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Marcelo Diamand's contributions to economic theory through the lens of the classical Keynesian approach: a formal representation of unbalanced productive structures

***Abstract:** We examine both conceptually and in formal terms the contributions by the structuralist economist Marcelo Diamand, which all revolve around the notion of unbalanced productive structure, and its implications on income distribution, the general price level, and output dynamics in Latin American countries, with a special focus on Argentina. We argue that Diamand's work provides a very useful framework to understand why institutionally and historically determined real wage and real exchange rates can, on the one hand, explain the relatively low productivity of the industrial sector and, on the other hand, cause devaluations to be both inflationary and contractionary, as has been the case in many Latin American countries that attempted to initiate an industrialization process by import substitution.*

***keywords:** exchange rate inflation, external constraint, Marcelo Diamand, stop-and-go cycles, unbalanced productive structure*

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By the end of the of the 1940s and the beginning of the 1950s, and as an almost natural reflection of what had happened during the two World Wars and the huge economic depression that took place in the interwar period, a growing consensus emerges among Latin American economists around the idea that integration between Latin American countries and the industrial centers of North America and Europe could no longer be grounded on the principle of comparative advantages. It is on this basis, let us recall, that the “agro-export” production model, universally adopted by the countries of that region during the first decades of the twentieth century, was conceived and developed—a mode of production that “condemned” peripheral countries to provide raw materials and foodstuff for developed economies in exchange for their industrial products.

This vision was perhaps first definitely characterized in the seminal contribution by Raul Prebisch (1949). Based on Prebisch’s well-known thesis about the secular fall in the terms of trade of peripheral economies, this article sustains the idea that, by themselves, the forces of the market are unable either to allow periphery to appropriate the fruits of technical progress or to solve the chronic problem of unemployment. This is how industrialization, due to both its dynamism and capacity to create employment opportunities, coupled with demand-side policies of Keynesian spirit, start to be seen as necessary conditions to achieved a sustained process of economic growth. But whereas these ideas of, say, *general* character, gain acceptance among the economists of the region, Latin American reality pushes them to go further, and to reflect on the *specific* problems of those countries. In particular, we speak of the balance-of-payments crises that, in those years (1940s–1950s), recurrently afflicted the region as a consequence of the same process of industrialization, followed by abrupt devaluations with their both regressive and recessive effects (Díaz Alejandro, 1963), and also inflationary consequences (Noyola Vázquez, 1956). These continuous oscillations in the levels of output, employment, and prices, which became known as stop-and-go cycles (Braun and Joy, 1968), were generally absent in developed countries; they were accordingly ignored, or at least minimized in their effects, by theorists of the center. In sum, by the beginning of the second half of the twentieth century it seems to have emerged with sufficient clarity that, differently from what normally happens

in those countries that have reached a certain level of economic development, Latin American, semi-industrialized, countries, present certain *structural features* that make external fragility a true “constraint to growth.”¹ And as a reaction to the inability of traditional theory to account for these problems, what would later be known as the structuralist school emerged, with a strong influence within the Economic Commission for Latin America and the Caribbean (ECLAC). Its main representatives advocated for the need to resort to nonorthodox measures to resolve the problems, in particular, contradicting the effectiveness of devaluation as a way to correct recurrent external imbalances.²

In this particular context of attempts and failures to consolidate the industrial sector, signed by highly fluctuating growth rates,³ Marcelo Diamand, on the basis of his analysis of the Argentine economy of the 1950s and 1960s, develops and presents his main contributions to economic theory (Diamand, 1972, 1973, 1977, 1978). Born in Poland in 1928, Diamand arrived in Argentina with his family in 1946. After he graduated as an industrial engineer from the University of Buenos Aires, he started working in his family’s business in the electronics sector. He soon became a successful representative of the national bourgeoisie, and even became a distinguished member of the Argentine Industrial Union (UIA), an association that still today gathers the country’s leading enterprises. He established himself in economic theory essentially as an autodidact, developing his thought independently of the influence of academic circles. However, and despite the potential disadvantages of his “nonrigorous” development, his role as a booming businessman led him to observe facts in an unprejudiced way and to detect with notable clarity the problems that afflicted postwar Latin American countries in their attempt to consolidate industrialization.

Diamand differs from others at the time who dealt with the same issues but emphasized a supposed lack of “internal savings” as the main problem behind insufficient industrial development,

¹ The phenomenon of external constraint to growth would later be formalized by Thirlwall (1979) to explain the divergences in growth rates even among developed countries, in what became known as Thirlwall’s law. At any rate, Thirlwall himself has acknowledged the influence of Prebisch in the development of his argument (see McCombie and Thirlwall, 2004, p. 7).

² See Bielschowsky (1998, pp. 26–27). This work is also useful for understanding the evolution of structuralist economic thought within ECLAC.

³ See Rapoport (2008, ch. 4 and 5) for a detailed analysis of the Argentine economy during this period.

and claimed that foreign capital was the solution (i.e., so-called developmentalist thought, represented in Argentina by leading figures such as Arturo Frondizi and Rogelio Frigerio but also finds strong support among ECLAC economists).⁴ Unlike them, Diamand underlines the obstacle caused by the “lack of foreign exchange,” in particular the inability of the industrial sector to export a portion of its production and generate the necessary resources for its own development. Behind this inability Diamand detects a persistent, structural problem, which labels the *imbalance of the productive structure*. He argues that this problem is generally absent in industrial countries, and hence impossible to solve with the theoretical tools developed in these economies. Diamand defines an unbalanced productive structure (UPS) as an economy in which two or more sectors operate under considerably different levels of productivity. This phenomenon: (a) impedes the sector with the lowest level of productivity from being competitive at the international level; (b) forces the UPSs to face a chronic scarcity of foreign exchange; and (c) cannot be eliminated by standard devaluations of the exchange rate. While this notion seems sufficiently “simple” to grasp at first sight, we shall see that it actually hides the author’s deep comprehension of the determinants of income distribution and the exchange rate in modern capitalist economies.

Before we examine Diamand’s contributions in greater detail, it is convenient to note first that, notwithstanding the originality of his thought, it is clear that his work is permeated by the influence of the historical context in which it developed, and hence it should be no surprise that it finds similarities with other theoretical contributions of that period. Beyond the coincidences between Diamand’s ideas and the general features that mark structuralist thought, the concept of UPS also bears some resemblance to the notion of “Dutch disease,”⁵ since behind both concepts is an underlying concern with the negative effect on the industrial structure caused by the appreciation of the currency. However, the fact

⁴On the distinctive features of developmentalist thought in Argentina, see Rapoport (2008, pp. 456–462).

⁵This, let us recall, refers to the negative effect of exchange rate appreciation on the competitiveness of the industrial sector; which is, in turn, caused by the discovery of some natural resource, or by any other factor that boosts an extraordinary inflow of foreign currency (see Corden and Neary [1982] for a formal presentation of this idea).

is that the Dutch disease is usually a problem of *already* industrialized economies that face a certain pressure to reprimaritize their economic structure. The problem of UPSs, on the contrary, is a specific feature of developing countries. As mentioned, this is strictly related to their attempt, with the aim of achieving the full employment of labor and closing the gap with developed countries, to overcome their primary-based structure, and instead initiate a path toward industrialization. The fundamental implication of this difference is that, while in the first case the economic-policy prescriptions point in the direction of avoiding appreciation of the national currency, in the second case, Diamand will argue, the optimal exchange rate policy involves *exchange rate differentiation*.

