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The Macroeconomics of a Financial Dutch Disease

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Alberto Botta[♣]

Abstract: In this paper we describe the medium-run macroeconomic effects and long-run development consequences of a *financial* Dutch disease that may takes place in a small developing country with abundant natural resources. The first move of such a peculiar Dutch disease is on financial markets. An initial surge in FDI flows targeting domestic natural resources sets in motion a perverse cycle between exchange rate appreciation and mounting short-term capital flows. Such a spiral easily turns out to give rise to exchange rate volatility, foreign capital reversals, and sharp macroeconomic instability. In the long run, such acute macroeconomic instability as well as overdependence on natural resource exports all dampen the development of non-traditional tradable good sectors and curtail labor productivity dynamics. We advise the introduction of constraints to short-term capital inflows, in the form of taxes on exchange rate-based capital gains, to tame exchange rate/capital flows boom-and-bust cycles. We provide support to a developmentalist monetary policy that targets competitive nominal and real exchange rates in order to favor the process of production and export diversification. Such a policy stand can be particularly effective to counter-act the long-run negative effects of the financial Dutch disease we describe.

Keywords: Financial Dutch Disease, exchange rate volatility, macroeconomic instability, developmentalist monetary policy

JEL classifications: O14, F32, O24

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1. Introduction

Several economic facts in the last two decades seem to support the belief that financial market liberalization and free capital movements are relevant sources of macroeconomic volatility and, in the end, macroeconomic vulnerability (Krugman (1999), Stiglitz (2002), Gallagher, Griffith-Jones and Ocampo (2012)). In this sense, economists' concern is mainly about portfolio investment, which often has a short time horizon and is more quickly reversible than Foreign Direct Investment (FDI). On the contrary, Foreign Direct Investment benefits of much more benevolent evaluations. In the case of developing countries, they are generally supposed to contribute to domestic capital formation and to improve domestic labor productivity by "importing" best practices and better production technologies from more advanced economies.

The support to Foreign Direct Investment as source of long-run progress in developing countries is not unanimous. FDI's supposed positive contribution to economic dynamics heavily depends on the way FDI integrates into the productive system of hosting economies, hence on FDI's effective capability to build up domestic human capital and technological knowledge. In this sense, the sectoral pattern of incoming FDI is likely to be a decisive factor. FDI targeting natural resource sectors likely plays a radically different role than FDI expanding domestic manufacturing. The former very often operates as a separated enclave into the productive system of host economies. It may increase production and export dependence on natural resources, thus possibly exacerbating Dutch Disease and the natural resource curse. On the contrary, manufacturing sector FDI could more likely foster the creation and diffusion of technological progress, this way supporting long-run growth.

The traditional literature on the Dutch disease usually describes it as a real-side phenomenon that emerges from real-side mechanisms. In a nutshell, natural resource booms or huge international aid inflows tend to raise domestic expenditures and modify domestic relative prices in favor of non-tradable sectors. Such a *real* exchange rate appreciation in turn harms the development of non-traditional tradable sectors by making them less profitable and competitive. A de-industrialization process eventually takes place, possibly curtailing long-run growth potential (Sachs and Warner (1995, 2001), Ros (2001)). According to such a perspective, most of the studies on the Dutch disease follow the original contribution of Corden and Neary (1982) by "ignoring the monetary implications" of natural resource booms, i.e. the effects such events may trigger off on the external balance and financial solidity of the economies under observation. We think this is a relevant shortcoming. First, the lack of a precise national account framework in most Dutch disease models impede them to consider the possibility that natural resource booms might influence economic dynamics by feeding the excessive accumulation of foreign liabilities and by giving rise to boom-and-bust cycles[1]. Interestingly, this is the hypothesis originally put forward by Manzano and Rigobon (2001) in their econometric work on the economic performance of natural resource abundant countries in the 70s and in the 80s. Second, when natural resource booms are tightly connected to

[1] Some traditional Dutch disease models formalize capital movements and external financial imbalances into perfect-foresight infinite lifetime frameworks. Accordingly, international borrowing and increasing foreign debt today are fully repaid through increasing domestic savings and rising current account surpluses tomorrow. In these models, boom-and-bust cycles are avoided by assumption.

mounting FDI, they directly affect the financial sphere of an economy by altering its external net investment position. According to Singh (2003), these effects cannot be neglected, since that "FDI creates foreign exchange liabilities not only now but also into the future [so that] unfettered FDI may create a time profile of foreign exchange outflows and inflows which may be time inconsistent (Singh, 2003, p. 209)."

The aim of this paper is to contribute to the literature on the Dutch disease and the effects of natural resource-based FDI on the economic dynamics of developing countries. In light of the above observations, and differently from previous Dutch disease models, here we focus on the effects that natural resource-based FDI may induce on economic development by affecting the macroeconomic stability of hosting economies. We think about a sort of *financial* Dutch disease. FDI targeting developing countries' natural resources directly affect their productive structure, and therefore their growth potential. On top of this, they also affect their external balance equilibrium. In a flexible exchange rate regime, for instance, long-term FDI may induce the exchange rate to appreciate. Exchange rate appreciation, which is first *nominal* and then real, may attract additional portfolio investment (by reducing perceived country risks or increasing capital gains' expectations). Portfolio capital inflows in turn feed back on exchange rate dynamics and lead to even stronger appreciations. There are at least two possible undesirable outcomes of this process. First, exchange rate appreciation may impinge on the profitability of domestic manufacturing, reduce its external competitiveness, and likely lead it to shrink with respect to the natural resource sector. This effect corresponds to the core outcome of standard Dutch disease models, even though in this paper it will emerge through financial and monetary mechanisms rather than real-side ones. Second, and perhaps more relevantly, the above economic spiral may be abruptly reverted should economic agents evaluate the accumulation of foreign debt and the exchange rate appreciation to be unsustainable processes. The ensuing quick capital reversals, exchange rate collapses and macroeconomic instability constitute an relevant factors jeopardizing long-run growth, and manufacturing development in particular, since that productive investment in the real business sector may be highly sensitive to this kind of boom-and-bust cycles. All in all, the first move of these events is on financial markets and due to FDI. A seemingly traditional Dutch disease actually manifests itself through rather unusual mechanisms that are primarily connected to the overall external soundness of an economy. This is why we label it a *financial* Dutch disease[2].

