Economics Bulletin

Volume 33, Issue 1

Current account balance and exchange rate adjustment in New Caledonia

Florence Huart
University Lille 1

Gaël Lagadec
University of New Caledonia

Abstract

New Caledonia has a structural trade deficit. Public transfers from the French State amount to a large part of credits in the current account balance. The local currency, the franc XPF, has had a fixed parity against the euro since 1999. In prospect of independence, which would imply a loss (or decrease) of transfers received from metropolitan France, we evaluate what would be the required adjustment in the F.XPF/euro exchange rate in order to prevent the current account balance from worsening. Results mainly depend on the evolution of the price of nickel.

Citation: Florence Huart and Gaël Lagadec, (2013) "Current account balance and exchange rate adjustment in New Caledonia", *Economics Bulletin*, Vol. 33 No. 1 pp. 113-125.
Contact: Florence Huart - florence.huart@univ-lille1.fr, Gaël Lagadec - lagadec@univ-nc.nc.
Submitted: June 02, 2012. **Published:** January 14, 2013.

1. Introduction

New Caledonia is a French collectivity located in the South Pacific. The local currency is the franc XPF, which has been pegged to the euro since 1999 (1 000 F.XPF = 8.38 €).[1] The main resources of the territory are mineral products. Products from the nickel industry amounted to 70 percent of total exports of goods and services on average over 1999-2009 (15% of GDP).[2] Other resources are public transfers from the French State (18% of GDP on average), which represent a high share of the credits in the current account balance (47% in 2009) and compensate the trade deficit for a large part. Foreign trade is structurally in deficit due to a strong external constraint and low price competitiveness. As a matter of fact, prices of Caledonian goods are very high. This is mainly due to the small size of domestic market (insularity), a great number of taxes and protectionism (Perret, 2002).

New Caledonia is a French territory which is in the process of emancipation. According to the *Noumea Accord* in 1998, three referendums about self-determination are to be held between 2014 and 2018. An approval of independence would mean that New Caledonia has full sovereignty with kingly powers. In such a case, New Caledonia would no longer be able to rely on substantial public transfers from metropolitan France. The loss or decrease of these financial transfers would be a constraint for the current account balance, and as a consequence, for the fixed parity of the franc XPF with the euro. In order to prevent the current account balance from worsening, we want to assess what would be the size of the required adjustment of the F.XPF/€ exchange rate in case such public transfers would disappear or decrease.

We thus need to determine the equilibrium exchange rate of the franc XPF with regard to the euro. There are several approaches of the equilibrium exchange rate.[3] The oldest approach and the simplest one is the Purchasing Power Parity (PPP) theory, which was specified by Gustav Cassel in the 1920s. The PPP theory states that the change in the nominal exchange rate between two currencies must equal the differential of inflation rates between the two countries considered. It insists on the influence of price competitiveness on the foreign trade balance. However, it ignores income effects. The latter are taken into account in the external constraint approach (Krugman, 1989) in which the change in the exchange rate is influenced by the impact of the differential of GDP growth rates between the domestic economy and the rest of the world on the foreign trade balance. Yet, this approach disregards price effects. In other respects, the *Fundamental Equilibrium Exchange Rate* (FEER) approach defines the equilibrium exchange rate as the exchange rate consistent with both the internal equilibrium (saving-investment) and the external equilibrium (current account balance) of an economy (Artus, 1978; Williamson, 1993). Determining the FEER requires an assessment of the underlying financial flows (reflecting the internal equilibrium).[4] In the *Behavioral Equilibrium Exchange Rate* (BEER) approach, some financial variables are added, such as the differential of nominal interest rates between the domestic country and the rest of the world, and expectations of exchange rate variations (Clark and MacDonald, 2000).

[1] There was a fixed parity against the French franc before (and no devaluation since 1949).
[2] We use data from ISEE, the Caledonian institute for statistics.
[3] See Egert (2004) for a review of the literature.
[4] In the *Desired Equilibrium Exchange Rate* (DEER) approach, a target for the external balance is set, which is not necessarily the equilibrium.