Moreover, the idea of exchange rate differentiation is not the exclusive domain of Diamand's thought. It is found, for instance, in Kaldor (1965), who, following the Lewisian tradition (Lewis, 1954), highlights the existence of a gap between industrial and agricultural productivities in developing countries, and suggests the introduction of a multiple exchange rate system as a solution. We also find this same idea in Latin American scholars, such as Daniel Schydowsky (1967), whose work involves hypotheses similar to those endorsed by Diamand.⁶ In fact, Diamand explicitly admits the influence of both scholars in his writings (e.g., Diamand, 1972, p. 42; 1978, p. 28). However, the Argentine author presents this distinctive feature of the Latin American economies within a comprehensive macroeconomic framework, and highlights with particular clarity the role played by both the determinants of income distribution and the exchange rate in this explanation. It is the aim of this article to examine and assess Diamand's ideas, and to show that they stand on strong ground when rigorously formalized.

The unbalanced productive structure

As mentioned at the beginning of this paper, Diamand's contributions to economics revolve mostly around the concept of UPS, and are specially focused on the experience of the Argentine economy of the 1950s and 1960s. We turn to a closer examination of the notion of UPS.⁷ A UPS is characterized by having

⁶We thank an anonymous referee for this reference, which had escaped our attention.

⁷This section is based on Dvoskin and Feldman (2015).

two (or more) sectors that work under considerably different productivity conditions: on one hand is the primary sector (in the case of Argentina, the agricultural sector), capable of producing at the level of international prices owing to the high fertility of its land. On the other hand is the industrial sector, whose costs are considerably higher than those prevailing at the international level. The emergence of UPSs is caused by the need to develop the industrial sector in primary-exporting economies as a way to achieve the full employment of labor, to diversify their productive structure, and, finally, to take advantage of the productivity gains typically associated with industrialization (Diamand, 1972, p. 25).

Within a UPS, the external sector initially exerts a “chronic limitation”⁸ (Diamand, 1972, p. 26); according to the argument, the increase in output and employment is fostered mainly by development of the domestic, market-oriented industrial sector. However, the sustainability of this process requires increasing quantities of imports, and hence of foreign currency. This is because industrialization in developing countries is *incomplete*, namely, there are “holes” in the input–output matrix that force the economy, in order to increase production, to rely on imports of capital goods and “inputs of widespread use.” However, given the low level of industrial productivity, foreign currency can *only* be provided by the primary sector, whose production is, however, constrained either by demand, by supply factors, or both. While in earlier stages of economic expansion import-substitution simultaneously allows the external sector to be in equilibrium, the virtuous process becomes “increasingly slower” (Diamand, 1972, p. 26). Eventually, the rate of growth of the economy surpasses a certain threshold, thereby leading to a growing “divergence” (Diamand, 1972, p. 26) between the industrial sector’s need for foreign currency and the agricultural sector’s capacity to provide it. The country eventually exhausts its foreign exchange reserves, and economic authorities are therefore forced to devalue the domestic currency to restore the external balance.

Diamand argues that according to traditional theory, a devaluation should allow balance-of-payments equilibrium to be reached through the action of an “automatic mechanism” (Diamand, 1973, p. 38) or “price effect” (Diamand, 1978, p. 27); that is, through

⁸Quotations have been translated into English by the authors.

a sufficient *fall in the real wage* rate that induces both an increase in exports and a fall in imports. The working of this mechanism, the argument follows, presumes that while productivity levels among countries can well differ to a considerable extent, commodity prices within each national economy, measured to a common standard such as the dollar, “turn out to be approximately equal” (Diamand, 1972, p. 32). The reason is that

the exchange rate is settled at precisely the level where the price of industrial commodities expressed in dollars is equal to the international level. Thanks to this adjustment mechanism, international trade can operate and countries with different levels of productivity such as Korea compared to the United States can trade their products. (Diamand, 1972, pp. 32–33)

In other words, traditional theory explains international trade through the action of the well-known purchasing power parity condition. As Diamand explains, the latter

assumes that the exchange rate parity between two countries must be such that their internal prices are equal, since if the exchange rate does not satisfy this relationship, the result would be trade flow that unbalances a country’s balance of payments. The country in question will be forced to devalue its currency, so that an equilibrium situation featured by the equality of internal prices would be achieved. This is precisely the previously described mechanism that allows different countries to trade with each other, in spite of differing productivities. (Diamand, 1972, p. 38)

The determinants of income distribution

We now consider Diamand’s criticisms of what he calls the “traditional paradigm” of economics (Diamand, 1978, p. 21). In his view, traditional theory has forgotten, or simply ignored, that the action of the above-mentioned “price effect” is valid *only* in the case of a *balanced* productive structure (BPS), namely, in economies in which productivity differences across sectors are rather small. “The fact that the automatic external balance is valid only within the balanced productive structures is mentioned neither in treatises nor in books, almost all of which are written in industrial countries” (Diamand, 1973, p. 38). Diamand offers two reasons to justify why the price effect fails to work in UPSs. First, the development of the industrial sector in these economies

presents a specific feature that prevents the mechanism from fully working its effects.

The action of the mechanism that leads to the equalization of the internal purchasing powers is based on the implicit premise that there is no protective regime, since only in this case price inequality is translated into an increase of imports. In unbalanced productive structures, born under the shelter of protection, the premise of free trade is not fulfilled

Industrial development in countries like Argentina involves the deliberate abandonment of comparative advantages, the creation of an imbalance within its productive structure, and fostering of the industrial sector, that is ... the sector with lower relative productivity. (Diamand, 1973, pp. 15–17)

Second, Diamand argues that “belief in the balancing capacity of market forces is based on two unrealistic and implicitly assumed premises” (Diamand, 1978, p. 21). In the first place, according to traditional thought, “*real wages are not an objective but an equilibrating variable to be adjusted according to market forces.*” (ibid., original emphasis unless otherwise noted). In the second place, traditional theory assumes that the adjustment of real wages “*is sufficiently effective so as to avoid unemployment*” (ibid., p. 22). However, Diamand continues, the real wage should not be treated as an “equilibrating variable,” since

in the real world, any attempt to diminish real wages runs into great resistance. The social pressure which always appears in support of higher real wages becomes multiplied in intensity when it finds opposing measures designed to lower them. Psychologically, the level once achieved by real wages becomes a “normal” standard of reference and its reduction is felt as an attempt against acquired rights. Therefore, *while economic thought treats real wages as an equilibrating variable to be adjusted according to the forces of the market, to modern society their preservation is a fundamental objective.* (Diamand, 1978, p. 22)

We should note, albeit largely implicitly, that the target of these criticisms is the neoclassical approach to prices and distribution. Indeed, the issue is not so much that the real wage is treated as an endogenous, “equilibrating” variable. Rather, what is at stake here is whether, under unemployment, this variable will *react sufficiently* so as to compensate for productivity differences among

countries and, hence, allow the principle of comparative advantages to fully operate. Only neoclassical theory, with its supply-and-demand explanation of distribution, claims this; nothing of the sort is to be found, for instance, in the classical Keynesian approach formalized in relatively recent years by Sraffa and his followers (Garegnani, 1984). Indeed, the latter approach stresses the same institutional and political aspects highlighted by Diamand to explain the determinants of real wage.⁹

Trends in income distribution, output, and the price level in UPSs

The fact that the price effect does not work in UPSs has important consequences for their income distribution trends, price levels, and aggregate output. For unlike the BPS, where currency devaluation would allegedly allow the increase of exports, and through import substitution, also the decrease of imports—in other words, the devaluation allows an increased share of net exports in output and, at least when there is unemployment and idle capacity, it also has an *expansive* effect on the level of output—in UPSs external equilibrium is reached, but essentially through the *contraction* of the level of economic activity, owing to the working of what Diamand calls “the income effect.”¹⁰

To understand how this mechanism works, we must first note that, in the author’s view, in UPSs the parity of the exchange rate is generally settled around the level that allows equalization of internal costs and external prices of the sector with the *highest* productivity. This decision, however, does not respond to any “objective,” that is, market law, but it is rather “a totally free choice that implies, consciously or unconsciously, certain economic objectives” (Diamand, 1972, p. 40), with the implication, at least in UPSs, that the level of the exchange rate is not determined by market forces but, like real wage, it is influenced mainly by institutional and political factors.