The paper is organized as follows. Section 2 explains the macroeconomics of the financial Dutch disease. Section 3 shows how such macroeconomic dynamics may affect the sectorial composition of an economy and thus overall labor productivity dynamics. Section 4 concludes by outlining some policy implications in order to deal with FDI flows, macroeconomic volatility, and the long-run productive development of a developing country.

[2] In a way, we provide a formal analysis of what Ocampo (2013) defines a "Balance of Payments dominance" regime, i.e. a macroeconomic framework in which macroeconomic dynamics is determined by external shocks, boom-and-bust cycles in external financing in particular. The kind of shock we think about is a surge in FDI targeting developing countries' natural resources.

2. The macroeconomics of a *financial* Dutch disease

This article hinges on a previous paper we wrote on recent macroeconomic dynamics in Colombia as due to booming FDI in the domestic oil sector (Botta *et al*. (2014)). Even though inspired by the peculiar Colombian experience, this paper describes economic dynamics that may also materialize in other developing countries. More precisely, we have in mind the case of a small open developing economy presenting three basic features. First, the economy is characterized by a relevant endowment of natural resources possibly attracting foreign productive investment. Second, the economy is open to free trade and free capital movements. Macroeconomic policy's main concern is about stability, price stability in particular. Inflation targeting is the way monetary policy is implemented (Masson *et al*. (1997), Minshkin (2000), Gemayel et al. (2011)). Third, consistently with an inflation targeting monetary policy, the nominal exchange rate is free to float (Masson *et al*. (1997), Mishkin (2000), Epstein and Yeldan (2009)). Exchange rate dynamics is the result of Balance of Payments (BoP) dynamics. BoP surpluses lead to exchange rate appreciations, whilst deficits induce depreciations. The domestic central bank may intervene to influence exchange rate dynamics (or take it into account in defining its benchmark interest rate) in the case it would threaten the achievement of the inflation target (Edwards (2006)). Central bank's intervention is promptly implemented in the event of exchange rate depreciations putting at risk domestic price stability by lifting "imported" inflation. Much less concern emerges in presence of appreciation trends that increase domestic purchasing power and reduce inflationist pressures[3].

Beyond the above macroeconomic framework, we also assume that both long-term FDI and short-term portfolio investment are allowed. For the sake of simplicity, we assume FDI to concentrate in the domestic natural resource sector only. Portfolio investment takes mainly the form of short-term/medium-term foreign debt (denominated in foreign currency), let's say bills or financial loans[4]. In order to keep the model as simple as possible, we neglect equity holding. Such simplification does not modify the logic of our model and the economic mechanisms we are dealing with (see below and footnote 11).

Our model is intentionally kept in the simplest form possible in order to make our point as clear as possible. It mainly consists of two non-linear differential equations. Equation (1) explains exchange rate dynamics on the base of the interactions among the various BoP's components[5]:

[3] See Galindo and Ros (2006) on the asymmetric response of Mexican monetary authorities to exchange rate appreciations and depreciations. Mohanty and Klau (2005) provide evidence about monetary policy's asymmetric responses to inflation shocks (tougher against positive shocks than against negative ones) for a larger sample of emerging economies. Interestingly, Pontines and Siregar (2012) find a stronger response of domestic central banks against appreciations rather than depreciations in the case of Indonesia, South Korea, Philippines and Malaysia from 2000 to 2006. After the East Asian crisis at the end of the 90s, even in the (formal) context of an inflation targeting monetary policy, these countries have paid attention to maintain a competitive nominal and real exchange rate in order to avoid trade and current account deficits.

[4] See Taylor (1998), Neftci (1998), Mishkin (1999) and Frenkel and Rapetti (2009) on the short-term structure of foreign liabilities of domestic agents, financial intermediaries in particular, in the emerging economies affected by financial and currency crises in the 90s.

[5] Taylor (2004) rejects the traditional Mundell-Fleming duality between a flexible exchange rate and variations in foreign reserves as alternative adjusting variables of external disequilibria in the short run. Equation (1) might apparently seem to be at odd with such a perspective. However, a deeper look at equation (1) reveals that

$$\dot{e} = e\left\{\left[imp_M(e) - \frac{exp_M(e)}{e}\right] - exp_{NR} + i_H D + \pi_{NR} + \dot{R} - KA_{PI}\left(i_H - i_F - \sigma(e,D)\right) - KA_{FDI}(N)\right\} \qquad (1)$$

Equation (1) distinguishes between import and export flows of manufactured goods as expressed in foreign currency, imp_M and (exp_M/e) respectively; foreign currency-denominated exports of domestic natural resources exp_{NR}, say oil; interest payments on foreign debt $i_H D$; foreign firms' profit repatriation out of natural resource revenues π_{NR}; domestic central bank's variations of foreign reserves $\dot{R}$; net portfolio capital inflows KA_{PI}, and net FDI KA_{FDI}. In the rest of the paper, we also assume that foreign firms' profit repatriation π_{NR} is a constant share α of natural resource exports exp_{NR}.

In equation (1), we assume that manufactured good imports (in foreign currency) and exports (in domestic currency) respond negatively and positively respectively to *nominal* exchange rate depreciations (i.e. higher e values). In this regard, it is worth noting that manufactured good imports and exports, as well as the viability of non-traditional tradable good sectors, are mainly affected by *real* exchange rate dynamics rather then by nominal one only. For the sake of simplicity, here we don't take into account relative price dynamics between the home economy and foreign countries. This simplification does not modify the solidity of our model. First, the kind of financial Dutch disease we aim at describing primarily affects the nominal exchange rate set on currency markets rather than the real one through, say, changes in relative prices[6]. Second, huge foreign capital inflows may easily keep domestic inflation at higher levels with respect to those observed in foreign economies – developed ones in particular (see Frenkel and Rapetti (2009)). Accordingly, the inclusion in our model of domestic and foreign inflation rates would simply reinforce the kind of dynamics we already describe. The logic of the model would not be altered. Last but not least, inflation-targeting monetary policy can restrain inflation lifts due to abundant capital inflows. Relative inflation rate dynamics among trading partners may be of less concern with respect to what observed in the recent past into fixed exchange rate regimes. Accordingly, we neglect it in this model.

