September. NBER Working Paper 20898.
- Broda, Christian, 2004, "Terms of Trade and Exchange Rate Regimes in Developing Countries," *Journal of International Economics*, 63(1), pp. 31-58.
- Cashin, Paul, Luis F. Céspedes, and Ratna Sahay, 2004, "Commodity Currencies and the Real Exchange Rate," *Journal of Development Economics* 75, no.1: 239-268.
- Céspedes, Luis Felipe, and Andrés Velasco, 2012, "Macroeconomic Performance During Commodity Price Booms and Busts." *IMF Economic Review* 60, no.4: 570-599.
- Chen, Yu-chin, and Kenneth Rogoff, 2003, "Commodity Currencies," *Journal of International Economics* 60, no.1: 133-160.
- Edwards, Sebastian, and Eduardo Levy Yeyati, 2005, "Flexible Exchange Rates as Shock Absorbers," *European Economic Review*, Vol. 49, Issue 8, November, pp. 2079-05.

Fraga, Armino, Ilan Goldfajn, and André Minella, 2003, "Inflation Targeting in Emerging Market Economies," *NBER Macro Annual 2003*, Kenneth Rogoff and Mark Gertler, editors (MIT Press: Cambridge).

Frankel, Jeffrey, 2007, "On the Rand: Determinants of the South African Exchange Rate," *South African Journal of Economics*, vol.75, no.3, September, 425-441.

Frankel, Jeffrey, 2008, "UAE & Other Gulf Countries Urged to Switch Currency Peg from the Dollar to a Basket That Includes Oil," *Vox.EU*, July 9.

Frankel, Jeffrey, 2011, "A Comparison of Product Price Targeting and Other Monetary Anchor Options, for Commodity-Exporters in Latin America," *Economia*, vol. 12, no. 1: 1-57. NBER WP 16362.

Frankel, Jeffrey, 2012b, "Product Price Targeting -- A New Improved Way of Inflation Targeting," in *MAS Monetary Review* Vol. XI, issue 1, April (Monetary Authority of Singapore), pp.2-5.

Frankel, Jeffrey, 2014, "Nominal GDP Targeting for Middle-Income Countries," *Central Bank Review*, vol.14, no.3, September (Central Bank of the Republic of Turkey), pp.1-14. HKS RWP 14-033.

Frankel, Jeffrey, 2018, "The Currency-Plus-Commodity Basket: A Proposal for Exchange Rates in Oil-Exporting Countries to Accommodate Trade Shocks Automatically," forthcoming in: *Macroeconomic Institutions and Management in Resource-Rich Arab Economies*, edited by Hoda Selim, Kamiar Mohaddes and Jeffrey Nugent (Oxford: Oxford University Press). HKS Working Paper No. RWP17-034.

Meade, James, 1978, "The Meaning of Internal Balance," *The Economic Journal*, 88:423-435.

Tobin, James, 1980, "Stabilization Policy Ten Years After," *Brookings Papers on Economic Activity* 1: 19-72.

Woodford, Michael, 2012, "Methods of Policy Accommodation at the Interest-Rate Lower Bound," *The Changing Policy Landscape: 2012 Jackson Hole Symposium* (Federal Reserve Bank of Kansas City).