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# A Modigliani-Miller Theorem for the Public Finances of Globalized Economies: Theory, Policy Implications, and Keynesian Reflections

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# A MODIGLIANI-MILLER THEOREM FOR THE PUBLIC FINANCES OF GLOBALIZED ECONOMIES: THEORY, POLICY IMPLICATIONS, AND KEYNESIAN REFLECTIONS

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**ABSTRACT**

*This article is about the economics of the power of global finance to enforce its own interests over national economies. In line with the capital structure irrelevance principle of Modigliani and Miller (1958) as applied to corporate finance, the article shows that the value of the public sector claims (money and debt) of a financially globalized economy is independent of the capital structure of the government's finances. In particular, the article transposes the Modigliani-Miller approach (enhanced as needed) to public finances and proves a new "neutrality theorem" (and two important related corollaries) whereby, in an economy that is internationally highly financially integrated, the cost of the capital needed by governments to finance their deficits is independent of whether: i) financing originates from debt or money, ii) debt is denominated in domestic or foreign currency, and iii) money and debt are issued under floating or fixed exchange rates. The two corollaries show that governments seeking to monetize their deficits must remunerate money holdings with a return that vary inversely with credibility is lower and directly with the stock of money (eventually defying the original policy objective). The article discusses the options available for countries to approach financial globalization.*

**Key words:** capital structure; credibility; debt, equity, and money; global financial investors; credibility; policy space; public sector claims.

**JEL codes:** E12, E13, E43, E44, F62, G12.

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# A MODIGLIANI-MILLER THEOREM FOR THE PUBLIC FINANCES OF GLOBALIZED ECONOMIES: THEORY, POLICY IMPLICATIONS, AND KEYNESIAN REFLECTIONS[1]

> *"The huge rents collected today by the financial sector are made possible by the assumptions on which neo-classical economics is built and which produce the 'flaws' of the model: the rents presently collected by the financial sector are in effect assumption-based rents." (Reinert, 2012, p.9)*

## 1. PREAMBLE

As I have realized through my own research activity over the years, and most of all as I could observe across a long professional life spent within many financial institutions worldwide, the phenomena that take place "out there" in the real economies are very often manifestations of John Maynard Keynes (JMK)'s *beauty contest* logic, whereby the occurrence of those phenomena is driven by people's expectations of what leading agents believe will occur, rather than what will be revealed to be ontologically true of the way the economy works.

This lies at the root of the concept of "self-fulfilling prophecies," so frequently employed by macroeconomists, according to which "predictions" come true because people believe they will come true and hence act in ways that will fulfill their own beliefs.

For this to be possible, I notice, it is not necessary that all agents in the economy know the "right" (or ontologically true) model of the economy, on which they base their beliefs. It suffices that a few of them (the leading ones – those who have the power to influence market choices) *believe* a certain model to be the "right" one and act in ways that will produce outcomes that are consistent with it,

[1] I thank an unknown referee of the PKES WP Series for giving me useful suggestions on literature relevant for the topic of my article, but I am obviously the only responsible for anything I may have missed in terms of useful references to related research. As always, I am grateful to wife Ornella, for her unremitting love and support.

even if the model is "wrong " (or ontologically false). The other agents will follow through (they can't do otherwise and find it very costly to coordinate their actions differently) and will thus act in ways that reinforce the model's outcomes.

Said otherwise, if the leading agents *believe* the economy works along Neoclassical postulates, they will act in ways that eventually produce Neoclassical outcomes. Like Erik Reinert in the epigraph, the huge rents collected by the financial sector are made possible by the assumptions on which neo-classical economics is built: it is not just a question of self-fulfilling prophecies, it is one of "self-fulfilling models." For example, as I have argued in recent work, if global financial investors rightly or wrongly believe that a country's macro policies will be ineffective, they will adjust their portfolios in ways that neutralize those policies and make them truly ineffective: policies will be ineffective not because they are intrinsically so, but because powerful actors believe they are so and act in ways that will validate their beliefs ex post.[2]

All this long premise to say that in submitting this article to a Post-Keynesian audience, I wish to alert readers that the analysis that follows – which is centered on the key role that "global financial investors" (henceforth, "global investors") play in allocating capital across highly internationally financially integrated economies – makes use of some Neoclassical assumptions and analytical techniques.

This I do not because "I" believe those assumptions and techniques are the right ones, but because "they" (i.e., the global investors) believe so and have the power to generate outcomes that are consistent with them – in a "self-fulfilling model" fashion. **The article is thus about the economics of the power of global finance to enforce its own interests over national economies, and what national economies can do about it.**

[2] See Bossone (2019, 2022).

I hold that studying economies where global investors play a prominent role requires recognizing pragmatically the relevance of their mode assumptions and realistically analyzing the outcomes their model generate. At the end of my analysis, I will discuss how the tyranny of "self-fulfilling models" can be broken.

I want to conclude this preamble signaling Post-Keynesian readers that the model I use for this article's analysis also includes key assumptions that are distinctly non-Neoclassical. Most of all, the equilibrium of the model I use is not necessarily one of full employment, and it thus creates space (at least in principle) for active government's macroeconomic policies. In addition, the model I use shows that the economy's equilibrium real interest rate is a *conventional variable* and fully embodies JMK's liquidity preference theory: as in JMK, it is this conventional variable that anchors the real economy, and not vice versa (like in Neoclassical economics).

## 2. INTRODUCTION

In line with the capital structure irrelevance principle of Modigliani and Miller (1958) as applied to corporate finance, this article shows that the value of the public sector claims (money and debt) of a financially globalized economy is independent of the capital structure of the government's finances. In particular, the article transposes the Modigliani-Miller (MM) approach (enhanced as needed) to public finances and proves a new "neutrality theorem" (and two important related corollaries) whereby, in an economy that is internationally highly financially integrated, the cost of the capital needed by governments to finance their deficits is independent of whether: i) financing originates from debt or money, ii) debt is denominated in domestic or foreign currency, and iii) money and debt are issued under floating or fixed exchange rates.

The two corollaries show that governments suffering from low policy credibility and seeking to monetize their deficits to reduce or avoid recourse to debt financing, need to remunerate money holdings with a return that is higher where credibility is lower and rises with the stock of money (eventually defying the original policy objective).

The theorem and its corollaries are grounded on two building blocks. First, fiat and irredeemable money issued by the State represents equity (not debt) of the issuing State (Bossone and Costa, 2021). Notice that in this article's analysis the money and debt issued by the State are rubricated as "claims" of the issuing State, in strict adherence to international accounting principles and practices.[3] Second, in financially globalized economies, the international allocation of capital is dominated by global investors, whose portfolio choices are guided by perceptions of how credibly the economies receiving their money will service their liabilities. In such economies, the value of the liabilities issued by the public sector (money and debt) is determined in the global markets, and the fiscal and monetary policy space available to governments is endogenous to the international capital allocation choices taken by the global investors (Bossone, 2019, 2022). The tendency of global investors to follow benchmarks (Raddatz et al, 2017) only amplifies the effect of this dominance.

Notice that the expression "policy space" is here used to refer to the perimeter of action available for policymakers to conduct expansionary fiscal and monetary policies before they threaten the sustainability of public sector liabilities and/or before measures become necessary to ensure such sustainability, eventually undoing the initial policies, and the term "credibility", referred to governments as issuers of (money and debt) claims, is used to indicate their (in)ability to preserve the (real) value of those claims over time and to deliver on their underpinning obligations.