We assume that portfolio capital investment takes mostly the form of foreign currency-denominated short-term bills or loans. Accordingly, foreign lenders do not support any direct exchange rate risk. The amount of net portfolio capital inflows is simply determined by the interest rates' differential ($i_H - i_F$), i_H and i_F being the domestic and foreign interest rate respectively[7], and by the country factor risk σ. Yet, portfolio net capital flows are related to exchange rate dynamics through the lender-borrower default risk. On the one hand, the more appreciated is the domestic exchange rate (low e values), the more easily domestic borrowers will meet payment commitments in foreign currency, and be financially sound. Accordingly, the country factor risk will decrease and portfolio investment will increase. On the other

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it does not determine any *instantaneous* equilibrium *level* of the exchange rate e, but simply takes into account all the possible factors, i.e. trade flows, financial flows and net transfers, that may give rise to excess demand or excess supply for the domestic currency on the currency market. These forces, in turn, drive *changes* and (perhaps temporary) *trends* in the exchange rate dynamics (i.e. $\dot{e}$). Following Taylor (2004), exchange rate dynamics are thus strongly influenced by interest rate differentials and the uncovered interests' parity through their effects on net (portfolio) capital flows. Equation (1) and equation (2) must be taken together in order to get how exchange rate dynamics and *endogenous* capital flows interact in the *medium run*.

[6] Goda and Torres (2013) provide empirical evidence supporting such interpretation of the Dutch disease episode currently underway in Colombia.

[7] We assume the domestic interest rate i_H to be an exogenous policy variable managed by the domestic central bank in order to achieve its inflation target.

hand, a depreciation of the exchange rate will make the foreign debt burden less sustainable and domestic borrowers' default risk higher. In this case, the ensuing increase in the country risk factor σ will probably curtail net portfolio capital inflows. All in all, a negative relationship between the domestic exchange rate and short-term portfolio capital flows emerges[8].

Net FDI KA_{FDI} is assumed not to depend on the exchange rate since that it mainly targets domestic natural resources that are exported on international markets and sold in foreign currency. It is positively influenced by the available stock of domestic natural resources *N*.

In equation (1), variations in domestic central bank's foreign reserves stand out as a policy variable monetary authorities can dispose of in order to affect exchange rate dynamics consistently with their inflation target.

Equation (2) makes explicit our assumption that net portfolio capital flows mainly consist of short-term bills or financial loans, thus representing foreign debt variations.

$$\dot{D} = KA_{PI}(i_H - i_F - \sigma(e, D)) \qquad (2)$$

With $(\partial KA_{PI}/\partial\sigma) < 0; (\partial\sigma/\partial e) > 0; (\partial\sigma/\partial D) > 0$

Equation (2) also states a reasonable negative relationship between the current level of foreign indebtedness *D* and its own dynamics. The higher current foreign debt, the less likely foreign lenders will increase their exposition towards domestic economic agents. This implies a self-stabilizing dynamics to take place as to the accumulation of foreign debt.

Whilst most of the partial derivatives' signs is clear in equation (2), something more is to say about stable/unstable exchange rate dynamics. Deriving equation (1) with respect to the current exchange rate in the neighborhood of the steady state and after some mathematical passages, we get:

$$\left.\frac{\partial\dot{e}}{\partial e}\right|_{\dot{e}=0} = \frac{exp_M}{e}\{\eta^e_{imp_M}\chi - \eta^e_{exp_M} + 1\} - e\frac{\partial KA^{PI}}{\partial\sigma}\frac{\partial\sigma}{\partial e} \qquad (3)$$

with $\chi = \frac{imp_M}{(exp_M/e)}$ as the manufacturing import-export ratio; $e\frac{(\partial imp_M(e)/\partial e)}{imp_M} = \eta^e_{imp_M}$ and $e\frac{(\partial exp_M(e)/\partial e)}{exp_M} = \eta^e_{exp_M}$ as manufactured good import and export elasticities to the exchange rate.

The above equation (3) defines the negative or positive effect an exchange rate shift may have on its own dynamics. The first part of equation (3) is the well-known Marshall-Learner condition in the case of an initial (manufacturing) trade imbalance. However, when capital mobility is assumed, exchange rate dynamics does not depend on trade flows only. On the contrary, in the most recent years capital movements have become overwhelmingly important. Accordingly, the second part of equation (3) takes into account how an exchange

[8] Such an assumption likely holds true even in the case we consider equity holding as an alternative investment option with respect to bills or loans. Exchange rate appreciation may in fact increase expected capital gains on domestic equities and stimulate portfolio investment to come in and flood the economy. In the end, foreign investment on domestic bills, equities and the provision of loans may all co-move. They may strongly increase in time of financial euphoria and suddenly dry up when signs of deep external imbalances emerge.

rate shift may affect net capital flows, portfolio investment in particular. The sign of equation (3) can be either negative (an increase in the current exchange rate – i.e. a home currency depreciation, tames further depreciations to take place) or positive (unstable feedbacks in the exchange rate dynamics). In this regard, the more liberalized is the capital account, the more intensively capital movements will respond to exchange rate shifts. This fact might likely outstrip possible stabilizing effects passing through trade flows and give rise to exchange rate instability. In the rest of the paper we assume the unstable scenario to apply.