⁹ Even when real wage is treated as an endogenous variable within the classical approach, these institutional factors manifest themselves, as Sraffa (1960, p. 10) has argued, “in devious ways,” for example, by setting a minimum threshold below which the real wage cannot fall, namely, a level that allows the subsistence of workers under the given historical and social conditions considered.

¹⁰ See also Krugman and Taylor (1978) for the negative impact of devaluations on the level of domestic output.

At that level of the exchange rate, however, domestic normal relative prices (i.e., costs of production) in the industrial sector are considerably higher than selling prices prevailing in the international market. Hence, given the large differences in productivity across sectors, a devaluation of the currency will not succeed in increasing the level of industrial exports. Moreover, agricultural exports will not substantially increase either, because their supply is essentially rigid in the short term, or, alternatively, because their demand is highly inelastic. Then, devaluation limits itself to increasing both the level of prices faced by the exporting agricultural sector and, through its effect on the prices of imported inputs, the prices of the commodities produced by the industrial sector. In the short term, the rise in price level—which, caused by the devaluation of the currency, Diamand (1972, p. 28; 1978, p. 26) calls “exchange rate inflation”¹¹—causes a significant fall in the real wage rate, generating, in turn, a considerable redistribution of income in favor of the other social classes. Given that workers have a higher propensity to consume than capitalists, the redistribution of income reduces internal aggregate demand, hence reducing output and imports to a level compatible with the equilibrium of the current account.¹²

Diamand asserts that in some cases, had it been persistent enough, the reduction in real wages could eventually have exerted

¹¹ Exchange rate inflation is a particular case of *structural* inflation, which is the outcome of the emergence of bottlenecks in the external sector due to the lack of foreign currency. Diamand (1978, p. 23) also uses the term “bottleneck inflation” to refer to this kind of inflation. Note that, as the author himself declares, exchange rate inflation differs from *demand-pull inflation*, since the former coexists with a recession. It is also a different phenomenon from *cost-push inflation* because it does not originate in a distributive conflict.

¹² In Diamand’s view, aggregate demand is also reduced for the following reason: higher prices cause “monetary illiquidity” because the Central Bank refuses to passively accommodate the supply of money for the new, higher needs caused by the increased internal prices, but rather allows the rate of interest to increase. However, the mechanism through which this illiquidity causes a fall in the output level is unclear. Diamand is probably thinking of a fall in the level of private investment due to the increase in the rate of interest. The mechanism that links the rate of interest to investment decisions will not be discussed here since it has been shown to be empirically very weak (see Chirinko, 1993) and, moreover, it lacks solid theoretical foundations (see Petri, 2004, ch. 7). In any case, none of the fundamental aspects of Diamand’s framework depend on the existence of an inverse relationship between the rate of interest and private investment.

Table 1
Distinctive features of balance and unbalanced productive structures

Productive structure	Adjustment mechanism	Role of the exchange rate	Effects of a devaluation on output	Effects of a devaluation on the real wage rate
Unbalanced	Income effect	Equalizes internal cost and international price in the sector with the highest productivity	Contractionary in the short run, neutral in the long run	Negative in the short run, neutral in the long run
Balanced	Price effect	Equalizes internal costs and international prices in all sectors	Expansionary	Decreases permanently

a positive effect on the level of exports,¹³ thus relaxing the external constraint on growth. Persistent real wage reduction, however, is not observed in practice, with the further consequence that the external equilibrium becomes a purely *transitory* phenomenon. In effect, after sufficient time, Diamand argues, workers will succeed in reestablishing their initial real wage by struggling for increases in the nominal wage. They also successfully resist the initial rise in unemployment: they push for expansionary economic policies, with the consequence that “this procedure neutralizes the regressive and recessive effect on which external equilibrium has been based” (Diamand, 1978, p. 27). “Therefore,” Diamand concludes,

Governments have no other choice than to push for (or to admit) a further devaluation. Real wages drop again, as do the levels of monetary liquidity, demand and employment; popular pressures gain new momentum and so on, in the fashion of the inflationary-recessive spiral already described, with inflation rates which can skyrocket to several hundred percent a year. (Diamand, 1978, pp. 27–28)

Table 1 summarizes the distinctive features both in BPS and UPSs, according to Diamand’s view.

To conclude our characterization of Diamand’s thought, it should be observed that the scarcity of foreign exchange plays

¹³This is what happens, according to Diamand, when there are supply constraints on agricultural production. In this case, he writes, “If society were prepared to endure indefinitely the sacrifice of a strongly regressive income redistribution imposed on it, primary production and consequently exports could rise.” When exports are limited by world demand, however, “not even in the long run does the sacrifice stimulate exports” (Diamand, 1978, p. 27).

two *complementary* roles in Diamand's explanation of the dynamics in income distribution, output, and inflation in the UPSs, and that are somehow intertwined in his explanation of these phenomena. On one hand, the recurrent scarcity of foreign-exchange reserves is at the heart of Diamand's explanation of the stop-and-go cycles faced by the UPSs. On the other hand, while in his writings Diamand seems to envisage exports as the main determinant of aggregate output, he does accept that "the role of exports is not to substitute this consumption [internal consumption, both public and private—A.D. and G.F.], but to provide the necessary 'fuel' for it to grow" (quoted by Chumbita, 1989, p. 8). The implication is that the availability of foreign currency generated by the growth of the agricultural sector determines not an attractor of the actual growth rate, but rather a sort of *upper boundary to growth*, namely, the maximum rate the economy can attain in the long term. Finally, we note that such a boundary will generally be reached much before these economies achieve the full-employment of labor.

A formal reconstruction of Diamand's thought

In this section we provide a formal representation of Diamand's notion of unbalanced productive structure, exchange rate inflation, and external constraint to growth. We adopt a classical Keynesian framework of prices, distribution, and growth because the notion of free competition assumed within this approach only implies the tendency to a uniform rate of return on capital, and is therefore compatible with Diamand's idea that both the real wage and the real exchange rate are not variables exclusively determined by "market forces," but instead are mainly influenced by political and cultural factors that depend on the historical period under consideration.

Value and distribution

We begin with income distribution and relative prices. Following Diamand, we consider a two-sector economy, the agricultural (A) and the industrial (I) sectors, and two social classes defined by their role in the production process: workers and capitalists.

To simplify the exposition, it is assumed that commodity A is produced by means of labor on land of homogeneous quality; and to focus on the division of output between workers and capitalists, we further assume that the land is not scarce and neglect absolute rent; wages are paid in advance. On these bases,

the supply price of **A** (p_A^s), namely, the minimum price necessary to normally produce commodity **A**, is determined by:

$$p_A^s = wl_A(1 + r), \tag{1}$$

where w is the nominal wage rate, l_A is the quantity of labor per unit of output, and r is the normal rate of profits.

