A Note on the Natural Rate of Dollarization: Mathematical Approximation of Limits

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January 2022

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Janvier 2022

Abstract

This reflection attempts to explain the issue of dollarization in a different and innovative way with new recipes for ideas to understand how dollarization works and slow down its pace. Proceeding by a mathematical reflection of limits, we show that in a period of stability, when the rate of dollarization approaches very closely but is not equal to the total dollarization, all monetary policy interventions limit the rate of dollarization in order to that it does not achieve full dollarization. And when monetary policy interventions aim to de-dollarize the economy, the rate of dollarization becomes equilibrium or natural, so we obtain a natural rate of dollarization.

Keywords: Dollarization, Monetary policy

During the first week of September 2014, while I was reading in room 21 of the economic department at the University of Kinshasa, a book on economic policy. A colleague whose thesis was on dollarization came to ask me questions about the impact of dollarization in the Democratic Republic of the Congo (DRC). We have started to analyze the impacts and solutions to remedy this problem. After 2 hours of discussion, an inspiration came to my mind to interpret this phenomenon of dollarization, after reviewing the measures and achievements of many countries in terms of de-dollarization, I understood two essential and relevant things: (1) Almost all countries have some level of dollarization. This fact is explained by the main currency denominated for international transactions which is the king US dollar; (2) the problem of dollarization in the DRC and in many developing countries is structural and has never been resolved. This is how the genesis of this note began, the aim of which is to bring a new reflection on the understanding of dollarization and to generate a lively debate on the scientific landscape.

Often underestimated by its measurement, the weight of dollarization in the Democratic Republic of the Congo has reached a significant level (Pinshi, 2020). Monetary policy could have an impact on financial assets in national currency but not in foreign currencies, the weight of dollarization complicates the intermediate objectives and the transmission mechanisms of monetary policy (Alvarez-Plata and Garcia-Herrero, 2008; Hail and Jong, 2021). The more dollarization dominates the monetary system of developing countries, the less effective monetary policy will be. With an average of more than 84% of foreign currencies in the Congolese banking system, financial dollarization reigns supreme and further indicates how much confidence is lacking in monetary stability (Pinshi, 2021). This could lead to empirical evidence as to whether this is a memory effect or an effect of uncertainty. But on that note, we attempt to explain the dollarization issue in a different and innovative way with new recipes for understanding how dollarization works and slowing its pace.

This reflection could serve as a tool for decision-makers to analyze dollarization from another angle. It is about bringing a reflection on the understanding of dollarization, as King Solomon said, there is no new thing under the sun. Far from debating the legitimacy of this reflection, we wish to redefine the stylized facts of dollarization and once again open the breach to a new way of analyzing this phenomenon.

We begin by contextualizing the analysis of dollarization on its source related to macroeconomic and monetary instability and the finding after return to equilibrium, which followed no significant effect. Then we try to reason differently using the mathematical approximation of the limits to try deriving a natural rate of dollarization, that is to say the rate at which each country can accept at normal or at equilibrium without harm the economy. The basic premise is that the dollar would remain for a long time the first currency of international denomination, referential and preferential. We will conclude with two propositions that could serve as the basis and asymptotes for the deeper analysis of dollarization.

Contextualization of an analytical backpedal

Dollarization is very often a rational reaction of agents to political and economic instability (Weymouth, 2007). Because high dollarization limits the capacity of the central bank and thus makes monetary policy ineffective, the solution to de-dollarization was to strengthen and maintain macroeconomic stability. However, this action had only a small significant effect, dollarization persisted and intensified (Ize and Yeyati, 2006).

Starting from macroeconomic stability, many economists have asked the question: how does dollarization still persist? Thus, on the one hand, economic agents have a delay in the effect on the cause, observed in their behavior (hysteresis) and on the other hand, they are uncertain of the dynamics of the national economy (uncertainty). We try to think differently by assuming that dollarization will hardly ever be eradicated as long as the dollar remains the international liquidity par excellence. We propose a mathematical approximation to bring out some evidence that should now be taken into account in the new recipe for reflection on dollarization.

Towards a new way of understanding the phenomenon: Construction of the mathematical model

We set :

$$IS = Monetary\ policy\ interventions\ in\ the\ event\ of\ stability$$

$$d = Dollarization\ rate$$

$$dd = De - dollarization$$

$$d^* = Natural\ rate\ of\ dollarization$$

$$d^\infty = Total\ dollarization$$

By making a limiting approximation,

$$\lim_{d \to d^\infty} f(d) = IS \qquad (1)$$

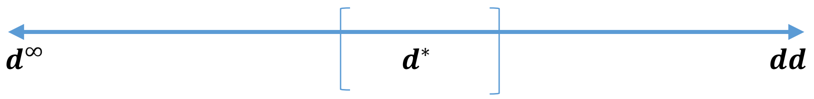
$$\lim_{IS \to dd} f(IS) = d^* \qquad (2)$$

By focusing on this approximation, we can find the following propositions.

Proposition 1:
In times of stability, when the rate of dollarization approaches very closely but does not equal total dollarization, all monetary policy interventions limit the rate of dollarization so that it does not reach total dollarization.

Proposition 2:
When monetary policy interventions aim to de-dollarize the economy, the dollarization rate becomes equilibrium or natural, so we get a natural dollarization rate.

Analytical scheme



More analytically, this means that when there is stability, monetary policy does not reverse dollarization (to de-dollarize) but only slows its magnitude in the economy. Monetary policy would just like this natural rate not to cross the equilibrium threshold (d^*). This shows the limit threshold of monetary policy, it would be necessary to think of additional measures to exceed this threshold and move towards effective de-dollarization.

In conclusion, monetary policy does not have much power to de-dollarize developing economies, such as the Congolese economy, because it only maintains stability, in turn, the latter maintains dollarization at a threshold, called equilibrium threshold. This is called "the equilibrium dollarization threshold" or the natural rate of dollarization $\boldsymbol{d}^*$.

Works cited

Alvarez-Plata, P., & Garcia-Herrero, A. (2008). To Dollarize or De-Dollarize: Consequences for Monetary Policy. *DIW Berlin Discussion Paper* No. 842. https://ssrn.com/abstract=1428828

Hail P., & Jong C. S. (2021). The effectiveness of monetary policy instruments under dollarization: a cross-country analysis. *Asia-Pacific Journal of Accounting & Economics*. DOI: 10.1080/16081625.2020.1870508

Ize, A., & Yeyati, E. L. (2006). Financial de-dollarization: is it for real? *Financial dollarization*, pp. 38-63. Palgrave Macmillan, London.

Pinshi, C. P. (2020). Monetary Policy, Uncertainty and COVID-19. *Journal of Applied Economic Sciences,* Fall 3(69), 579-593, September.

Pinshi, C.P. (2021). Dollarization and Foreign Exchange Reserve: Debate on the Effectiveness of Monetary Policy in Democratic Republic of Congo. *Journal of Applied Economic Sciences,* (72), 222-227. DOI: https://doi.org/10.14505/jaes.v15.3(69).07.

Weymouth, S. (2007). Political Institutions, Policy Instability, and Financial Dollarization. *University of Califonia, San Diego*.