The effect of a higher foreign debt stock D on the exchange rate dynamics is clearly positive. A higher debt stock induces the nominal exchange rate to depreciate faster. First, an increase in D will lead foreign lenders to be more skeptical about new credit lines conceded to the home economy, so that $(\partial\sigma/\partial D) > 0$. Portfolio investment might probably decrease as well as the demand for domestic currency will do. Second, higher debt stocks imply tougher debt burdens and heavier interest payments. The demand for foreign currency will increase and the domestic exchange rate will depreciate. The positive link between D and $(\dot{e})$ is formally stated in the derivative below:

$$\left.\frac{\partial \dot{e}}{\partial D}\right|_{\dot{e}=0} = e i_H - e\frac{\partial WA_{PI}}{\partial \sigma}\frac{\partial \sigma}{\partial D} > 0$$

2.1 Macroeconomic dynamics in the exchange rate-foreign debt space

According to the economic relationships encapsulated in equations (1) and (2), dynamics in the exchange rate and foreign debt stock can be described according to the Jacobian matrix J:

$$J = \begin{matrix} \dot{e} \\ \dot{D} \end{matrix} \begin{matrix} e & D \end{matrix} \begin{bmatrix} + & + \\ - & - \end{bmatrix}$$

The signs of partial derivatives in matrix J reveal that the geometric loci for constant values of e and D both slope downward. Should the $(\dot{D} = 0)$ locus be steeper that the locus for $(\dot{e} = 0)$, the system will be unstable. On the contrary, a pretty flat locus for $(\dot{D} = 0)$, in particular flatter than the isocline for $(\dot{e} = 0)$, will open space to stability. A focus will emerge. Cyclical fluctuations around the equilibrium point will be stable and converging back to equilibrium should the Jacobian matrix's trace tr.(J) be negative. Should the matrix's trace be positive, diverging cycles will take place outside equilibrium.

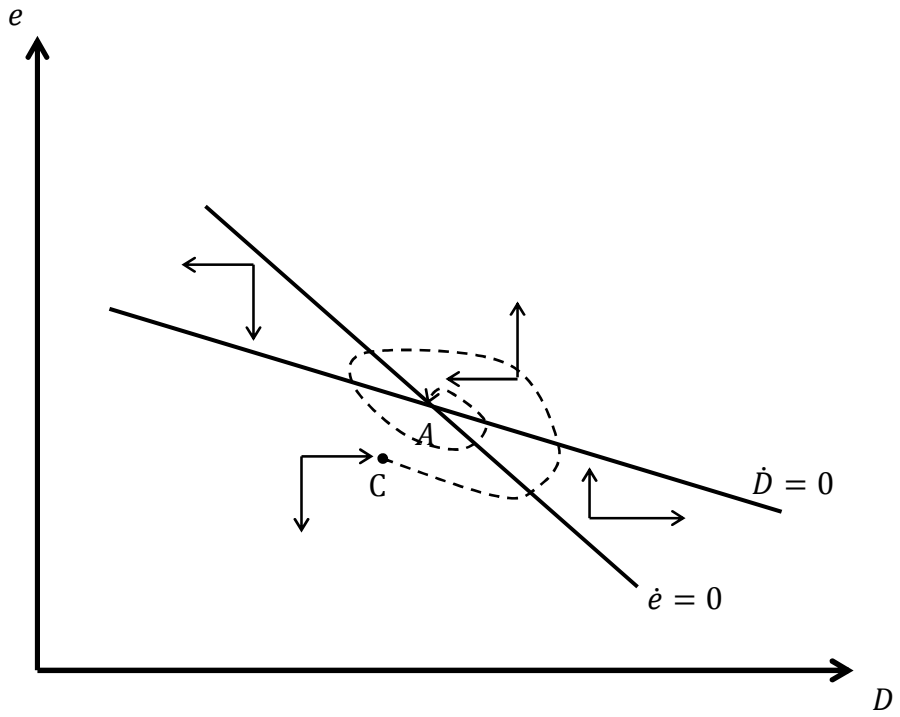

Figure 1 – Medium-run cycles in the exchange rate-foreign debt space

Possible converging fluctuations characterizing such economic system are portrayed in figure 1. Should an economy be initially in point C, its balance of payments will register a surplus. Accordingly, the nominal exchange rate will appreciate. A decreasing domestic borrower's risk (or perhaps chances of capital gains on the domestic equity market) will induce foreign portfolio investment to flow in. A foreign credit boom likely takes place and foreign debt increases[9]. The exchange rate appreciates even further, jeopardizing home economy manufacturing exports, favoring imports and leading to a wider manufactured good trade deficit. Once the trajectory of the economy crosses the isocline for ($\dot{e} = 0$), a BoP deficit emerges. The exchange rate starts depreciating even though short-term portfolio investment continues to flow in at least for a little while. Sudden stops, capital reversals and exchange rate collapses eventually take place once the economy's trajectory passes the isocline for ($\dot{D} = 0$). A depreciating exchange rate and a too high foreign debt stock make foreign investors fear domestic borrowers will hardly honor their payment commitments. External financial support rapidly dries up and well-known external debt/exchange rate twin crises may take place. Needless to say, the effects on the real side of the economy may be harsh[10].

[9] In Colombia, the initial surge in FDI has been more recently followed by positive and increasing net foreign portfolio investment. Indeed, in the first half of the 2000s, portfolio investment in Colombia was close to zero or even negative. Since 2007, with the only exception of 2008, it turned into positive. From 2011 to 2013, according to data provided by the Central Bank of Colombia, it amounted to more than 5.5 billion dollars yearly, i.e. more than 1.5% of Colombian GDP. In the first quarter of 2014, it stood at more than 2.5 billion dollars.

[10] Mishkin (2000) notes that "in many emerging market countries the balance sheets of firms, households and banks are substantially dollarized [...] Because inflation targeting necessarily requires nominal exchange rate flexibility, exchange rate fluctuations are unavoidable. However, large and abrupt depreciations may increase the burden of dollar-denominated debt, produce a massive deterioration of balance sheets, and increase the risks of a financial crisis (Mishkin, 2000, p. 6)".

2.2 A Natural Resource-FDI Boom

Assume now that new natural resources are discovered in the economy. This fact stimulates a jump in net FDI targeting domestic natural resources, so that WA_{FDI} increases. From a graphical point of view, the isocline for ($\dot{e} = 0$) moves rightward, see figure 2. A new equilibrium point B emerges. Cyclical dynamics like those described in figure 1 will in turn affect an economic system originally located in the initial equilibrium A.