The Neutrality Theorem shows that when international capital allocation choices are determined by global investors, there are no net gains (there is no "free lunch") the government of a highly internationally financially integrated and yet poorly credible economy can extract from the economy by resorting to one type of deficit financing versus another. Where credibility is low, and especially where debt is large, the theorem disproves some well-established arguments in the literature and the

[3] Usually, and erroneously, economists consider balance sheets as being constituted of Assets and Liabilities. In fact, the correct balance sheet components are Economic resources and Claims, with the latter including Liabilities (i.e., debt) and Equity. See IASB (2018).

economic debate, such that issuing domestic denominated debt may prove a superior option to raising external debt (Bua et al., 2014) or others, which have been popularized by Modern Money Theory (MMT), whereby governments with monetary sovereignty (and the societies they govern) would be better off doing away altogether with (costly) debt and, instead, finance fiscal expenditures with (cost-free) money (resorting to taxation only to relieve the economy from inflationary pressures if output exceeds full employment).[4]

The article is organized as follows. Section 3 reviews the literature on neutrality theorems in macroeconomics; Section 4 describes the building blocks of the Neutrality Theorem for Public Finances, defines the economy's model, and derives its equilibrium conditions; Section 5 demonstrates the neutrality theorem and its two corollaries on the equilibrium return on money; Section 6 concludes the article with Keynesian reflections on the policy implications of the Neutrality Theorem, and discusses the options available for countries to limit the "tyranny" of financial globalization.

## 3. RELEVANT LITERATURE

The literature reviewed in this section relates to the two instruments used to establish the Neutrality Theorem for Public Finances. The first instrument is the portfolio theory underpinning the international capital allocation choices taken by the global investors who invest in, and trade, public sector claims issued by highly internationally financially integrated economies. The second instrument is the MM approach as applied to money and debt claims issued by the public sector of such economies.

The literature relevant to the first instrument relates to the portfolio balance approach (PBA) to open economies (Branson, 1985); Wang, 2009), whereby financial markets create demand for predetermined stock supplies of domestic and foreign assets (such as money and bonds), based on

[4] As relevant references for MMT, see Wray (2015) and Kelton (2020).

current wealth, and assets are imperfect substitutes. As the PBA, the portfolio analysis used here assumes that assets are part of the investor portfolios and that changes in asset supplies induce investors to re-balance their portfolios upon risk-return considerations and set in motion an adjustment process that influences asset prices via demand changes for assets. The portfolio analysis here used, however, moves beyond the PBA, in that it assumes a highly integrated world capital market driven by investors who act globally and allocate resources across countries, based on intertemporal optimization criteria, and it also gives prominence to governments' intertemporal budget constraint (IBC) as an essential determinant of the market value of public sector (money and debt) claims. In this context, the self-fulfilling character of the model (noted in Section 1) that is used by global investors to determine their optimal portfolio allocations shows affinity with the notion of "self-confirming equilibrium" introduced by Fudenberg and Levine (2009), whereby beliefs are self-confirming because they do not induce actions that generate observations that disconfirm the beliefs. If the agents' beliefs are generated ex ante by what the agents consider to be the "true" the model of the economy, the model would eventually be validated by the agents' model-driven choices and would thus be proven "true" ex post.

As regards the second instrument, i.e., the MM approach, it should be noted that it constitutes to this date a cornerstone of corporate finance (Pagano, 2005), in that it provides a crystal-clear benchmark case where capital structure does not affect the value of the firm, and helps us understand when, under which conditions, and why it does so – which will turn out to be particularly useful for this article's analysis. In addition, by relying on an arbitrage argument, the MM methodology adopted in this article is especially fit for studying the determination of the market value of public sector (money and debt) claims in global capital markets. Finally, the extensions of the MM methodology operated in this article, and the assumptions chosen for its application (i.e., open (global) capital markets, negligible transaction costs for global investors, and non-zero default risk of claim issuers), make the theorem robust against its original weaknesses (Ahmeti and Prenaj, 2015) and suitable to investigate the reality of today's financially globalized economies.

To complete this review, consideration should be given to other neutrality theorems for public finances. The only relevant ones, to my knowledge, are the Ricardian Equivalence Theorem (RET) by Barro (1974) and the Wallace Irrelevance Proposition (WIP) by Wallace (1981). Both theorems, however, feature fundamental differences from the MM application, which deserve comment. As is well known, the RET tells us that fiscal policy is not effective as a tool to stimulate aggregate demand and output, the reason being that households are realize that the tax cuts or deficit spending made by the government today will have to be paid back some time in the future: in advance to these payments, households increase their current savings and hence neutralize the fiscal stimulus.[5] The RET rests fundamentally on households being experts and fully informed, and planning ahead based on permanent income expectations over an infinite lifetime horizon (or being intergenerationally connected through income transfers motivated by altruistic behavior). Moreover, while the RET assumes that the government never defaults, the MM approached here pursued explicitly assumes various forms of default risk on public sector claims (money and debt).

The WIP (a.k.a. "Wallace neutrality") asserts that, in certain environments, holding fiscal policy constant, alternative paths of the monetary policies have no effect on the sequences for the price level and real allocations in the economy. The proposition rests on a no-arbitrage argument similar to that of the MM approach and, like in the RET, all agents in the economy are assumed to be expert, well-informed, and infinitely lived optimizers.

Conversely, the Neutrality Theorem shown in this article, while bearing indirect implications for fiscal and monetary policy (in)effectiveness, to be discussed later, aims at showing that the cost of capital to the government is the same independently of whether the budget is financed with money or (domestic or foreign) debt, and under either fixed or floating exchange rates. Moreover, the Neutrality Theorem rests on more plausible assumptions than those underpinning the RET and WIP: whereas these require (unrealistically) that *many* (unexpert) households behave consistently with a model of

[5] For a review of the RET literature, see Kooij (2011).

the economy where all future generation plans are correctly retroflected within their current decisions (and are not robust to changes in assumptions[6]), the Neutrality Theorem only requires that a *relatively small number* of (expert) global investors determine asset prices that fulfill their own beliefs (in terms of JMK's conventional beliefs) on how the economies work in the global markets.

## 4. THE BUILDING BLOCKS OF THE NEUTRALITY THEOREM FOR PUBLIC FINANCES

### A. Money as Equity of the Issuing State

As is finally emerging in the Economics literature, and as the idea is receiving credit also within the international Accounting standards setting community, State-issued irredeemable fiat money (i.e., representation of value created *ex nihilo*) generates a specific form of revenue income that corresponds to the real resources that fiat money allows the issuing State to acquire (Bossone and Costa, 2021).

In other words, when the money issued by the State is exchanged for real resources or against promises to receive real resources in the future, its value is a source of income for the money issuing State. From accounting rules standpoint, in so far as this income is undistributed, it constitutes "equity" of the issuing State, and it can no longer be considered as debt, as is the case when money is redeemable in commodities or third-party liabilities.[7]

Now, accounting for money as equity of the issuing State implies the recognition of specific ownership rights. These are not the rights that are typically enshrined in corporate shares, since the equity that stands against money does not grant money holders any residual claims on the net assets

[6] For instance, the RET can be shown not to hold (and Keynesian multiplier effects to obtain) in dynamic optimizing models where one combines price rigidities and the birth of new agents (Bénassy, 2006), while the WIP ceases to be valid when the allocation of risk in the economy changes due to reallocations of assets holdings between private and public sectors (Benigno and Nisticò, 2020).

[7] Examples of this last case include commitments to fixed exchange rate arrangements, economy's dollarization, and currency boards.

of the issuing State (much like consumers buying goods from firms do not hold ownership rights on the selling firms). The rights from money as equity, instead, consist of claims on marketable national wealth (or accumulated output), which money holders may exercise at any time: those who receive (hold) these claims acquire (possess) generalized purchasing power on national wealth.

This view of money as equity of the issuing State is particularly conducive to transposing the Modigliani-Miller approach from its natural corporate finance habitat over the realm of public finances. In the analysis that will underpin the Neutrality Theorem for Public Finances, the State as issuer of claims in the form of equity (money) and debt is considered as an enterprise, the agents holding those claims are the enterprise's shareholders and/or creditors, and the State mobilizes the economy's output to support the real value of the claims issued.