Let us now turn to the industrial sector. Besides labor, the sector employs an imported input M in the quantity b per unit of output, whose demand is inelastic because it cannot be substituted by domestically produced inputs, whatever the level of the exchange rate. With advanced wages, the supply price of **I** (p_I^s) is given by:

$$p_I^s = [wl_I + bEp_M^*](1 + r), \tag{2}$$

where E stands for the nominal exchange rate.

The system of Equations (1)–(2) has five unknowns: p_A^s, p_I^s, E, w, r . There are, therefore, three degrees of freedom to “close” the system. First, we follow Diamand and assume that real wage is given by historically determined factors. If the consumption bundle of workers consists of \bar{c}_A units of A and \bar{c}_I units of I , this means that the money wage is determined by the following condition:

$$w = p_A^d \bar{c}_A + p_I^d \bar{c}_I. \tag{3}$$

In the above equation, p_A^d and p_I^d stand, respectively, for the demand or selling prices of A and I . The reason why these prices, and not p_A^s and p_I^s , are the prices consumers must pay in order to get commodities A and I , and hence, why they represent the relevant prices for them to make their consumption decisions, is the following: both A and I are internationally traded commodities, whose world prices, p_A^* and p_I^* , are exogenously given for the domestic economy. Precisely, p_A^d and p_I^d are obtained by expressing commodities’ world prices in terms of domestic currency. We thus obtain the following “demand-price” conditions (DPC):

$$p_A^d = Ep_A^*, \tag{DPC1}$$

$$p_I^d = Ep_I^*, \tag{DPC2}$$

and commodities A and I will be domestically produced if these demand prices cover the respective cost of production (i.e., $p_A^d \geq p_A^s$ and $p_I^d \geq p_I^s$). We will return to this condition below.

To eliminate the second degree of freedom we measure prices in terms of the following numéraire:

$$p_A^s + p_I^s = 1 \quad (4)$$

To close the system, we set the value of exchange rate E to formalize the concept of an *unbalanced productive structure*. This is legitimate if we recall that once we abandon the explanation of income distribution in terms of the forces of supply and demand, it must be admitted that the existence of “objective laws to fixing the exchange rate is illusory” (Diamand, 1972, p. 34) and hence, the fixing of E “is a totally free choice that implies certain economic objectives” (ibid., p. 40). To do this, we must first recall that commodities A and I will be domestically produced if their selling prices cover the respective costs of production (i.e., the supply prices, p_A^s and p_I^s). We can therefore define E_A and E_I as the lowest values of the exchange rate that allow the domestic economy to engage in production of A and I , respectively. These values must satisfy the following “effective-production” conditions (EPC):

$$E_A p_A^* = p_A^s, \quad (\text{EPC1})$$

$$E_I p_I^* = p_I^s. \quad (\text{EPC2})$$

If we put (1) into (EPC1) and (2) into (EPC2) we obtain the values E_A and E_I :

$$E_A = \frac{wl_A(I+r)}{p_A^*}, \quad (\text{ER1})$$

$$E_I = \frac{wl_I(I+r)}{p_I^* - bp_M^*(I+r)}. \quad (\text{ER1})$$

To formalize the concept of an unbalanced productive structure, it is finally necessary to assume that the value of the exchange rate that allows commodity A to be produced for the international market is lower than the value of E that allows commodity I to be produced and exported, that is, $E_A < E_I$. This implies that the following “unbalanced-productive-structure” condition (UPSC) must hold:

$$\frac{l_A}{l_I} < \frac{p_A^*}{p_I^* - bp_M^*(I+r)} \quad (\text{UPSC1})$$

That is, $E_A < E_I$, if the ratio of agricultural to industrial labor coefficients is lower than the ratio of the respective international prices (which must be considered net of imported inputs needed to produce commodity I). In this respect, we follow Diamand and assume that, thanks to “the special advantages of nature [the agricultural sector] has particularly high productivity” (Diamand, 1972, p. 33). Hence, *ceteris paribus*, we assume that the labor coefficient in the agricultural sector is sufficiently small for the (UPS1) condition to hold.

In turn, note that if we fix the value of E within the interval $[E_A, E_I)$ only commodity A will be competitive in the international market, while it will not be profitable for I to be domestically produced. Therefore, we fix the exchange rate so that:

$$E \in [E_A, E_I). \quad (\text{UPS2})$$

In particular, we follow Diamand and assume that the exchange rate is fixed “on the basis of the sector with the highest productivity” (Diamand, 1972, p. 33), that is, to equalize selling price and cost of production in the agricultural sector. This gives us the necessary condition to close the system:

$$E = E_A. \quad (5)$$

Condition (5) can be read as follows: if we define e_A as the real exchange rate faced by the agricultural sector, we have $e_A \equiv \frac{Ep_A^*}{p_A^S}$. Hence, e_A can be interpreted as a sort of agricultural competitiveness index (ACI). According to the closure imposed by condition (5), therefore, the nominal exchange rate is fixed so that $e_A = 1$, namely, the exchange rate is set at the minimum value that allows the agricultural sector to engage in production. Moreover, if we put condition (1) into e_A we obtain the following expression for e_A :

$$e_A = \frac{Ep_A^*}{wl_A(1+r)}, \quad (\text{ACI})$$

which, for a given money wage, implies a positive relation between E and r .

But given that condition (5) implies that commodity I cannot be profitably produced by the domestic economy (recall that condition [EPC2] is not fulfilled when $E < E_I$), we further assume, also in line with Diamand’s writings, that sector I “was born under the shelter of protection” (Diamand, 1973, p. 15). That is, we assume that the production of I is profitable because the government imposes either

economic measures (e.g., a tariff on imports of I) or, simply, extra-economic restrictions on imports of I . If we assume that imports of I are banned, the implication is that condition (DPC2) is no longer relevant to determine I 's demand price, which is now directly determined by domestic production conditions, that is, by condition (2).¹⁴

The configuration (1)–(5) formalizes the concept of unbalanced productive structure discussed above, namely, the coexistence of two sectors with considerable productivity differences, which can be summarized in the following two “unbalanced-productive-structure” conditions:

$$p_A^s \leq Ep_A^*, \tag{UPSC2}$$

$$p_I^s > Ep_I^*. \tag{UPSC3}$$

Before we move to a consideration of how quantities are determined in the model, several remarks are in order. First, note that the role of the exchange rate in system (1)–(5) is to “fix,” so to speak, income distribution. However, without further information, the level of E determined by condition (5) does not tell us anything about the behavior of aggregate quantities, that is, the level of E

¹⁴ As an anonymous reviewer has noted, Diamand also addresses another implication of the fact that “industry was born under the shelter of protection”: some sectors were obliged to employ domestically produced inputs even though the latter could be bought abroad at lower prices. This implied higher production costs for the former, hence a further reason for the low competitiveness of these sectors relative to the rest of the world. The main implication of this consideration is that the value of E_I would increase relative to a situation in which there are no import restrictions on capital goods. We could easily incorporate this feature into the model. For instance, assume that, besides commodity M , each unit of I employs 1 unit of a domestically produced input, N , and that each unit of N is in turn produced by l_n units of labor. N 's supply price is given by $p_N^s = wl_n(I+r)$, while its demand price is given by $p_N^d = Ep_N^*$. Then, if local producers were forced to buy commodity N domestically, I 's supply price would be: $p_I^s = [wl_I + bEp_M^* + wl_n(I+r)](I+r)$, whereas had they been allowed to import commodity N , this price would be: $p_I^s = [wl_I + bEp_M^* + Ep_N^*](I+r)$. We now label E_I^I and E_I^E as the exchange rates of industry that equalize selling and supply prices when imports of N are, respectively, allowed and banned. By simple algebraic manipulations it can easily be shown that the required exchange rate under import restrictions is higher, hence the competitiveness gap relative to the rest of the world of the industrial sector is higher, if given international prices and the rate of profits, the labor coefficient l_n is sufficiently high: $E_I^E > E_I^I$ if and only if: $\frac{l_n}{l_I} > \frac{p_M^*}{p_I^* - (1+r)(bp_M^* + p_N^*)}$. It is also clear that the consideration of this aspect of the problem has only the effect of increasing the difference between E_A and E_I ; hence it does not alter the main results, since it is still the case that the fact that the exchange rate is determined by condition (5) implies that only sector A will be internationally competitive.