The exchange rate will first appreciate and attract additional short-term portfolio investment. Positive FDI, portfolio investment, and the expanded export of natural resources all contribute to crowd out manufactured goods exports and give rise to a widening manufacturing trade deficit by leading to strongly appreciated nominal and real exchange rates. However, the appreciation of the domestic currency and the attraction of foreign portfolio investment may not last long. The widening manufacturing trade gap and foreign firms' profit repatriations (that partially compensate for increases in natural resource exports) will soon or later give rise to an overall BoPs deficit, hence downward pressures on domestic currency (i.e. a negative value of $\dot{e}$). The turning point in the exchange rate dynamics can take place even sooner should FDI decrease in a few years due to the progressive exhaustion of domestic natural resources (in figure 2, the locus for ($\dot{e} = 0$) will partially move back towards the original position).

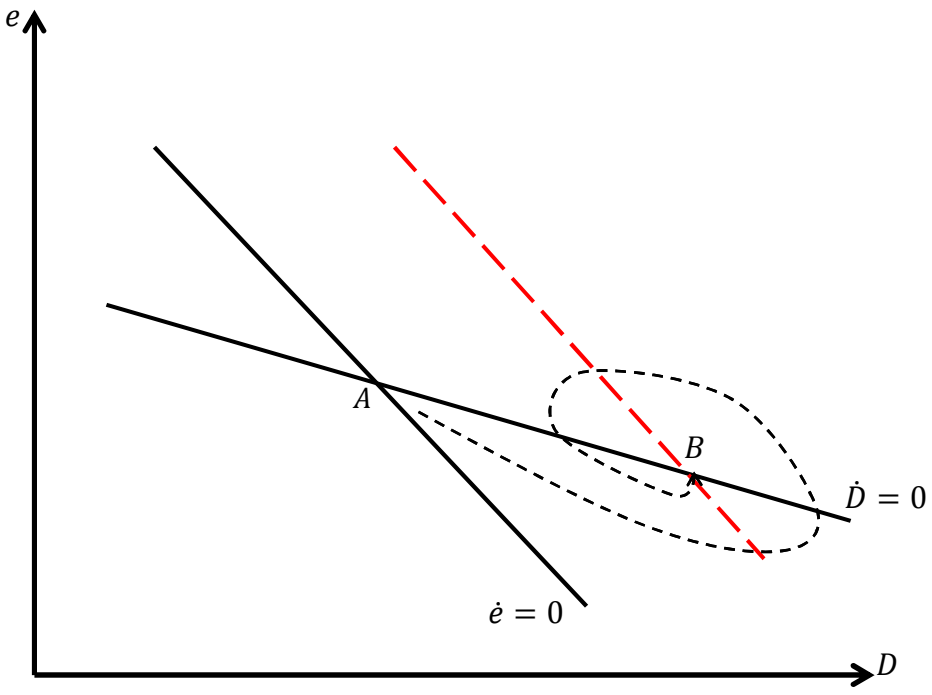

Figure 2 – FDI-induced fluctuations

Regardless of the converging or diverging nature of such economic dynamics, what turns out to be clear is that an initial surge in FDI may eventually ignite boom-and-bust cycles. Exchange rate volatility and quick capital reversals may in turn lead to the disruption of economic activity, and perhaps to relatively large period of economic stagnation should the domestic financial sector be badly hurt by such turbulences (IMF (2009)).

Following Rodrik (2007), exchange rate *appreciation* and exchange rate *volatility* both undermine the development of non-traditional tradable sectors. Manufacturing productions, exports and, above all, investment decisions are often planned in advance on a long-run time horizon. Uncertainty emerging from the above fluctuations may very likely discourage entrepreneurs from implementing new production processes and undertaking investment projects whose profitability cannot be assessed on sufficiently solid probabilistic bases. All in all, FDI targeting developing countries' natural resources may eventually hurt manufacturing and the overall development process thrice. First, they may induce a direct negative effect by shifting an economy productive structure away from the production of manufacturing tradable goods and towards a deeper dependence on natural resources. Second, higher natural resource exports may induce a secular long-run appreciation of the domestic currency, this way making domestic manufacturing less competitive, profitable and viable. Third, manufacturing development may be hindered even further by the uncertainty associated to macroeconomic fluctuations eventually generated by perverse feedbacks between FDI, exchange rate appreciation, and short-term portfolio capital movements. Needless to say, developing countries' policy makers should seriously pay attention to the medium-run and long-run effects of such a *financial* Dutch disease.

3. Long-run consequences of the financial Dutch disease

In the previous section, we have pointed out the macroeconomic volatility and vulnerability that may possibly characterize economies affected by a sort of *financial* Dutch disease. The first move is on financial markets and may take the form of FDI targeting developing countries' natural resources. Exchange rate appreciation, also due to increasing natural resource exports, follows closely and interacts with short-run capital movements into a perverse spiral undermining long-run development. In this section, we want to provide a deeper look at the possible long-run consequences of the aforementioned dynamics.

Our analysis rests on the well-know literature attributing specific growth-enhancing properties to manufacturing. Such a standpoint dates back to the 60s and to the theoretical contributions by Nicholas Kaldor. More recently, this perspective has been reinterpreted in formal models on the natural resource curse by Sachs and Warner (1995, 2001), and Ros (2001) among others. From an empirical point of view, Imbs and Warzciag (2003) and Klinger and Lederman (2004) note that most part of the development process hinges on the diversification of a country productive structure. Manufacturing provides more opportunities than other sectors as to the generation of innovation and to the enlargement of the production space. Accordingly, manufacturing development, by providing the basis for the production and export of new non-traditional tradable goods, represents a "positive" structural change that feeds growth (Rodrik (2009), McMillan and Rodrik (2011)) and may be the engine of economic take off (Rajan and Subramanian (2011)). Even though manufacturing may play a less relevant role for economic growth in the era of the digital economy than in the "golden age" after the end of the Second World War, it still emerges as a leading factor in the growth process of developing countries (Lavopa and Szirmai (2012)).