Thus, the future stream of output "returns" that the economy will yield is the flow of aggregate output that it will generate over time, and the real value that the money and debt issued by the State represent is supported by the economy's capitalized output and the credibility of the government's capacity to mobilize it in order to fulfill the obligations underpinning those claims.

### B. The Central Role of Global Financial Investors

Global investors are financial intermediaries that operate on a global scale and allocate financial resources internationally taking on a global perspective. They may be large or largely connected institutions and, unlike conventional local representative agents, global investors exercise much greater market power and influence on the price of securities and currency issued by countries, by operating as "marginal" investors.[8] Their power of influencing markets is magnified where wealth is highly concentrated and where savings are largely institutionalized, and wealth is managed professionally.

[8] For a study of the marginal investor and references to the financial literature on the marginal investor, see Bartholdy and Kate (2004) and, more recently, Chen and Zhang (2018).

Global investors are not necessarily foreign entities to the country where they operate; they can be country residents, local branches of foreign entities, or foreign entities operating in the country through local correspondents or intermediaries. What matters is that they are influential and make investment decisions based on a global perspective that transcends local interests and preferences. Global investors mobilize far more resources, process far more information, than (typically smaller) agents operating locally, and trade at far lower costs. They are free from "home bias" and, even when they reside in or operate from a country, they are unlikely to use more than a modest fraction of their managed wealth (if at all) to finance consumption. Alternatively, global investors residing in major global financial centers, such as the US or other advanced countries, may feature home bias (Subramanian et al., 2009) but they are otherwise indifferent to "home interests" of the other country economies where they invest and, if anything, this may amplify the effects of their reallocation decisions when their perceptions on country economies change. Global investors do not aim at optimizing the level of consumption over time but maximize the utility of financial wealth by managing financial wealth.

Global investors are not interested in the stability of the countries in which they invest, except as it is necessary to protect the value of their investment, and, unlike local agents, they do not participate in the costs of stabilizing the economy, where necessary, whereas they are ready to rush towards the exit from investments in countries at risk of stability, transferring their capital (or managed capital) elsewhere. They are not interested in the evolution of domestic price inflation or unemployment in a country, other than to gain insights into the credibility and stability of the country's policy framework and use international price indices or currency baskets as deflators to calculate the real value of relevant financial variables and as a benchmark for estimating exposures to exchange rate risk of local investments.

Global investors are much more sensitive to this risk than local entities and require higher premia on the liabilities of a country in the face of issuances that they believe could jeopardize the stability of

their external value. Moreover, they can replace these liabilities much more quickly with others (especially foreign ones), at lower transaction costs and on a much larger scale than local investors can do. And whereas local agents operating in closed or captive markets are forced to accept and hold issues of public liabilities on terms that are convenient for the issuing government, global investors operating in open markets can set prices on less favorable terms for the issuing governments, based on their higher risk sensitivity, since they are in a position to exert a much stronger and more effective "exit" threat on the pricing of the government liabilities being issued and traded.

True, local agents always demand domestic currency for internal transactions and to settle tax payments, but their demand may not be sufficient to prevent currency depreciation, as the value of the currency is determined on the margin by global investors and their trading activity on all instruments denominated in that currency. It is global investors, and the influence they exercise on large domestic wealth holders, who ultimately determine the price and, hence, the (real) quantity of the money that circulates domestically.

With integrated international financial markets, global investors can move financial capital between markets and countries in real time and at negligible transaction costs. Thus, under conditions of high uncertainty, with capital flowing freely and easily, the price of liabilities that are less secure than others decreases and vice versa. And if global investors (rightly or wrongly) deem a country's credibility to be weak, or if they expect it to be weakened by the growth of its public sector liabilities, this will cause the liabilities to lose value regardless of the currency in which they are denominated.

### C. The Economy

Following Stiglitz (1967)'s generalization of the MM theorem, as noted, the analysis that follows uses a stripped-down-to-the-bone general equilibrium, multi-economy model, where each economy features two types of agents: the State and a representative Global investor (as described in Section 4.B). Other relationships (e.g., consumption, investment, external trade, etc.) that are not strictly relevant for the problem at hand are not part of the model, whereas the model's core builds exclusively

on the portfolio allocation choices made by the Global investor under alternative State budget financing decisions.

Each economy is characterized by a given level of credibility, $\beta \in [0,1]$, attributed to it by the global financial investors (henceforth, "global investors"). The above value range of the credibility factor $\beta$ is such that its lowest extreme, $\beta = 0$, means total lack of credibility, and its maximum extreme, $\beta = 1$, means absolute trust. While neither extreme is a representation of realistic cases, they both define the large scale of credibility valuations that investors can use to classify different country economies (see also below).

The economy generates a stream of future aggregate output levels $x(X) = x\big[[X(1), X(2), Xt), \dots, X(T)\big]$, which extend indefinitely into the future; these levels are not constant, and they are uncertain. It is assumed that the mean value of the stream over time, or the average output-return per unit of time, is finite and represents a random variable subject to a (subjective) probability distribution. Specifically, the economy's output $X$ is itself a random variable with probability distribution $\phi(X)$, whose form is uniquely determined by function $x(X) = x\big[[X(1), X(2), Xt), \dots, X(T)\big]$, and the expected aggregate output-return, $\bar{X}$, is defined as $\bar{X} \equiv E(X) = \int x(X)\, \phi(X) dX$, with $Var(X) = Var(X|\beta) = \int \big(x(X) - E(X)\big)^2 \phi(X) dX$, such that $Var(X|\beta_1) > Var(X|\beta_2)$, if $\beta_1 < \beta_2$, that is, economies with lower credibility feature higher levels of output volatility (and hence uncertainty).

***The State***

Throughout this article, the term "State" shall be understood as referring to a single public entity, with a consolidated central bank-treasury balance sheet, which is responsible for deciding the quantity (or the price) and the composition of the public sector claims.

In each economy, the State issues money and debt claims. Debt consists of a number *D* of nominal (interest-bearing) bonds, which can be denominated in either the domestic currency or a foreign

(typically reserve) currency, and trade in the domestic and foreign markets at prices $P_{Dd}$ and $P_{Df}$, respectively, where subscripts *d* and *f* stand for domestic and foreign, respectively. The issuance of public sector claims at each date aims at financing government expenditures aimed at closing any output gap:

(1) $G_t - T_r = \Delta M_t + P_{D,t}\Delta D_t - \Delta T_t = \chi(\mathrm{X}_t - X^F)$ with $\chi' < 0$

where *T* is lump-sum taxes and $X^F$ is full-employment output, given the government's intertemporal budget constraint (IBC):

(2) $P_{D,t}D_t = P_{Dd,t}D_t + e_{df}P_{Df,t}D_{f,t} = \sum_{\tau=t}^{\infty}\gamma^t\beta^t(\hat{T_{\beta,t}} - G_t + \Delta M_t)$,

which requires that the current market value of government debt equals the present discounted value of the future streams of government primary surpluses, *T*^ – *G*, and monetary financings, $\Delta M$. This value reflects the economy's credibility factor $\beta$, which acts as a scale factor that *corrects* it.[9] Taxes here are exogenously set at *T*^ and depend on the economy's level of credibility $\beta$.[10] No analysis of tax changes will be carried out in this article.

[9] Credibility factor "$\beta$" condenses global investor views on the policy credibility of individual country economies. This factor can indifferently be thought of as an index that investors apply to the government IBC, which scales its value up or down correspondingly, or as a probability measure that generates an expected value of the IBC, or else as a risk factor that adjusts the value of the IBC. All else equal, a lower $\beta$ reflects larger expected losses on government debt (either via higher inflation or default) and translates into a tighter IBC for the government, thus requiring larger (and possibly more frontloaded) fiscal efforts to sustain a given debt stock.