may not be consistent with the condition of sustainability of the balance of payments, as we will discuss below. Second, and in connection with the previous remark, note that the notion of UPS can only be defined “ex post,” that is, once relative prices, and hence income distribution, have already been determined. We will come back to this point in the concluding section, when we assess the limits and scopes of Diamand’s contributions to economics.¹⁵ Third, once the real wage and the real exchange rate are given, the rate of profits, r , emerges as an endogenously determined variable in the system. This rate, we incidentally note, need not coincide with the international rate, which is a plausible outcome if we consider that Diamand writes the bulk of his contributions in a historical context of strong capital controls.¹⁶

As a final remark, we define the real exchange rate faced by the industrial sector, $e_I \equiv \frac{EP_I^*}{P_I^S}$. As a mirror to e_A , e_I defines the industrial real exchange rate as a sort of industrial competitiveness index. It has already been assumed that the domestic industry is not competitive in foreign markets ($e_I < 1$, see condition [UPSC3]), hence the above-mentioned need to rely on some sort of extra-economic “restriction” on imports in order to enable the domestic sector to produce commodity I . Therefore, note that a devaluation of the currency manages to improve the degree of competitiveness of the industrial sector as long as it allows a rise in the industrial real exchange rate. Putting (2) into e_I we obtain a condition that determines the competitiveness of industry in terms of the nominal exchange rate, E :

$$e_I = \frac{P_I^*}{\left[\frac{w}{E}l_I + bp_M^*\right](I + r)} \quad (\text{ICI})$$

It follows from condition (ICI) that a rise in E manages to raise the industrial exchange rate only to the extent that it reduces either the rate of profits or the domestic wage expressed in foreign currency. In other words, one can observe that, given productive techniques and the money wage, there is a trade-off between the real exchange rate and the real wage (and a positive relation between the real exchange

¹⁵ In particular, had the exchange rate been higher, that is, $E = E_I$, and there is no a priori, *general* reason why this should not have been the case, production of I for the international market would have been possible.

¹⁶ In Diamand (1985), the specific problems raised by free capital mobility, and the possibility of setting capital controls to solve them are discussed. We expect to examine these issues with the same tools used in this paper in a future article.

rate and the rate of profits).¹⁷ We shall return to this point later, first when we examine the contractionary effects of a devaluation endorsed by Diamand in terms of the model presented above; and then, when we study the potential solutions to overcome the limits to economic growth imposed by foreign-exchange scarcity.¹⁸

Quantities

As an intermediate step to examine stop-and-go cycles and the limits to growth in terms of our model, we explain how quantities are determined.¹⁹ Diamand's rejection of the view of real wage as the variable

¹⁷ Let us recall that, *ceteris paribus*, from conditions (3) and (DPC1)–(DPC2) it is clear that there is a one-to-one relationship between the wage expressed in dollars and real wage.

¹⁸ A final remark may be worth making: in order to focus on the division of income between workers and capitalists, we have assumed land of homogeneous quality. Hence, we abstract from differential rent. To formalize this kind of rent within our model, we should have considered, for instance, heterogeneous land, say of two different qualities $k = 1, 2$. We would therefore have two supply prices of A ($p_{A,k}^s$), one for each kind of land: $p_{A,k}^s = w l_A^k (1 + r)$, $k = 1, 2$, with l_A^k the amount of labor employed on land k . The implication would be that the equality between supply and demand prices in the agricultural sector established by condition (5) would only hold for land of the “worst” quality, say land of quality $k = 2$, whereas for land of quality $k = 1$, precisely a differential rent per unit of output (ρ_A^D) would emerge, in this case, determined by the difference in productivity of the two pieces of land within the domestic economy. The condition for differential rent would therefore be $\rho_A^D = p_{A,2}^s - p_{A,1}^s$. For simplicity, we abstract from this issue here without affecting the main results (see, however, below where some implications of this kind of rent are considered). For an explicit treatment of differential rent within Diamand's thought, see Crespo and Lazzarini (2015). See also Dvoskin and Feldman (2010).

¹⁹ An anonymous referee has note that Diamand himself, in a paper with Crovetto (1988), formalizes the behavior of quantities in a UPS (the distributive sphere is not formally discussed). However, that presentation has some drawbacks. In particular, investment there is treated as purely autonomous. A first implication is that when exports rise, investment does not follow, and hence the economy eventually reaches the normal level of capacity utilization where a curious trade-off between investment and exports exists. Another problem is that because exports do not cause investment to rise, in the authors' model the rate of growth of the economy depends only on the rate of growth of investment. But why would investment, hence output, increase when the economy reaches the normal level of capacity utilization? Furthermore, why would there be any incentive to raise investment demand when capacity is below its normal level? The treatment of investment as a fully autonomous variable might be accepted in the short term, but it is hard to accept in a model which aims to describe more persistent tendencies, as the idea of UPS aims to capture. Finally, the normal level of capacity utilization is, without justification, assumed to be the full-employment level. But in capitalist economies the tendency of capacity utilization to be normally utilized is *always* at work because it is another aspect of the tendency toward a uniform rate of return on capital, and this does not imply the tendency toward labor full-employment. In our

that equilibrates supply and demand for labor implies that he rejects, as well, the idea that production is determined by the level of full-employment income. We formalize this by assuming that production is driven by the autonomous components of effective demand. In the case of the agricultural sector, the level of output, Q_A , is determined by aggregate workers' consumption, C_A , and exports, X_A (for simplicity we assume that capitalists do not consume):

$$Q_A = C_A + X_A, \quad (6)$$

where $C_A = c_A[l_A Q_A + l_I Q_I]$ and Q_I stands for the aggregate level of production of the industrial sector, we have:

$$Q_A = \frac{I}{I - l_A c_A} [l_I Q_I + X_A]. \quad (7)$$

Therefore, given the level of real wages and the dominant technique, and given the proportion of real wage devoted to agricultural products, A 's aggregate production depends on the output level of I , and on the level of agricultural exports.

In the case of the industrial sector, the level of production Q_I is determined by domestic absorption, which is equal to the sum of aggregate workers' consumption C_I , private investment I_I , and public expenditure G_I .²⁰

$$Q_I = C_I + I_I + G_I, \quad (8)$$

where $C_I = c_I[l_A Q_A + l_I Q_I]$, it is further assumed that private investment is induced by aggregate income, in-line with the flexible accelerator principle.

$$I_I = (d + g_I)vQ_I, \quad (9)$$

where v is the capital output ratio given by the dominant productive technique, and d is the depreciation rate, putting (7) and (9) into (8), we derive an expression for the level of production of the industrial sector analogous to a "supermultiplier" relationship:²¹

formalization all these shortcomings are avoided, first, by treating investment as fully induced by the accelerator principle and second, by not identifying normal and full capacity utilizations. Hence, our presentation is more general.

²⁰As we have seen, Diamand accepts that internal consumption, both private and public, are relevant components to determine aggregate effective demand.