In order to make our point clearer, equation (4) formalizes in the simplest way possible some of the factors affecting manufacturing development. We assume manufacturing development to be captured by manufacturing contribution to real GDP.

$$m = f(e, \rho, WA_{PI}, K_{NR}) \qquad (4)$$

With $(\partial m/\partial e) > 0;\ (\partial m/\partial WA_{PI}) < 0\,;(\partial m/\partial K_{NR}) < 0$

In equation (4), we first assume that non resource-based tradable good sectors (as a share of GDP) are positively affected by a depreciated exchange rate. This assumption relies on the considerable and expanding body of literature that defines exchange rate policy as one of the most effective industrial policies favoring the expansion of non-traditional tradable sectors versus non tradable industries, at least in the early stages of economic development and economic take-off (Gala (2008), Rodrik (2008a, 2009), Cimoli *et al*. (2013)).

Following Rodrik (2007), manufacturing development responds positively to a relatively depreciated and *stable* (real) exchange rate. On the contrary, exchange rate volatility may seriously hinder the emergence in the home economy of new non-traditional tradable industries. Accordingly, in equation (4) ρ stands for a measure of exchange rate volatility, let's say exchange rate variance. In our model, perverse feedbacks between initial FDI flows, short-term portfolio investment and exchange rate dynamics may give rise to protracted exchange rate fluctuations, hence increasing ρ values. On top of the initial appreciation phase in the exchange rate dynamics, such an exchange rate volatility put further strain on the (relative) expansion of domestic manufacturing activities.

In equation (4), we also think about a negative relationship between manufacturing development and net portfolio capital inflows. Such an assumption does not hinge upon any specific empirical evidence. Studies have mostly focused on the effects of portfolio capital flows on general macroeconomic dynamics and volatility rather than on possible effects on the sectorial composition of the recipient economy. Nonetheless, it may be reasonable to assume that other non-tradable sectors may benefit most from a surge in portfolio foreign investment. This is the case, for instance, of financial services or the real estate sector that might better exploit chances to get easy access to cheap external finance and use it to speculate on domestic financial assets (Taylor (1998))[11].

Finally, manufacturing GDP share is affected negatively by the dimension of the domestic natural resource sector, here represented by the capital stock K_{NR} invested in the natural resource industry, which is in turn positively influenced by the stock of natural resources N.

Equation (5) gets in the simplest way possible the essence of the Kaldorian argument as to the peculiar pro-growth properties characterizing manufacturing. Formally, we translate such a point in a positive relationship between manufacturing GDP share m and the overall labor productivity growth rate y_l.

[11] See IMF (2009) on the asymmetric response of service and manufacturing sectors to economic cycles. Service and real estate sectors have been relevant sources of employment creation during perhaps finance-led expansions since 1970. Manufacturing employment, on the contrary, has traditionally been the main victim of contractions.

$$y_l = g(m) \qquad (5)$$

With $(\partial y_l/\partial m) > 0$ and $\partial(\partial y_l/\partial m)/\partial m < 0$

The long-run development effects of the medium-run dynamics described in the previous part of the paper pass through the kind of relationships formalized in equations (4) and (5). These relationships are depicted in figure 3.