[10] To be consistent with the model of the economy here used, driven by global investor choices, in each economy taxes are set by the government at the level that optimizes the tradeoff between the positive effect of taxation (ceteris paribus) on the default risk on public debt, on one side, and the negative effect of taxation of current output, as can be seen from Eq. (1), on the other. Optimal taxes would differ economy-wise, depending on the economy's level of credibility, and it can be argued that (all else being equal) optional taxes would be higher in less credible economies and lower in more credible economies. Also, looking forward, while global investors expect governments of highly credible economies to set future taxes at whatever level is required to satisfy Eq. (2), they expect a less virtual fiscal behavior from economies with low credibility. The issue of taxation will no further detain us in this study.

Money and bonds are used by the domestic agents for consumption and saving-investment purposes and can be intermediated in foreign exchange and financial markets largely dominated by global financial investors (as discussed above).

Money claims yield to their holders a real rate of return, $r_M$, and government debt pays to its holders a real rate of return, $r_D$. As will be derived in Section 5.B, the equilibrium return on money varies positively with the expected stock of money claims and negatively with the stock of debt outstanding as well as with the economy's credibility. At this stage, it should only be noted that, since money holdings are equity for the issuing state (see Section 4.A), on the one hand, and claims on the economy's output for their holders, on the other, each unit of $M$ yields real return $x = \frac{1}{M}X$, with probability distribution $\phi(Mx)d(Mx)$, expected value $\bar{x} = \frac{1}{M}\bar{X}$ and variance $Var(x) = Var(x|\beta) = \int\left(x(Mx) - E(Mx)\right)^2 \phi(Mx)d(Mx)$, such that $Var(x|\beta_1) > Var(x|\beta_2)$, if $\beta_1 < \beta_2$.

The return on debt, too, varies inversely with the economy's credibility, but positively with ratio $\frac{P_{Dd}D_d + e_{df}P_{Df}D_f}{PX} \equiv \mathcal{D}$ (for a given demand for debt), where $P$ is the economy's general price level, and the ratio measures the market value of debt (in real terms) relative to the economy's output-return. Thus,

(3) $\quad r_D = r(\mathcal{D}, \beta), \qquad$ with $r'_{\mathcal{D}} > 0$ and $r'_{\beta} < 0$

that is, as the ratio $\mathcal{D}$ increases, and the economy's credibility weakens, the rate $r_D$ increases until the government may find itself unable (or unwilling) to continue to service its debt in real terms; at which point, either it will interrupt its payments causing a technical default, or it will pay with domestic currency whose external value would (ceteris paribus) depreciate, thus causing holders to lose value (in real terms), which will henceforth be referred to as "economic" default. More specifically, denoting $\theta = Prob\left[\left(\frac{M+P_D D}{P}\right) < E\left(\frac{M+P_D D}{P}\right)\right]$ the probability of the government (technically or economically) defaulting on public sector claims, this probability is governed by the following relationships:

(4) $\theta \in [0,1]: \begin{cases} \approx 1 \; if \; \mathcal{D} \gg \mathcal{D}^C \\ = \theta_\beta \ll 1, \text{if } \beta \gg 0, \mathcal{D} \leq \mathcal{D}^c, \text{and } \mu_d \leq \mu_f \end{cases}$ where $\mathcal{D}^c = \delta(\beta), \delta' > 0$

and

(5) $\theta = \theta(\mu_d - \mu_f)$, with $\theta' > 0$,

that is, the default probability reflects the economy's credibility $\beta$ and equals its minimum value $\theta_\beta$, strictly lower than 1, if the debt ratio stays within its critical threshold and the rate of growth of the stock of domestic currency does not exceed that of the foreign currency taken as benchmark (Bossone 2019, 2022). The default probability increases if the latter condition is violated and reaches its highest level if the debt ratio exceeds the critical threshold. Accordingly, the higher the credibility of an economy, the larger the fiscal space available to its government for active macroeconomic policies. Later, for analytical convenience, the default probability will be posited as $\theta_\beta = 1 - \beta$.

***The Global Investor***

Following the asset utility approach adopted in Bossone (2019), which readers are referred to for the details of the following model,[11] the representative Global Investor – acting on its own behalf and/or behalf of its clients – maximizes the intertemporal utility generated by wealth portfolio *W*:

(6) $U(W_t) = Max_W E_t[\sum_{t=\tau}^{\infty} \gamma^t u(W_t)]$

s. t.

(7) $W_t = M_{d,t} + e_{df,t}M_{f,t} + P_{Dd,t}D_{d,t} + e_{df,t}P_{Df,t}D_{f,t} - \Delta W'_{t-1} = M_{t-1}R_{M,t-1} +$

$e_t M_{f,t-1}R_{M,t-1} + P_{Dd,t}D_{d,t}R_{D,t-1} + e_{df,t}R_{Df,t-1}P_{Df,t}D_{f,t} + \Delta W_{t-1} + (1 - r_W)\Delta W'_{t-1}$,

(8) $M_d, M_f, D_d, D_f \geq 0; \; \Delta W \gtreqless 0 \; \Delta W' \geq 0$, and

(9) $\sum_{n=d,f} \frac{P_{n,t}X_{n,t}}{\rho_{\beta_n}} = W_t$

[11] I have originally proposed and developed this approach in Bossone (2014), which builds on JMK's liquidity preference theory and combines it with choice theory.

where $e_{df}$ is the market exchange rate between domestic currency $d$ and foreign currency $f$ and is expressed as the number of units of the former per unit of the latter, and the summation term in Eq. (9) is the sum of capitalized output across the economies where global investors invest and represents the source of real wealth (see the market valuation of public sector claims relative to the economy's output, below). Finally, the optimization plan is closed by transversality condition:

(10) $\lim_{t\to\infty} W_t = 0.$

Function $u(\cdot)$ is a standard strictly quasi concave, time-separable, and well-behaved utility function; $\Delta W$is net additional investment or divestment taking place through Global Investor, where net divestments correspond to consumption decisions taken by agents who had previously invested in the portfolio of the Global Investor;[12] $\Delta W'$ is borrowing from the market that the Global Investor might want to access in order to fund extra current investments; $R$ is the real gross rate of return on assets and incorporates the risk of loss from government (technical or economic) default, $1-\beta$.

***Equilibrium (not necessarily at full employment)***

Given the government's decision to issue money and debt claims in certain quantities and (or at certain prices) and in a certain combination, and given the economy's expected aggregate output, $\bar{X}$, at equilibrium the total market value of the economy's public sector claims (money and debt), expressed in domestic currency, is

(11) $V^* = \frac{M^*+P_D^*D_d^*+e_{df}^*P_{Df}^*D_f^*}{P^*} = \frac{\bar{X}}{\rho^*}$,

where $\rho$ is the economy's expected rate of output-return on the public sector claims. Factoring into the economy's credibility $\beta$, and dropping the aster, Eq. (9) can be generalized and re-expressed as:

[12] In other words, these agents liquidate (part of) their investment to finance current consumption. If they divest funds to re-invest them, their net effect on the Global Investor's portfolio is zero ($\Delta W = 0$). On the other hand, if agents invest more money, then this adds to the Global Investor's portfolio ($\Delta W > 0$).

(11a) $V_\beta = \frac{\beta(+P_D D_d + e_{df} P_D D_d)}{P} = \frac{\bar{X}}{\rho_\beta}$,

where credibility $\beta$ acts as a discount factor and can be interpreted as the expected value of the public sector claims outstanding that would be recovered – through the output generated by the economy – in the event of government (technical and economic) default, and $\rho_{\beta_1} > \rho_{\beta_2}$, if $\beta_1 < \beta_2$. Its complement, $1 - \beta$, is thus the expected value loss (as posited earlier). Also, $\rho_\beta$ is the economy's expected rate of output-return on public sector claims, which reflects the economy's credibility and, hence, the risk of government default.