²¹For a detailed description of the supermultiplier model in a classical perspective, see Serrano (1995) and Bortis (1999, ch. 4).

$$Q_I = SM * \left[\frac{l_A X_A}{I - l_A c_A} + G_I \right]. \tag{10}$$

With $SM \equiv \frac{I}{I - \frac{l_A l_I c_I c_A}{I - l_A c_A} - l_I c_I - (d + g_I)v}$, note that $\frac{\partial SM}{\partial c_j} > 0, j = A, I$.

The supermultiplier defines a relationship between the level of production and the level of aggregate demand that goes from the latter to the former. Equation (10) shows that, given workers' composition of consumption (i.e., c_I and c_A), the level of industrial production is determined by two factors: public expenditure (G_I), and agricultural exports, which stand as the two autonomous components of aggregate demand in our model. If we further assume that c_A and c_I do not substantially change with economic growth, the rate of growth of industry, g_I , is driven by the rates of growth of public expenditure, g_I^G , and exports, g_A^X .

$$g_I \cong \alpha_G g_I^G + \alpha_A g_A^X, \tag{11}$$

where, α_G and α_A stand, respectively, for the shares of G_I and X_A in output.

Finally, we characterize the behavior of the external sector. Assuming the absence of capital mobility, the balance of payments **BP** is defined by the sum of the current account (in this case, only by the trade balance):

$$BP \equiv X - M. \tag{12}$$

Clearly then, the condition for sustainability of the balance of payments is:²²

$$BP \geq 0. \tag{13}$$

The level of imports is determined essentially by the level of industrial production, which demands inputs of widespread use and capital goods to keep up with normal operation. It is precisely for this reason that, given the dominant technique of production in industry, the rate of growth of imports is equivalent to the rate of growth of the former:

$$\begin{cases} M = bQ_I \\ g_M = g_I \end{cases} \tag{14}$$

²²Or some negative value if the economy has a positive level of initial reserves.

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From conditions (13) and (14) it follows that the condition for sustainability of the balance of payments implies that the rate of growth of sector I is limited by the rate of growth of agricultural exports (g_A^X). In other words, the rate of expansion of agricultural exports imposes a maximum for the rates of growth of industrial production and employment levels:

$$g_I^{MAX} = g_A^X. \quad (15)$$

Note that this condition closely resembles the so-called Thirlwall's law (Thirlwall, 1979). (The general form of the law is $g_I^{MAX} = g_A^X/\pi$, where π represents the income elasticity of imports. In the case under consideration, with a linear import function, π is equal to 1). However, given that, besides exports, our model considers other autonomous components of aggregate demand (G_I), the rate of growth of output that emerges from condition (15) should *not be read* as an attractor of the actual rate of growth, but rather, as a sort of *upper boundary* of the latter.

The external constraint: stop-and-go cycles and limits to growth

In our model, to understand how the external constraint affects the dynamics of the business cycle in UPSs, we should first examine the distributive effect of a devaluation of the currency. Suppose that we are in a long-term position with a given nominal wage $w = \bar{w}$ that allows workers to buy their historically determined consumption bundle, that is, initially condition (3) holds. Now, when the nominal exchange rate rises, the selling prices of A and I rise as well (see conditions [DPC1] for commodity A and [2] for I). This phenomenon represents what Diamand denominates "exchange rate inflation."

As a result, for a given nominal wage, \bar{w} , the initial effect of a devaluation is to force a decrease in the real wage. In particular, since the food component of the consumption bundle can be assumed to be less sensitive to changes in monetary prices, the consumption of industrial goods diminishes, with the implication that in the *short term*, variable c_I is the main adjusting variable of the system²³:

²³ Cf Diamand (1977, pp. 19–20). From a classical perspective, one could associate the food component of the consumption bundle with the subsistence wage, and the industrial component with the part of the wage that participates in social surplus.

$$c_I = \frac{\bar{w} - p_A^d \bar{c}_A}{p_I^d}. \quad (16)$$

We now explore the implied macroeconomic tensions that emerge as an endogenous response to the pace of industrial production expansion. As we have already seen, Diamand notes that with the growing of the industrial sector, the higher rate of import growth, rather than exports, causes a continuous drain on reserves, which eventually causes an external “bottleneck,” namely, a level of imports that is higher than the capacity of agricultural exports to generate foreign exchange. In terms of the model, with the pace of capital accumulation, the “distributive closure” imposed by conditions (3) and (5) eventually becomes incompatible with the sustainability of the balance of payments (condition [13]). When the loss of foreign reserves is no longer sustainable, the monetary authority is forced to devalue the currency to stop the drain. In other words:

$$X - M \leq 0 \rightarrow \Delta E. \quad (17)$$

This solves, in the short run, the external imbalance, *but only through a contraction of economic activity*, and therefore, of imports. Indeed, the erosion of real wages leads to a lower effective demand for industrial goods by workers— c_I —and diminishes according to condition (16). Hence, there is a (temporary, see below) decrease in the multiplier SM given by condition (10). On the basis of expression (9), it is possible to see that this entails a reduction of industrial production, which implies a diminished level of imports (condition [14]). Therefore, the model captures all the typical features of the business cycle’s “stop” phase: devaluation followed by inflation, a reduction in real wages, and, finally, a recession. Indeed, note that whereas a lower wage in foreign currency promotes a transitory improvement in the industrial real exchange rate, condition (ICI), the initial competitiveness gap, relative to the rest of the world (UPS2), is *sufficiently important* to prevent the devaluation from stimulating industrial exports, and thereby, a rise of aggregate output through this channel.²⁴ In other words, it is assumed that the magnitude of the devaluation necessary to promote industrial exports will imply a *drastic* fall in

²⁴At any rate, however, even if we accept the rise in industrial exports, the decrease in internal consumption due to the decrease in real wage implies that the total effect on the production of I is a priori undetermined.

the real wage—so drastic that it would cause social reactions that impede the normal function of the economy.

But once the economy adjusts its demand for imports to the level implied by the external balance, a renewed “go” phase of the business cycle begins. To see this, we must remember that Diamand plausibly assumes that, at least over sufficiently long periods, real wage is determined by historical and institutional factors, with the implication that the nominal wage becomes endogenous to the real wage target (condition [3]).²⁵ In other words, both c_A and c_I are given over long time spans, and then the rise in the general price level that follows a standard devaluation fully passes through to the level of money wages. That is, the elasticity of real wage with respect to the nominal exchange rate, $\varepsilon_{w, E}$, is equal to 1, with the implication that standard devaluations have only *transitory* effects on the real exchange rate. The recovery of the money wage, and the consequent increase in c_I up to its predevaluation level, also prompts a recovery of the multiplier SM of (10) to its predevaluation level, with the consequent expansion of industrial production and imports, until the economy collides against the ceiling determined by the external constraint.

So far we have characterized the level effect of a devaluation. Now, when the focus is instead placed on longer-term developments, we must concentrate on the growth effects of a rise in the exchange rate, which should be reflected in a permanent relaxation of the external constraint (condition [15]). But, it should be clear that a standard devaluation does not modify any of the variables involved in that relation, with the implication that it is necessary to search for alternative measures to overcome the limits of sustained economic growth in UPSs. Indeed, on one hand, the income elasticity of imports (π) does not react to changes in relative prices: the increase in the price of the latter is thus unable to trigger a process of import substitution by domestic production. On the other hand, the rise in the nominal exchange rate is unable to accelerate either agricultural or industrial export rates of growth. Industrial exports do not rise because the devaluation cannot be sufficiently large to allow the industrial sector to produce for the international market. And agricultural exports do not rise either. The reason is

²⁵ The reason is that in the UPSs, which operate around a full employment level of production, there are powerful labor unions. This institutional context implies that wage resistance is strong under inflationary pressures.

that before devaluation, agricultural production was *already competitive* in the international market (see condition [UPSC3]), which means that world prices are determined by p_A^* and not by p_A^S . Hence, for a given money wage, the only effect of the rise in \mathbf{E} is to increase the rate of profits (see [ACI]), but this need not entail any effect on agricultural production. Furthermore, the price elasticity of agricultural exports may plausibly be expected to be rather small. Therefore, even if we assume that before the rise in \mathbf{E} , sector \mathbf{A} was not competitive in the world market, the effect on \mathbf{A} 's exports might be legitimately neglected. And, in any case, this pure "price effect" on exports is doomed to be transitory simply because the rise in the real exchange rate, and thus the implied reduction in the real wage, is transitory as well.