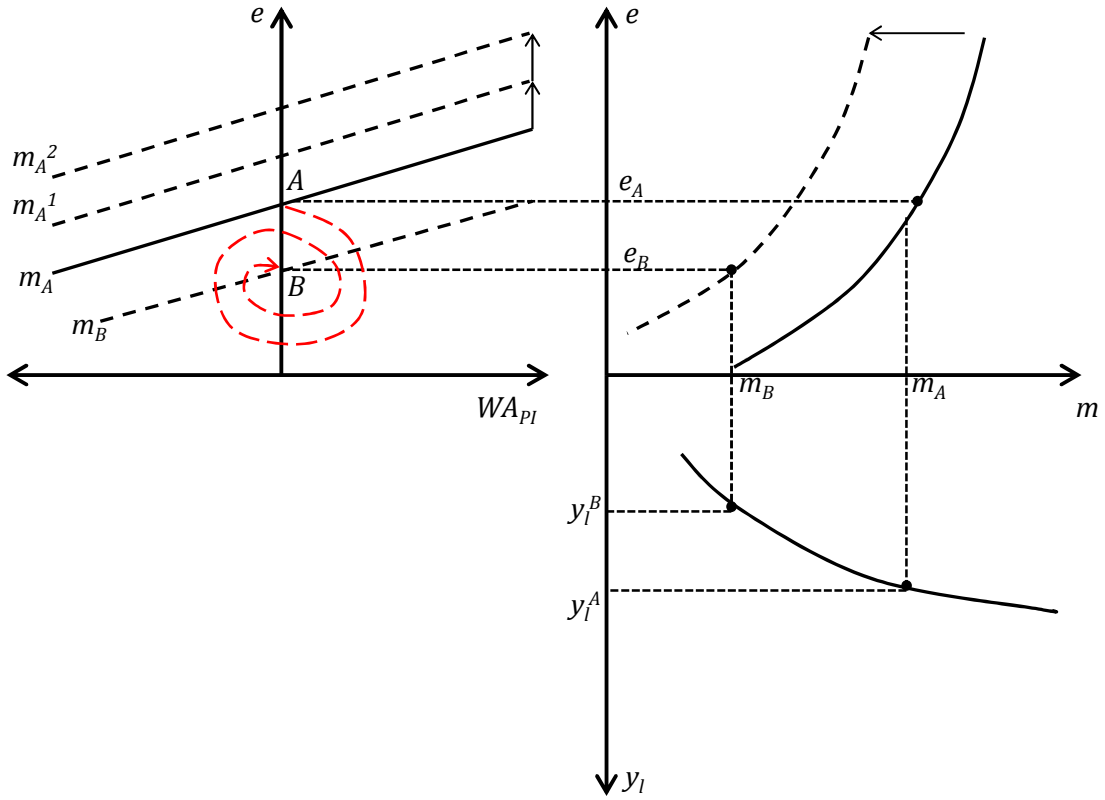

Figure 3 – Long-run effects of the financial Dutch disease

In the top-left panel of figure 3, we match each other those values of the exchange rate *e* and of net portfolio capital flows WA_{PI} that keep manufacturing GDP shares constant. According to partial derivatives' signs associated to equation (4), the locus for constant *m* values is upward sloping. In figure 3, the "m_A curve" represents all possible *e*-WA_{PI} combinations that keep the home economy manufacturing GDP share equal to m_A, i.e. its initial value in equilibrium point A. Points below the "m_A curve" stand for levels of manufacturing development lower than m_A. Points above the "*m_A curve*" correspond to manufacturing shares on GDP higher than m_A. According to equation (4), the position of the map of contour curves for different *m* values change according to ρ and K_N. Should ρ and/or K_N increase, the isocline for values of *m* equal to m_A will move upward. Given net portfolio flows, a depreciation of the exchange rate must materialize in order to preserve manufacturing contribution to GDP from declining.

The top-right panel of figure 3 depicts the positive relationship between the exchange rate *e* and *m* as encapsulated in equation (4). Last but not least, the bottom-left panel of figure 3 reproduces the positive link between manufacturing development and overall labor productivity growth.

According to the analysis proposed in the previous sections of this paper, a natural resource boom will attract new FDI. The capital stock K_{NR} will increase and natural resource production (and exports) expand. Ceteris paribus, this will imply a direct contraction of the manufacturing GDP share. The productive system will rely more, at least in relative terms, on natural resource industries rather than manufacturing. In the top-left panel of figure 3, such a shock is represented by a parallel upward shift of the "m_A isocline" (from m_A to m_A^1).

Beyond this first direct effect, the initial FDI inflow sets in motion the cyclical dynamics described in section 2. This fact is reproduced in the top-left panel of figure 3 through the red-colored dashed line. The economy will move away from the initial equilibrium *A* and fluctuate around the final equilibrium *B*. Along the cyclical traverse towards the new equilibrium, increasing exchange rate volatility will take place (at least with respect to the initial steady state), so that ρ will increase in equation (4). According to the arguments outlined above, exchange rate fluctuations will jeopardize manufacturing development even further. In the top-left panel of figure 3, this additional indirect and undesirable outcome of initial FDI inflows is captured by a second-round upward shift in the "m_A isocline" (from m_A^1 to m_A^2).

In point B, net portfolio capital flows are in equilibrium and the foreign debt stock stable. The exchange rate *e* will set at a new lower and more appreciated long-run value than the initial one. Indeed, increasing exports of primary commodities on international markets may lead to a long-term persistent appreciation of the domestic currency, this way crowding out manufacturing exports. Domestic manufacturing will likely shrink even further[12].

In the top-right panel of figure 3 we reproduce the long-run contraction of domestic manufacturing in the (*e*-*m*) space. The leftward movement of the (*e*-*m*) curve represents the effects on manufacturing development due to both the initial FDI shock and the ensuing sharp exchange rate and macroeconomic volatility. The downward movement *along* the new dashed line from e_A to e_B is the outcome of the long-run exchange rate appreciation. Accordingly, manufacturing participation to GDP will decrease from m_A to m_B.

In line with our assumptions, the upward sloping curve in the bottom-left panel of figure 3 shows the positive link between manufacturing development and overall labor productivity dynamics. It also shows the possible worrisome long-run effects of such a financial Dutch disease. FDI in natural resource sectors, unstable portfolio capital flows and a permanent exchange rate appreciation may eventually lead to a permanent slowdown in the growth rate of labor productivity and in the pace of economic development.

4. Policy Options

The long-run negative effects on labor productivity dynamics due to such a financial Dutch disease are not automatic. First, these effects depend on how FDI integrates with the rest of

[12] In a way, we formalize the original argument put forward by Singh, when he argues that "FDI surges, as those of portfolio investment can lead to equally undesirable consequences such as exchange rate appreciation and reduced competitiveness of a country's tradable sector (Singh, 2003, pag. 209)".

the domestic productive system, which in turn depends, at least partially, by the industrial policy implemented by domestic authorities. Second, exchange rate volatility and financial turbulences might be tamed through specific measures adopted by monetary and fiscal institutions. In both cases, domestic authorities may be expected to intervene in order to avoid perverse dynamics and get the best possible from foreign productive investment inside the domestic economy.

The kind of policies that could be implemented to tackle with the Dutch disease depends on the precise mechanisms through which the Dutch disease operates. The OECD (2013), for instance, recognizes the existence of a de-industrialization episode currently underway in Colombia and describes it in line with standard real-side Dutch disease models. Accordingly, the OECD recommends a set of restrictive fiscal and monetary policies in order to tame possible perverse effects of the ongoing natural resource-FDI boom. OECD claims that in time of economic bonanza restrictive fiscal policies may help to reduce inflationist pressures due to increased domestic expenditures and create a fiscal buffer to deploy in the event of future reductions in the price of primary commodities. Monetary policy should focus on price stability, and perhaps increase the target interest rate and indirectly reinforce nominal exchange rate appreciation to meet its own inflation target. In such a context, in presence of a permanently appreciated market-driven nominal exchange rate, the need to maintain the real exchange rate competitive should be pursed through structural measures. OECD's emphasis is on the removal of minimum wage regulations and on the support of infrastructural investment raising overall factor productivity.

In this paper, we describe the Dutch disease, the Colombian one among others, from a different perspective with respect to traditional models on this topic. The Dutch disease we deal with has a prevalent financial nature and leads to de-industrialization through rather different mechanisms with respect to those considered in the traditional story. Accordingly, a different set of policies should be considered to tackle with it. Alternatively, the same policies mentioned above might take a different stance. In this paper, we focus on two specific topics that mainly concern macroeconomic policies rather than long-run industrial ones, even though relevant overlaps exist between the two types of measures (Rodrik (2008)). The first issue refers to financial flow controls. The second one refers to the exchange rate policy implemented by domestic monetary authorities, hence on the management of foreign reserves.