For given levels of the economies' output and given sequences of expected returns and exchange rate changes conditional on the economies' level of credibility $\left[\left(R_{M_d,t}, R_{M_f,t}, R_{D_d,t}, R_{D_f,t},\ \varepsilon_{df,t}\right)|\beta_d, \beta_f\right]$, for $t = T, \ldots, \infty$, solving plan (6)-(10) yields the optimal portfolio composition $\left(M^*_{d,t}, M^*_{f,t}, D^*_{d,t},, D^*_{f,t}\right)$ of the Global Investor at equilibrium prices $\left(P^*_t, P^*_{Dd,t}, P^*_{Df,t}, e^*_{df,t}\right)$ at each date of the relevant time horizon, as determined by the following two first order conditions; the first f.o.c. is:

(12) $$u'(M_{d,t})R_{M_d,t} = \frac{1}{e_t}u'(M_{f,t})R_{M_f,t} = \frac{1}{P_{Dd,t}}u'(D_{d,t})R_{D_d,t} = \frac{1}{e_{df,t}P_{Df,t}}u'(D_{f,t})R_{D_f,t} = \lambda_t,$$

which requires equating the marginal utilities of domestic and foreign *M* and *D* holdings, each weighted with its own price, and the second f.o.c. is:

(13) $$\lambda_t = \gamma E_t R_{Md,t+1}\lambda_{t+1} = \gamma E_t R_{Mf,t+1}\lambda_{t+1} = \gamma E_t R_{Dd,t+1}\lambda_{t+1} = \gamma E_t R_{Df,t+1}\lambda_{t+1},$$

which requires equalizing all rates of return on assets in real terms and net of default risk at each date and intertemporally. For completion, and although consumption choices are not incorporated into the model, since the Global Investor acts on behalf of its client wealth holders, it may be added that optimality requires that the periodical divestments from its portfolio to finance consumption activities (as discussed earlier) generate, at the margin, the same utility that is generated by the assets held or acquired by the Global Investor.

Notice from Eq. (11) that there is no mechanism in this model that guarantees that equilibrium is reached at full resource employment. The economy's expected output return $\bar{X}$ can settle at any level and this level would be validated by the portfolio choices of global investors. Thus, in situations of resource underemployment or unemployment, governments may legitimately pursue active macro policies. Policy effectiveness and how neutrality affects it are discussed next.

## 5. THE NEUTRALITY THEOREM FOR PUBLIC FINANCES

The Neutrality Theorem and its two Corollaries on the Equilibrium Return on Money are here derived and discussed.

### A. Neutrality Theorem

From Eq. (11a) at equilibrium, and in the vein of Modigliani and Miller, follows the:

**Neutrality Theorem for Public Finances.** *In equilibrium, the total market value of the public sector claims (currency and debt) of an economy with a given credibility i) is equal to the capitalization of the expected "return" on the economy expressed in expected real output terms, and whose degree of uncertainty is reflected in the economy's level of credibility, and ii) is independent of the capital structure of the government finances.*

The Neutrality Theorem can be equivalently stated in terms of the average cost of capital to the government, as:

$$(14) \qquad \frac{\bar{X}}{\beta\left(M+P_{Dd}D_d+e_{df}P_{Df}D_f\right)\frac{1}{P}} = \frac{\bar{X}}{V_\beta} = \rho_\beta,$$

where $\rho_\beta$ can be regarded as the market rate of capitalization for the expected value of the uncertain streams of output generated by an economy with credibility $\beta$. Eq. (14) indicates that, *the average cost of capital to a government i) is completely independent of the capital structure of the government finances and ii) is equal to the capitalization rate of the output stream expected to be generated by*

*the economy, whose degree of uncertainty is reflected in the level of credibility attributed by the global investors to the economy.*

To establish the Neutrality Theorem, it will be shown that, as long as Eqs. (11a) or (14) do not hold between any pair of financially globalized economies at the same level of credibility, arbitrage will take place in the global capital market and restore the stated equalities. The term arbitrage is adopted purposefully. For if the theorem did not hold, investors could buy and sell currencies and bonds and exchange one income stream for another that is identical in all relevant respects except that sells at a lower price. The exchange would be advantageous to the investors quite independently of their attitudes toward risk,[13] and as investors exploit these arbitrage opportunities, the value of the overpriced securities (currencies and bonds) falls and that of the underpriced securities (currencies and bonds) rises, ultimately eliminating any value discrepancies.

By way of proof, consider two identical economies ($i, j$), featuring the same level of credibility, $\beta_i = \beta_j$, which generate equal output-returns, $\bar{X}_i = \bar{X}_j = \bar{X}$. Let the government of economy *i* finance itself entirely by printing money, $M_i$, and call it for brevity the "money-financed" economy, and let the government of economy *j* finance itself partly through money printing, $M_j$, and partly through issuing debt alternatively denominated either in the domestic currency, $P_{Ddj}D_{dj}$, or in a foreign (typically) reserve currency, $P_{Dfj}D_{fj}$, and call it the "debt-financed" economy.

The issue of debt denomination requires comment. The cases of domestic and foreign denomination of public debt will be dealt with separately and under the assumptions of fixed and floating exchange rates, respectively. The two cases, however, coincide in the case of highly credible economies, where the risk of (technical or economic default) is nihil and the global investors are indifferent between

[13] In choice theory, exchanges are movements from inefficient points in the interior to efficient points on the boundary of the investor's opportunity set – not movements between efficient points along the boundary. Hence, in this article's analysis there is no implications for investor attitudes or behaviors other than they act consistently and always prefer more income to less income, ceteris paribus.

otherwise identical bonds that differ only for currency denomination, and treat them as perfect substitutes. (The risk neutrality issue will be discussed below.) In such case, as shown next, the analysis can be framed in terms of one type of debt denomination only, since one case also covers identically the other. The following analysis will only use the foreign denomination except for the case of economies with low credibility.

***High credibility and fixed exchange rates***

Economies *i* and *j* are both highly credible and economy *j* adopts a fixed exchange rate regime, with the exchange rate being set exogenously and is posited as $e_{jf} = \hat{e}_{jf} = 1$ for expositional convenience. Credibility is such that $E(\varepsilon_{jf}) = 0$, where $\varepsilon_{if} \equiv \frac{de_{if}}{dt}\frac{1}{t}$ is the rate of change of the exchange rate. This implies, as noted, that one unit of $D^d$ is identical to, and perfectly interchangeable with, one unit of $D^f$ and trades at the same price. As an additional assumption, the debt ratio of both economies is well within the critical threshold corresponding to the economy's same level of credibility, $\mathcal{D}_i, \mathcal{D}_j \ll \mathcal{D}_\beta^c$, so that no risk of default is considered for either government.

Following Modigliani and Miller, suppose the value of the debt-financed economy is conjectured to be larger than that of the money-financed economy, $V_j > V_i$, as it is the case when markets believe that deficit monetization is inflationary. Consider global investors holding $m_j$ unit of currency *j*, representing a fraction $\alpha$ of $M_j$. The return from this portfolio, denoted by $Y_j$, will thus be a fraction $\alpha$ of the income available for the holders of currency *j*, which is equal to the total output-return $X_j$, plus the interest received on money balances, $r_{Mj}M_j$, less the debt interest charges, $r_{Dj}P_{Df}D_{fj}$ . By the above assumption $\bar{X}_i = \bar{X}_i = \bar{X}$, the return from the initial portfolio can be written as:

(15) $\quad Y_j = \alpha(\bar{X} - r_{Dj}P_{Df}D_{fj})$.