However, it is difficult to apply econometric techniques to Caledonian data. Indeed, there is very few available data. Moreover, there is not any net international investment position of New Caledonia and there is no financial integration of New Caledonia with the rest of the world (the franc XPF is not convertible on foreign exchange markets). Given such limitations, we propose to build a simple model of the equilibrium exchange rate of New Caledonia, by focusing on the determinants of the current account balance and by taking into account both price and income effects. Due to a lack of data, we disregard the financial and monetary determinants of the balance of payments. To our knowledge, there has been no study on the relationship between public metropolitan transfers and exchange rate adjustment in New Caledonia. This is thus an original approach. To calibrate our model, we build a sample data covering the period 1999-2009.[5] We make simulations according to different assumptions concerning the size of the decrease of public transfers received from metropolitan France.

In the rest of the paper, we review the main features of the Caledonian foreign trade (section 2) and present our model of the equilibrium exchange rate of the Caledonian economy (section 3). We then describe the data and calibration, and comment the results of our simulations (section 4). We finally summarize our results and draw policy conclusions (section 5).

2. Caledonian foreign trade

Trade openness of New Caledonia (NC) is 31% of GDP on average over the period 1999-2009. Foreign trade is in deficit (table 1). This is due to some specific features of New Caledonia: insularity, a very small manufacturing sector, an insufficient local production and large imports of final goods. Moreover, foreign trade is mostly influenced by the evolution of the nickel price on world markets. Indeed, a large share of exports relies on the industry of nickel products (table 2).

Table 1. Current account balance of New Caledonia (billion-F.XPF)

	2002	2003	2004	2005	2006	2007	2008	2009
Balance of goods	-77,1	-66,0	-44,5	-52,9	-55,9	-42,4	-143,0	-114,2
Balance of services	-8,6	-11,5	-10,7	-39,0	-64,3	-67,7	-65,7	-51,8
Net incomes	34,2	35,7	39,6	46,2	40,2	34,8	38,0	37,6
Current transfers	38,0	37,9	40,3	40,0	40,7	49,7	55,1	57,6
Balance	**-13,5**	**-3,9**	**24,6**	**-5,5**	**-39,4**	**-25,6**	**-115,6**	**-70,8**

Source: IEOM (Annual reports of balance of payments, from 2004 to 2010)

[5] There are missing data before 1997 (for instance, about GDP) and some data are still provisory (estimated) for 2010. Moreover, there is a break in 2010 as regards the series of the metropolitan public transfers because of a change in methodology.

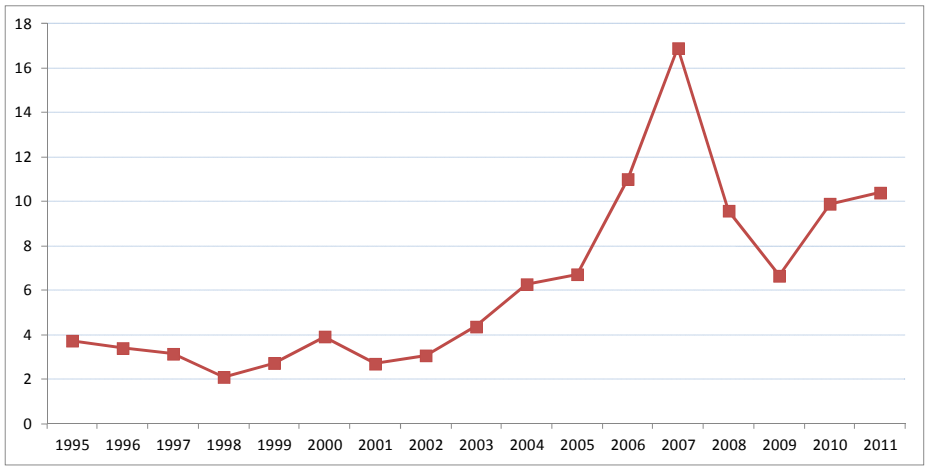
Table 2. Foreign trade of New Caledonia by sectors (share of total exports or imports of goods and services in %)