Exchange rate fluctuations and financial turbulences we describe come from an initial surge in FDI that triggers off a vicious spiral between volatile capital flows and exchange rate dynamics. The destabilizing effects of short-term capital flights are clear. Accordingly, this paper provides further support to the already existing convincement that short-term foreign portfolio investment should be tightly controlled. Into the macroeconomic context we describe, it appears fundamental to sharply reduce the sensitiveness of capital flows to exchange rate changes. On top of possible quantitative restrictions, we think about taxation schemes that target capital gains, those emerging from exchange rate appreciations in particular. Taxes on capital gains may first discourage speculation on the domestic equity market. Second, they may curb domestic agents' propensity to search for financial resources on international markets to deploy on speculative activities on domestic assets. This might significantly contribute to reduce domestic agents' exposition to foreign debt.

To get this point clearly, assume that policy intervention works to remove destabilizing connections between portfolio foreign investment and the exchange rate. Accordingly, the locus for $(\dot{D} = 0)$ gets vertical (see figure 4). On top of this, the locus for $(\dot{e} = 0)$ may turn out to be positively sloped. Once removed destabilizing forces connecting e to $\dot{e}$ through boom-and-bust dynamics in portfolio capital flows, a depreciation of the exchange rate will more easily improve the trade balance and the overall Balance of Payments, provided that the Marshall-Learner condition holds true. In such a new framework, FDI targeting domestic natural resources will still appreciate the exchange rate, hence undermining the competitiveness of domestic manufacturing. Yet, exchange rate volatility and financial turmoil will be avoided. The system will become stable. This simple fact will positively affect long-run economic development and the relative expansion of manufacturing by providing a more stable and safer context for taking long-run and often irreversible production and investment decisions.

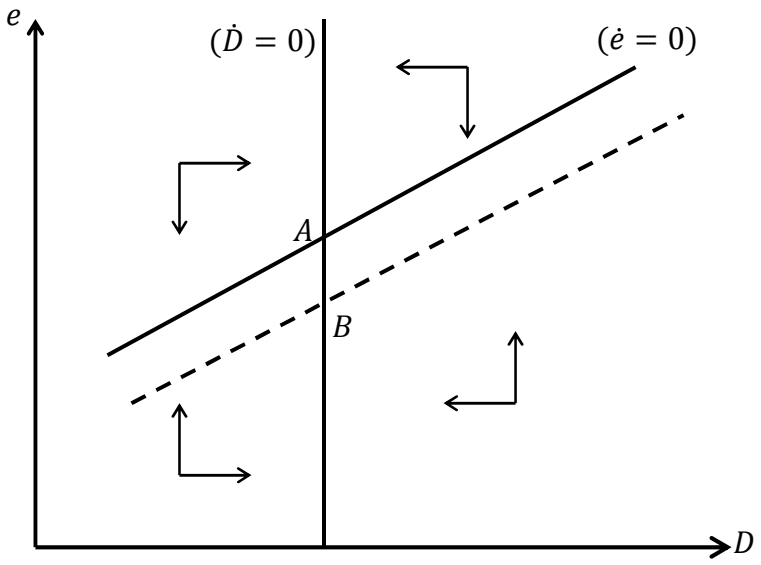

Figure 4 – Short-term capital flow controls and macroeconomic stabilization

Despite of a much more stable macroeconomic framework, FDI-induced pressures on exchange rate appreciation will still work against long-run manufacturing development. In order to effectively tackle with this problem, the domestic central bank could intervene on the currency market and avoid nominal appreciation by increasing its own foreign reserves. In terms of our model, a rise in $\dot{R}$ will help to bring back the isocline for $(\dot{e} = 0)$ to its original position or even move it upward in figure 4. Accordingly, the domestic exchange rate could remain constant or even depreciate. Perverse effects of FDI inflows on the competitiveness of domestic non-traditional tradable sectors will be neutralized or even reverted.

More generally, in this paper we are describing an economic scenario in which a FDI-induced surplus in the home economy Balance of Payments initially drives home currency to appreciate. According Frenkel (2008), this is a context in which the well-know trilemma does not hold true. The domestic central bank can thus safely intervene on markets, accumulate foreign reserves, maintain an independent monetary policy and control the exchange rate

according to its own objectives even in presence of unfettered capital movements. In this sense, domestic monetary authorities could be actively involved in fostering the home economy long-run development process and recognize the importance that the exchange rate may play to favor productive and export diversification. They could aim at controlling the *nominal* exchange rate in order to maintain the *real* exchange rate at competitive levels that are consistent with an ongoing industrialization process. Needless to say, such a monetary stance largely departs from a strict inflation targeting monetary policy. Monetary policy should be charged of a much wider range of purposes far beyond price stability. One the one hand, the attempt to keep inflation under control should be maintained and pursued through a tight coordination between monetary, fiscal and social policies. On the other hand, monetary policy should take a much more developmentalist stand and support domestic productive progress by targeting an international competitive nominal and real exchange rate. Past experience has revealed that exchange rate pegs and external nominal anchors may easily give rise to speculative attacks and cannot protect developing countries from the risks posed to economic development by appreciating *real* exchange rates. Inflation targeting monetary policy and market-driven exchange rate fluctuations, however, seem not to provide a reliable alternative, since that exchange rate and macroeconomic volatility may sharpen, and pressures to nominal and real exchange appreciations still persist. In the end, the best BoPs/exchange rate regime seems to be a managed, and sometimes highly managed exchange rate regime in which domestic monetary authorities also a competitive (and stable) real exchange rate in order to favor growth and employment (Ocampo (2013)). There is increasing evidence this kind of policy has been effective in the case of successful newly industrializing East Asian countries (Sachs (1985), Gala (2008), Cimoli *et al*. (2013)). There is a widespread belief that it might turn out to be extremely useful to tackle with the undesirable long-run outcomes of a financial FDI-driven Dutch disease (Ros (2011)). The present paper provides theoretical support to this last perspective.

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