Positing in the following *P=1* for convenience, suppose now that global investors sold $\alpha M_j$ worth of currency *j* and acquired instead an amount $m_i = \alpha(M_j + P_{Df}D_{fj})$ of currency *i*. They could do so by utilizing the amount $\alpha M_j$ realized from the sale of their initial holdings and by borrowing an

additional amount $\alpha P_{Df} D_{fj}$on their own credit and investing it in economy *i*, or by reducing the amount of bonds and other securities they already hold. They would thus secure for themselves a fraction $\frac{m_i}{M_i} = \frac{\alpha(M_j + P_{Df} D_{fj})}{M_i}$ of currency *i*. Making allowance for the interest payments on their debt $\alpha r_{Dj} P_{Df} D_{fj}$ or for the incomes forgone by selling bonds or other securities, the return from the new portfolio, $V_i$, is given by:

$$(16) \qquad Y_i = \frac{\alpha(M_j + P_{Df} D_{fj})}{M_i} \bar{X} - \alpha r_{Dj} P_{Df} D_{fj} = \alpha \frac{V_j}{V_i} - \alpha r_{Dj} P_{Df} D_{fj}.$$

Comparing Eqs. (15) and (16), it can be observed that if $V_j > V_i$, then it must also be that $Y_i > Y_j$. Thus, it pays holders of currency *j* to sell it, thereby depressing its value and, hence $V_j$, and to acquire instead currency *i*, thereby raising its value, and hence $V_i$. The conclusion is that debt-financed economies cannot command a premium over (hypothetically identical) money-financed economies because global investors have the opportunity of putting the equivalent leverage into their portfolio by raising the needed liquidity in the market.

Consider now the other possibility, namely that the value of debt-financed economy *j* is conjectured to be less than money-financed economy *i*, $V_i > V_j$, as for instance would be the case under MMT-consistent expectations ~~(Section II.B)~~, since issuing money is costless, protects the government from the risk of technical default, and allows to steer and keep the economy at full employment. Suppose that global investors hold initially an amount $m_i$ of currency *i*, representing a fraction $\alpha$ of the total outstanding stock of money, $M_i$. The return from this holding is:

$$(17) \qquad Y_i = \frac{m_i}{M_i}(\bar{X}) = \alpha(\bar{X})$$

Suppose now that the global investors exchange their initial holdings for an alternative portfolio, also worth $m_i$, but consisting of $m_j$ units of currency *j* and $d_j^f$ units of bonds *j*, where $m_j$ and $d_j^f$ are given respectively by:

(18) $m_j = \frac{M_j}{V_j} m_i$, and $d_j^f = \frac{P_{Df} D_{fj}}{V_j} m_i$.

In other words, the new portfolio includes economy *j*'s currency and bonds in the proportions $\frac{M_j}{V_j}$ and $\frac{P_{Df} D_{fj}}{V_j}$, respectively. The return from the currency in the new portfolio will be the fraction $\frac{m_j}{M_j}$ of the total return to economy *j*, which is $\left(\bar{X} - r_{Dj} P_{Df} D_{fj}\right)$, and the return from the bonds will be $r_{Dj} P_{Df} d_{fj}$. Using Eq. (17), and since $m_i = \alpha M_i$, the total return from the portfolio, $Y_j$, is:

(19) $Y_j = \frac{m_j}{M_j}\left(\bar{X} - r_{Dj} P_{Df} D_{fj}\right) + r_{Dj} d_j^f = \frac{m_j}{V_j}\left(\bar{X} - r_{Dj} P_{Df} D_{fj}\right) + \frac{r_{Dj} P_{Df} D_{fj}}{V_j} m_j = \frac{m_j}{V_j}\left(\bar{X}\right) = \alpha \frac{M_j}{V_j}\left(\bar{X}\right)$.

Comparing Eqs. (17) and (19), it can be observed that if $V_j < M_j \equiv V_i$, then it must also be that $Y_j > Y_i$. Thus, it pays the holders of currency *i* to sell it, thereby depressing its value, and hence $V_j$, and to acquire instead the optimal mixed portfolio seen earlier, which includes a fraction of the currency and bonds of issued by debt-financed economy *j*. This raises their value, and hence $V_i$, and afford global investors access to a larger share of economy *j*'s return $\bar{X}$.

It is this possibility of portfolio readjustments by global investors that prevents the value of debt-financed economies from being systematically less than those of monetized economies. It is these readjustments that "undo" the monetization and prevent the average cost of capital, $\frac{\bar{X}}{V_j} = \rho_j$, from being systematically higher for debt-financed than for money-financed economies, for a given level of credibility. This will be further clarified in Section 5.B.

Finally, since it has been shown that arbitrage will also prevent $V_j > V_i$, it can be concluded that, in equilibrium, it must be that $V_j = V_i$, in accordance with the Neutrality Theorem.

***High credibility and floating exchange rates***

With floating rates, Eq. (19) is rewritten replacing the exogenously set exchange rate, $\hat{e}_{jf}$, with market-determined rate, $e_{jf}$. Unlike in the case with fixed rates, the cost of capital to the government now changes with the exchange rate (although highly credible economies generally pursue policies

that make the exchange rate dynamics less volatile and more predictable, and the exchange rate risk less costly to hedge as a result). Yet, the Neutrality Theorem continues to hold in so far as the global investors exploit their virtually unlimited access to market funding and keep readjusting their portfolios until equality is re-established; besides, since they operate directly in the relevant foreign currencies, they shade their investments from exchange rate risk.

***Low credibility and fixed exchange rates***

The case of low credibility with fixed exchange rates does not differ significantly from the case just discussed of high credibility if (and to the extent that) the economy's debt ratio stays well within the critical threshold, $\mathcal{D} \ll \mathcal{D}^c$and domestic money growth does not exceed that of the reserve (benchmark) currency, $\mu_d \leq \mu_f$, thereby implying that the default probability is low $\theta = \theta_\beta \ll 1$, and above all signaling that the government intends to build credibility by pursuing a conservative policy stance.

Conversely, if the government sets to expand its deficits and either of the two conditions above, or both, are violated, the risk of (technical or economic) default on public sector claims is perceived by the global investors to increase. Similarly, the government's commitment to pegging the exchange rate at $e_{jf} = \hat{e}_{jf}$ is no longer credible, $E(\varepsilon_{jf}) \neq 0$, and the domestic currency is expected to depreciate.

Therefore, the case of interest, which is analyzed next, is when the economy's credibility is low, the exchange rate is floating, and public sector claims grow inordinately (that is, beyond the levels that global investors deem to be consistent with financial sustainability).

***Low credibility and floating exchange rates***

Assume an output gap emerges in low-credibility, debt-financed economy *j*, and the government decides to stimulate aggregate demand by expanding public deficit. Since the risk of technical default rises, the government commits to printing new money that it would use to pay future debt obligations

and so avert default. Specifically, the government promises to print future flows of new money claims, such that

$$(20) \quad \overline{\Delta M}_j \equiv \lim_{T\to\infty} \frac{1}{T}\sum_{t=1}^{T} r_{Dj}\left[P_{Dd}D_j^d + e_{jf}\left(1+E\left(\varepsilon_{jf}\right)\right)P_{Df}D_{fj}\right].$$

However, from Eq. (19) the return on the portfolio is now

$$(21) \quad Y_j = \alpha \frac{M_j + \frac{\lim_{T\to\infty}\frac{1}{T}\sum_{t=1}^{T} r_{Dj}\left[P_{Dd}D_{dj}+e_{jf}\left(1+E\left(\varepsilon_{jf}\right)\right)P_{Df}D_{fj}\right]}{\lim_{T\to\infty}\frac{1}{T}\sum_{t=1}^{T} e_{jf}\left(1+E\left(\varepsilon_{jf}\right)\right)} - \lim_{T\to\infty}\frac{1}{T}\sum_{t=1}^{T} r_{Dj}\left[P_{Dd}D_{dj}+e_{jf}\left(1+E\left(\varepsilon_{jf}\right)\right)P_{Df}D_{fj}\right]}{V_j}\bar{X} < Y_i,$$

and hence $V_i > V_j$, since the money stock is now subject to expected depreciation, $E\left(\varepsilon_{jf}\right) > 0$. To further use the corporate analogy, it would be as if an enterprise started paying its obligations by issuing new shares, which, ceteris paribus, would dilute the value of the enterprise's whole stock of outstanding shares. Debt repayments with depreciated currency causes global investors to lose value (in real terms) on their debt holdings (i.e., economic default). On such expectations, it then pays them to sell currency *j*. Yet this further depreciates the currency, unless and until an adequate return is paid on money holdings (see Section 2.B). However, increasing interest payments on money claims eventually defy the original policy purpose, showing that no actual gain can be reaped by the government using the printing press to service its debt obligations.