Solutions to the external constraint

It must still be proved that Diamand finds, via a multiple exchange rate regime, an effective solution to increase the level of industrial exports without affecting the real wage, hence overcoming the external constraint, as we have suggested at the beginning of the paper.²⁶ The challenges are: (a) to achieve persistent increases in the industrial real exchange rate to *reduce and eventually eliminate the competitiveness gap* with the rest of the world; the sector can start exporting and therefore generate the foreign exchange required for its development; and (b) to *avoid the decrease in the real wage*, with its contractionary effects, that generally follows standard devaluations. As such, a disconnection between agricultural and industrial exchange rates is needed. Moreover, if we

²⁶Note that, given the economy-wide import coefficient, determined by technical conditions, and consumption patterns, and given Diamand's (1978) reluctance to rely on capital inflows to compensate for current account deficits, the only way to relax the external constraint is to increase export levels. As to capital inflows, in fact, it is Diamand's view that they only allow postponement of the balance-of-payments crisis and the subsequent recessive adjustment, and, therefore, are unable to provide a definite solution for the problems faced by the UPSs. And, in the long run, they tend to worsen these problems since capital inflow in the form of foreign direct investment, and public or private foreign debt, cause a subsequent outflow of foreign currency in the form of utilities, dividends, and interest payments. This, in turn, requires a further inflow of foreign capital, thus generating an *explosive* spiral that, sooner or later, becomes unsustainable and forces a crisis (*ibid.*, p. 30). Of course, this is the case as long as these investments are not directed toward export-oriented sectors or sectors capable of substituting imports.

recall that the existence of “objective laws to fixing the exchange rate is illusory” (Diamand, 1972, p. 34), this disconnection is, in principle, perfectly possible from an economic standpoint, producing a relatively low rate of exchange for the primary sector and a higher exchange rate for the industrial sector.

In Diamand’s view, such a configuration of multiple exchange rates can be achieved in different ways:

1. through the establishment of an exchange rate that corresponds to the level of productivity of the industrial sector, plus the implementation of export tariffs;
2. by means of the imposition of an exchange rate that corresponds to the productivity level of the agricultural sector, plus the implementation of subsidies for the industrial sector; or
3. through the actual differentiation of the exchange rate by the establishment of a “commercial exchange rate” for exports, industrial inputs, and capital goods imports, and a higher, “financial exchange rate” for industrial exports.²⁷

Diamand concludes, “Leaving aside... the examination of the differences among these schemes, their common feature is the compensation of higher prices and internal industrial costs over the international level that constitutes the essential feature of unbalanced structures” (Diamand, 1972, p. 19).

We will next show how the abovementioned goals, (a) and (b), can be achieved through a devaluation coupled by the imposition of (i) a duty on agricultural exports and (ii) a subsidy on capital goods imports. To do this, we define E_0 and E_1 as, respectively, the pre- and postdevaluation levels of the exchange rate. Recall that the initial level of the exchange rate is $E_0 = E_A$ (condition [5]). Therefore, note that in order to reach goal (a), after the devaluation, condition (EPC2) must hold. That is, the rise in E must be such that $E_1 p_I^* = p_I^S$. If we (provisionally) assume that

²⁷ As Diamand explains: “We would have two basic exchange rates. On one hand, the nominal rate which would be used for financial transactions, industrial exports and, with the corresponding import duties (much lower than in the conventional system); also for imports. On the other hand, we would have the primary exchange rate for exports, determined by the nominal rate less export duties. This reform would bring the nominal exchange rate substantially closer to the structure of industrial costs and would improve the possibility of exporting manufactured goods. Another alternative or complementary procedure is to build up a de facto exchange system for exports with tax reimbursements and other fiscal stimuli” (Diamand, 1978, p. 31).

the rise in \mathbf{E} does not affect the supply price of I , \mathbf{E}_1 is given by the following effective production condition:

$$E_I = (wl_I + bE_0p_M^*)(1 + r)/p_I^*. \tag{EPC2'}$$

Now, we know that by itself this measure is insufficient to reach goal (b). First, because when \mathbf{E} rises, p_I^S also rises, because the price of \mathbf{M} is actually increased. Second, because the selling price of \mathbf{A} also rises. Both the increases in p_A^d and $p_I^S (= p_I^d)$ have the effect of decreasing the real wage to intolerable levels. To avoid this unintended outcome, it is necessary to complement the devaluation with a battery of measures. First, we introduce a subsidy μ that neutralizes the effect of the devaluation on the price of the imported goods \mathbf{M} , hence on the supply price of \mathbf{I} . The magnitude of the subsidy is given by the following condition: $E_1(\mathbf{1} - \mu) = E_0$. Therefore:

$$\mu = \frac{E_1 - E_0}{E_0}, \tag{18}$$

which implies that the supply price of I is now determined by:

$$p_I^S = [bE_1(\mathbf{1} - \mu)p_M^* + wl_I](1 + r), \tag{2'}$$

and, as such, does not change. Moreover, given that the subsidy allows the domestic price of the imported goods not to vary, condition (18) does give the relevant value of the final exchange rate, \mathbf{E}_1 , needed to make the industrial sector competitive at the international level.²⁸

Second, to avoid an increase in the selling price of \mathbf{A} , it is necessary to compensate the rise in \mathbf{E} by introducing an export tax, τ , whose magnitude must be such that, $E_1(1 - \tau) = E_0$, and hence:

$$\tau = \mu. \tag{19}$$

Equation (DPC1) must, accordingly, be modified as follows:

$$p_A^d = E_1(1 - \tau)p_A^*. \tag{DPC1'}$$

It is then clear that with the introduction of a tariff on agricultural exports, the relevant price of \mathbf{A} for domestic consumers does not suffer any changes. Moreover, the following point might be

²⁸ Note that the value of \mathbf{E}_1 determined by [EPC2] will be lower than \mathbf{E}_1 , determined by condition EPC2 because the latter takes the value \mathbf{E}_1 , and not $\mathbf{E}_A (< \mathbf{E}_1)$, as the former does, to determine the supply price of \mathbf{I} .

worth noting: as condition (19) shows, the magnitudes of the subsidy and the tariff coincide. However, when we consider the possibility that the agricultural sector works under conditions of differential rent (see n. 18), it is actually possible, at least in the most fertile lands, that the magnitude of τ exceeds the magnitude of μ , without affecting the normal profitability of the sector. Diamand, in fact, considers the possibility of establishing different levels of tariffs on different kinds of land to avoid the “unjustified transferences of income to the agricultural sector” (1972, p. 30) that usually take place with a devaluation when, in case agricultural production faces supply constraints, it is necessary to incorporate marginal lands for production.²⁹

In sum, the overall result of this battery of measures is, first, that the selling prices faced by consumers do not change, that is, the abovementioned goal (b) is fulfilled. And therefore, given that the real wage does not vary, the devaluation does not trigger a process of “exchange rate inflation.” The second result is that the industrial real exchange rate, e_I , given by condition (ICC) rises. The implication is that the increase in e_I closes the competitiveness gap with the rest of the world because now $e_I = 1$, and hence goal (a) is fulfilled too. Indeed, if e_I^I and e_I^O stand, respectively, for the pre- and post-real exchange rates faced by the industrial sector, we have by construction:

$$e_I^I = \frac{E_I p_I^*}{p_I^S} = 1 > e_I^O = \frac{E_0 p_I^*}{p_I^S}, \quad (\text{ICC}')$$

because the supply price p_I^S does not change, whereas the nominal exchange rate has increased. Given that a regime of multiple exchange rates allows the coexistence of high real wages and low money wages expressed in foreign currency, it is possible to break with the trade-off between the real exchange rate and the real wage that emerges under standard devaluations.