Moreover, if monetization is pursued and maintained thereafter, expectations of unconstrained currency weakening (and ultimately currency collapse) would eventually lead global investors to stop refinancing the government (*sudden stop*) or to even "flee the country" and shift their capital elsewhere (*capital reversals*).

This case violates the Neutrality Theorem and shows that the Emperor is left without cloths: money printing only gives the appearance of being a substitute for scarce foreign exchange (scarce in the sense of the domestic government not having control over its issuance). As new money is created that is not backed by new output, it generates value losses to all global investors (and the domestic agents) holding money, ceteris paribus, and it hampers government *j*'s finances.

Granted, paying debt with devalued currency may look less traumatic than stopping payments altogether; yet the expected losses from either event can't be any different from one another: a rational investor must expect from the same borrower the very same losses in real value terms, irrespective of the type of default events that may take place, since identical is in all cases the borrower's capacity to generate the real output necessary to repay the debt. To be sure, discrepancies between value losses can materialize ex post, in the aftermath of different technical and economic default events; ex ante, however, investors require the same hedging against their occurrence because identical are the associated expected losses.

Should global investors accept to be repaid in domestic currency, they would require the government to pay an adequate return on their money claims (see next section). This return should be high enough to reestablish equilibrium, where $Y_i = Y_j$ and $V_i = V_j$. This would restore the neutrality.

Notice that the above results closely resemble (although in an extended and more general form) those of Modigliani and Miller under *Proposition I* of their analysis of debt financing and its effects on security prices.

### B. The Equilibrium Return on Money

From the Neutrality Theorem follows:

> **Corollary 1.** *In equilibrium, a positive rate of return must be paid on money holdings for global investors to be induced to hold the money claims that the government issues to monetize its deficits,* and
>
> **Corollary 2.** *The equilibrium rate of return on money claims would (ceteris paribus) varies inversely with the credibility of the economy and directly with the expected stock of money claims.*

Considering money as equity, and its value being therefore determined as a claim on the economy's residual aggregate output (that is, the output that is left once interests have been paid out to the debt

holders), the value loss that the investors expect to bear, $E(\mathcal{L})$, is given by the government default probability from Eq. (2), $\theta_\beta$, as applied to the residual output on which the investors hold claims.

Positing for convenience $\theta_\beta = 1 - \beta$ ~~and denoting $P_{Dd}D_d + e_{df}P_{Df}D_f \equiv P_dD$~~, the expected loss in real value terms is:

(22) $\quad E(\mathcal{L}) = -(1-\beta)[\bar{X} - r_D P_d D].$

In equilibrium, the real rate of return on money issued in an economy with credibility $\beta$ must therefore be large enough to protect investors from the above risk of real value loss by paying them a spread $\mathcal{S}$ on the rate of output capitalization for the given level of the economy's credibility, such that:

(23) $\quad r_M = \rho_\beta + \mathcal{S} = \rho_\beta - E(\mathcal{L})/M.$

Recalling Eq. (14) and augmenting it with government's deficit monetization plans given by Eq. (19) to obtain $\bar{X} = \rho_\beta \beta \left(\frac{M+\overline{\Delta M}+P_d D}{P}\right)$, noting that $\rho_\beta = \rho\beta$, substituting in Eqs. (22) and (23), and simplifying, yields:

(24) $\quad r_M = \rho_\beta + (1-\beta)\left[\rho\frac{M+\overline{\Delta M}}{M} + (\rho - r_D)\frac{P_d D}{M}\right],$

which proves the two corollaries above.

Eq. (24) closely resembles (although in an extended and more general form) one of Modigliani-Miller's key results under *Proposition II* of their analysis of debt financing and its effects on security prices.

Importantly, Eq. (24) embodies JMKs' liquidity preference theory, whereby the rate of interest is not determined by the supply of and demand for (flows of) saving, but by the supply of and demand for assets into which holdings of (stocks of) wealth can be placed (Tily, 2021).[14]

[14] To quote from Keynes' *General Theory*, "The current rate of interest depends…not on the strength of the desire to hold wealth, but on the strengths of the desire to hold it in liquid and illiquid forms respectively,

Noting from Eq. (2) that $\rho - r_D < 0$ for rising levels of debt and/or for declining levels of credibility, Eq. (24) also shows that if the government were to monetize its future deficits fully and never raised (domestic or external) debt, $P_D D = 0$, the dampening effect of debt interests on spread $\mathcal{S}$ would be nihil, and the equilibrium return on money would (ceteris paribus) be permanently higher and growing with the expected stock of money claims.

Finally, if hypothetically a country enjoyed full credibility, $\beta = 1$, and the uncertainty on its output-return were assumed away, the equilibrium return on money would equal the economy's capitalization rate of output, $r_M = \frac{\bar{X}}{V} = \rho$ , which is the lowest possible average cost of capital to the government.

This last result deserves a "Post-Keynesian" comment. While it looks purely Neoclassical, in that it shows the cost of money to be anchored to the supply side of the economy, i.e., its output level, it in fact represents a special case of a more general situation where, as captured by Eq. (11a), the value of the public sector claims of a financially globalized economy is determined by the conventional beliefs of leading market agents over an uncertain future. As these beliefs dominate portfolio choices in the real world, and it is often the case that $\beta \ll 1$, the cost of capital reflects these beliefs and affects the economy's output by influencing aggregate demand. This inverts the above causal nexus in the Keynesian direction.

## 6. KEYNESIAN POLICY REFLECTIONS AND CONCLUDING REMARKS

The Neutrality Theorem demonstrated in this article is about the economics of the power of global investors to enforce their interests over economies that are integrated in global markets where their resources and claims are traded: their power is such that they can validate the models they use to determine their investment portfolio choices (self-fulfilling models).

coupled with the amount of the supply of wealth in the one form relatively to the supply of it in the other." (p.213).

The theorem shows that when international capital allocation choices are determined by global investors, there are no net gains ("free lunch") that the government of a highly internationally financially integrated can systematically extract from the economy by resorting to one type of deficit financing versus another.

Especially in the case of largely indebted countries with low credibility, issuing domestic rather than foreign denominated debt would not give the economy any cost advantage: the risk of real losses, as perceived by the markets, is the same and is priced identically. Nor would an economy with monetary sovereignty benefit from its government financing public expenditures with printing assumedly cost-free money: money is not cost free, and its cost rises with its stock. And neither would floating exchange rates grant any greater effectiveness to the economy's macro policies (vis-à-vis fixed rates): the risk of currency depreciation requires higher interest rates on public sector claims or forces investors to turn their money elsewhere.

Yes, it is ultimately a matter of credibility – as perceived by the markets. The higher the *credibility capital* a country is reputed to possess, the lower the cost of the *financial capital* it can access. There are indeed only a few countries in the world that benefit from a high credibility status and, hence, from a large policy space that markets afford them thanks to their status. But credibility capital is costly to build and very easy to dissipate, and no country that operates in the global financial space can maintain a high credibility (and extract its attendant benefits) for long by pushing inordinately and persistently on domestic indebtedness or money printing (even if abundant resources are out of employment), unless the economy is characterized by some very specific and rare factors. Examples are countries with exceptional geo-strategic, military, and/or economic prowess that make their currencies world reserve assets. As for other highly internationally financially integrated economies, weak (or weakening) credibility constrains the space available to their governments for conducting effective macroeconomic policies and raises their cost of financial capital.

The question is then, why should countries ever decide to integrate their economies in the global financial space?

The analysis is complex and requires not just economic but political economy considerations, which will not be entered into here. Put simply, however, the dominant Neoliberal tenet is that removing barriers to financial market fragmentation improves on the allocation of scarce resources and risks, ultimately providing the best price-quantity combinations that optimize the welfare of both investors and resource users. In practice, according to this tenet, financial globalization allows investors, on one hand, to find the best investment opportunities around the world, in terms of risk and return, and allows resource users, on the other, to access the widest possible resource base at the cheapest possible prices and accessory conditions. In addition, and as a corollary to the same tenet, financial globalization, and the attendant role of global investors as *vigilantes* (by virtue of their power to determine asset prices), are expected to induce discipline in the behavior of claim issuers, which should in principle promote financial stability worldwide.

Clearly, this is not the case in practice, as evidence abundantly shows: large movements of capital in and out of countries may alter dramatically and overnight the value of critical public and private sector assets; in global financial markets the choices of leading agents may cause herding behavior and thus unleash financial stampedes with economic consequences that veer very far from the path suggested by any reading of the economic fundamentals; and, finally, global investors scanning the world for best prices cerate pressures for undue conformity across countries' macro policies, and countries that deviate from the "norm" – even for appropriate reasons – are punished by capital flight (Kirshner, 1999).

Conversely, by enabling agents to exercise the freedom of moving capital across markets and borders, one benefit of financial globalization is that governments of highly internationally financially integrated economies are left with limited room (if at all) for exerting financial repression as they can otherwise do when markets are closed or segmented. This implies that governments cannot extract

from domestic agents (especially less informed investors and small savers) the rents that financial repression empowers them to do (through, for instance, explicit or implicit taxation and subsidies, caps on interest rates, directed credit, captive lending, etc.). For the very same reason, financial globalization allows domestic agents (including small ones) to access a much broader set of investment options, and since the price of public sector claims is determined at the margin by global investors searching for best options, all other investors (including small domestic savers buying those claims) benefit indirectly from the conditions that only the former can obtain in force of their superior market power and knowledge.[15]

How should then countries approach financial globalization and deal with its consequences? Should they just accept its costs in exchange for the benefit of the economic freedom of capital movements for individuals and businesses, or should they reject it in an attempt to preserve State sovereignty over the national economy?

While this question would per se deserve a fully dedicated work on its own, two options can be considered. They both rest on my entirely subjective view that gravitating toward a globalized economy (that is, a world where people move toward the open trade of everything) is ultimately an irresistible human tendency. Thus, both options follow the same logic that countries are better off if they prepare to deal with financial globalization, adapt to it, and manage its consequences, rather than succumbing to it unprepared and in an hopeless attempt to protect national sovereignty at all costs for ever. The two options are the following.

***Go for financial globalization, but play smart with it***

The first option is to accept globalization but using JMK*'s financial conservativeness*, as I discussed in a recent PKES contribution (Bossone, 2021). In a nutshell, countries that decided to go global should try as much as possible to remain in balance independently of the global financial markets,

[15] Yet they are exposed to much greater risk if they are not able to match global investor choices.

adopting policies to ensure internal and external stability of their economy without relying on entities – global financial investors – that are eager to take advantage of them and condition their destiny for the sole purpose of extracting wealth from them. Countries should keep their public debt levels low and sustainable, limiting them solely to financing investment programs that can repay themselves over time and/or to supporting the economy in recessions or crises but with the commitment to reducing debt during recovery and the high cycle phases, in the context of a high socialization of investment that would sustain a high level of (public and private) capital accumulation on an ongoing basis for stable employment and steady output growth. JMK's recipe would protect countries from the risk of surrendering their economic sovereignty in the hands of agents who have no interest whatsoever in their fate, other than their ability to honor their debts (at whatever social cost required to do so…). Such recipe would amount to a country keeping minimal exposure to financial globalization, along lines of prudence and self-restraint that would limit recourse to domestic and foreign debt and would require monetary policy to maintain investor confidence in the national economy. Here, fiscal-monetary coordination can expand the space available for an active policy stance, provided markets believe the authorities' commitment to price stability and public debt sustainability is credible (Bartsch et al., 2020). This option would be no easy job, but it would be less daunting and certainly less ambitious than the second one.

***Delay financial globalization, invest for the future, and get ready for it***

The second option is to retard financial market integration and use *financial repression* in the meantime as part of a medium-term national economic plan that gradually prepares the economy eventually to navigate the open world by supporting economic activities that are good for economic development ("Schumpeterian activities", to use Reinert's language[16]). Once this is done, and

[16] See the contributions collected in *The Other Canon* website, available at http://othercanon.org.

integration is accomplished, the government then proceeds along the financially conservative path recalled under the first option.

Since financial repression is a form of rent extraction by the State from the economy, the State can apply it strategically and in the public interest by offering a social compact to its citizens. The compact consists of the State committing to using financial repression for the purpose of financing a long-term national economic development program. In other words, citizens accept to relinquish current resources to the State (through financial repression) in exchange for the State mobilizing these resources to speed up economic growth and build greater national resource creation capacity in due time, by allocating resources to infrastructure and productive uses and to facilitate the adoption of new technologies, processes, and know-how by the local industries.

Defining and implementing such a compact, however, would be no easy task as it would require effective and transparent concertation between business, labor and government, significant trust by the citizens in their government, government's strong planning skills, and time-consistent action from the political leadership and policymakers. Also, designing a compact and sticking it, without abusing it (for example, through time inconsistent policies that would extract rents only for political expediency) would be critical for the economy to build sufficient credibility and thus navigate the open world from a position of relative strength.

The idea of using financial repression wisely is not inconsistent with JMK's support of the use of capital controls (especially over short-term capital movements), and more broadly with the idea of "embedded liberalism" that he pursued, where market forces are managed and contained as an alternative to unregulated capitalism (Kirshner, cit.).[17] Similarly, the idea of using rents from financial repression to mobilize capital for development purposes according to a national economic plan is not

[17] Kirshner, cit., argues that the idea of "embedded liberalism" should be attributed to JMK, and not to Karl Polany as is commonly done.

inconsistent with JMK's vision of central controls as necessary to ensure full employment and thus necessarily involving a large extension of traditional functions of government (Sicsù, 2020).

Where the idea of an economic development plan does exceed JMK's vision is that a plan that should prepare a country eventually to navigate the global space, steadily and at no risk of becoming hostage to global actors, would have to go beyond demand-side aspects (such as to guarantee full employment) and should as well encompass supply-side dimensions that would strengthen the country's capacity to compete globally. Issues like industrial strategy and policy, technology transfers and R&D investment, attraction of foreign direct investment, and building skills should receive within the plan at least as much attention as Keynesian demand-management policies and tools.

In short, while the first option aims at preventing and controlling the damage that financial globalization can bring, and it is relatively easy to implement, the second option aims at preparing the economy to compete in a financially globalized world economy and requires a much more demanding planning and implementation process.

In conclusion, recognizing realistically the "neutrality" of public sector claim valuation due to global market forces and its limiting impact on macro policy effectiveness, as this article has done, does not mean that governments are armless and bound to surrender to them. It is a matter of understanding how market forcers operate, identify the conventional beliefs through which they exert their dominance, and determine the space that each government can use to protect its citizens from unregulated capitalism.

Regrettably, this can only be done at the individual country level since no sign is in sight of an international cooperative will to change the global financial architecture toward a more just and fairer world order.

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