The effect on the quantities produced is straightforward: because the *I* sector exports part of its production now, g_I^{MAX} will go up, raising the maximum rate of growth compatible with the

²⁹ Among them, it is worth mentioning subsidies for purchasing inputs needed to increase production, or that allow the incorporation of marginal lands for production. Diamand also suggests the imposition of higher agricultural prices coupled with taxes on the differential rent obtained in the production of foodstuffs and subsidies to their consumption (Diamand, 1972, p. 40; see also 1978, p. 33).

external balance. It should be mentioned that, if this is the case, the factors now determining the maximum rate of economic growth are also those driving the effective growth of industrial production, since exports are now a new component of effective demand:

$$Q_I = C_I + I_I + G_I + X_I \tag{8'}$$

And the supermultiplier given by Equation (9) now takes the form:

$$Q_I = SM * \left[\frac{l_A}{I - l_A c_A} X_A + G_I + X_I \right]. \tag{10'}$$

Hence, the rate of economic growth is now a weighted average of the rates of growth of public expenditure and both agricultural and industrial exports:

$$g_I \cong \alpha_g g_G + \alpha_X g_X, \tag{18'}$$

where α_g and α_X reflect, respectively, the proportion of public expenditure and industrial and agricultural exports on output.

It must finally be remarked that in Diamand's (1972, p. 45) view, the imposition of a higher exchange rate for the industrial sector is not a measure that is necessarily permanent, as the industrial sector will eventually develop "dynamic comparative advantages"—namely, industrial productivity will usually increase endogenously as output increases (see Kaldor, 1966). Formally, we have:

$$I_I = f(Q_I), \text{ with } f'_{Q_I}$$

On the basis of Equation (2), *ceteris paribus*, p_I^S decreases, and given condition (ICI), e_I rises.

Concluding remarks: highlights and weaknesses in Diamand's thought

In this work we have explored Marcelo Diamand's contributions to economics, which essentially revolve around the concept of unbalanced productive structure. In summary, it might be useful to evaluate his work by identifying the highlights and weaknesses of his thought. If one were to identify the main problem in Diamand's contributions, it would lie in the consideration that

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he sometimes seems to envisage the degree of imbalance of the economic structure as a purely *physical* aspect of the economy under consideration. As reflected by condition (UPSC1), the consideration of *technical conditions* of production is no doubt necessary to determine whether a country is a UPS or not. However, we have also seen that this is not sufficient because one must also know relative prices, hence the levels of distributive variables and the exchange rate, as shown by conditions (3) and (5). Therefore, the notion of UPS is a concept that must also depend on those same *institutional* factors that, in actual economies, determine the level of the real wage, the rate of profits, and the real exchange rate.

Indeed, we have shown that Diamand comes very close to accepting this, for instance, when he claims that the low productivity of the industrial sector in UPSs is actually a reflection of the *decision* of the government, a “free choice” actually, to set the level of the exchange rate on the basis of the primary sector. The fact is that, given technical conditions of production, and assuming condition (UPSC1) holds (i.e., $E_A < E_I$), there is no *natural* constraint that prevents the parity of the currency from being settled at a sufficiently high level (i.e., $E = E_I$) to allow the industrial sector to become competitive in the world market. On the contrary, the Argentine experience suggests that the *institutional* constraint may sometimes be more relevant to unravel why this does not happen under specific sociohistorical circumstances.

Diamand also seems to overlook that the same principle applies in BPSs: in those economies *too*, no less than in UPSs, income distribution and the real exchange rate are influenced mainly by institutional factors. Hence, contrary to what his writings sometimes suggest, in those countries no “natural” law mandates that the level of the currency is settled to allow the principle of comparative advantage to regulate the pattern of international trade, and the principle of purchasing power parity to hold. As a result, Diamand fails to see that the scope of his conclusions is actually considerably more general: for instance, the reasons that may prevent the “price effect” from fully working after a devaluation can also be present in economies such as Italy or South Korea, which Diamand (1972, p. 32) mentions as possible examples of balanced productive structures. In fact, in some of those economies, no reason seems to prevent the real wage from being

treated as *independent* from the price system, and hence as a *given* for the latter. But if the specific historical context of, say, South Korea, is such that the real wage is settled at a relatively high level, it would not be surprising that the attempt to raise industrial competitiveness by means of devaluation, would trigger analogous outcomes to those experienced in Argentina.³⁰

In any case, Diamand (1978, p. 22) actually comes very close to reaching this conclusion too, when he writes that “*while economic thought treats real wages as an equilibrating variable to be adjusted according to the forces of the market; to modern society their preservation is a fundamental objective*”; he thus accepts that not only in UPSs but also in BPS countries real wages are not determined by market forces, but mainly by the institutional context in which the economy develops.

In sum, a *tension* constantly emerges in Diamand’s writings between, on the one hand, his envisaging of the structure of production as a purely physical aspect of the economy and, on the other hand, his accepting that the levels of the real wage and the exchange rate, hence institutional forces, are also central to assess whether the economy is a UPS or not. Nevertheless, Diamand’s recognition of the *conventional* (borrowing an expression from Keynes, 1973) character of real wage and exchange rate determination in actual economies, must be praised, since it has important consequences for understanding the potential tensions that countries like Argentina could face in the path toward industrialization and economic development. Furthermore, his emphasis on the complex interactions that emerge between technical and institutional factors within the economy may also be relevant in assessing the limits of some positions that have progressively gained momentum among nonorthodox economies. For instance, the currently widespread view held by neodevelopmentalist authors (e.g., Bresser-Pereira, 2011; Frenkel and Ross, 2006), who maintain that the increase in the real exchange rate triggers forces that tend to raise output and employment, and hence claim that a “competitive,” relatively high level of the exchange rate is a necessary condition for sustained growth. Diamand’s analysis undoubtedly helps

³⁰ Of course, one could always examine a particular historical experience and assess whether or not devaluation has been successful in increasing exports, output and employment, and so on. And then, depending on the results, one could label the economy as a BPS or UPS. But to proceed this way would lack the *causal* explanation Diamand was searching for.

us to understand why an attempt of the government to fix the real exchange rate at a relatively high level, through its negative effect on domestic aggregate demand, can well result in a decrease of aggregate output, rather than an increase as neodevelopmentalist authors forcefully claim. But also, and perhaps more important, Diamand's insistence on institutional factors that are behind both income distribution and exchange rate determination in market economies is central to understanding why the permanent rise in the real exchange rate can simply be an unfeasible option for policymakers.³¹

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³¹ The neodevelopmentalist view has other important theoretical shortcomings that we cannot discuss here (see Crespo and Lazzarini, 2015; Dvoskin and Feldman, forthcoming).

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