Imports	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average 1999-2009
Agricultural products	1,4	1,3	1,2	1,2	1,1	1,0	0,9	0,8	0,8	0,9	1,1	1,1
Food-processing products	10,5	10,0	10,1	9,9	8,6	9,6	8,6	7,7	7,0	7,4	8,6	8,9
Manufactured products	54,0	49,8	49,8	50,0	59,0	55,5	49,4	49,5	52,9	50,1	50,2	51,8
Energy	6,4	10,6	10,0	9,0	8,1	9,0	11,7	11,0	10,4	14,1	11,0	10,1
Transports	9,5	11,2	10,5	10,3	8,1	8,4	9,1	9,2	8,6	9,2	9,0	9,4
Other services	18,7	18,4	19,6	20,5	16,4	17,6	22,8	25,2	23,9	21,8	23,7	20,8
Exports	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**Average 1999-2009**
Agricultural products	0,8	0,9	1,3	1,0	1,0	0,6	0,2	0,2	0,2	0,6	0,7	0,7
Nickel-industry products	62,1	70,6	65,3	65,8	70,5	72,2	73,8	76,0	81,4	71,1	65,0	70,4
Food-processing products	2,8	2,2	2,9	2,7	1,9	2,0	2,4	1,8	1,1	1,5	1,5	2,0
Manufactured products	3,3	2,2	3,2	3,0	3,3	3,7	2,8	2,4	1,6	2,4	4,0	2,9
Energy	0,5	0,7	0,7	0,7	0,9	0,8	1,1	0,3	0,0	0,0	0,0	0,5
Transports	8,4	6,8	8,1	8,2	9,3	9,2	8,0	7,7	6,1	9,6	11,1	8,4
Other services	19,5	14,5	16,0	15,9	11,1	9,7	9,9	10,0	9,6	14,9	17,8	13,5

Source: own calculations based on ISEE data (*Economic accounts*).

The territory would contain between 10 and 40 percent of world's nickel reserves and is among the largest producers of nickel and ferro-nickel (Horowitz, 2004). It was the 6th exporting country in the world in 2011, behind Cuba, Canada, Indonesia, Australia and Zimbabwe (the rank was the fifth in 2009).[6] Nickel is exported mainly in its raw form. It is the main source of export revenues but nickel exports represented only 10% of GDP in 2009. There is a need to develop nickel refinement. There are currently two refineries (SLN and Goro in the South Province).[7] The territory does not import any nickel, but mainly manufactured products. In this respect, the sharp worsening of the trade deficit in 2008 is linked to the building of the refinery Goro from 2006. Investment spending led to an increase in imports of capital goods. Besides, the trade deficit was reduced in 2007 when nickel prices were high but it worsened when nickel prices fell in 2008 (figure 1).

Figure 1. Nickel prices (annual average, USD/Lb)



Source: ISEE (statistical series).

[6] Source: UN COMTRADE.
[7] A new refinery in the North is to be built in 2013 (project Koniambo).

Caledonian foreign trade is largely financed by public transfers from the French State (table 3). The latter are services from public administration (including armed forces), wages and salary in the public sector, and current transfers to other sectors of public administration for current expenditure, capital expenditure and discretionary expenditure including social protection (notably pensions). The share of metropolitan public transfers in total credits of the current account balance (CAB) was on average 41% over the period 2002-2009.

Table 3. Public transfers from the French State and external balance in New Caledonia

	2002	2003	2004	2005	2006	2007	2008	2009	Average 2002-2009
Balance of goods and services (in % of GDP)	-18,2	-14,9	-9,8	-15,4	-18,1	-14,3	-28,3	-22,2	-17,7
Metropolitan public transfers (in % of GDP)	19,2	19,0	17,8	17,7	17,7	15,5	16,8	16,7	17,6
Cover rate of foreign trade by transfers (in %)	106	127	182	115	98	108	59	75	109
Current account balance (CAB) (in % of GDP)	-2,9	-0,8	4,4	-0,9	-5,9	-3,3	-15,7	-9,5	-4,3
Share of transfers in credits of the CAB (in %)	45	42	40	39	41	33	42	47	41

Source: own calculations using ISEE data.

Before the financial crisis in 2008-2009, public transfers from the French State helped reducing the deficit of the CAB. In any case, the importance of these transfers makes the prospect of emancipation difficult without a plan of financial support or an alternate development policy. In other respects, the CAB deficit is also partly financed by foreign direct investments (CEROM, 2008) and it can be considered as being sustainable as long as New Caledonia has not a foreign debt of its own.[8] Furthermore, the sustainability of the current account deficit is helped by the fact that New Caledonia does not suffer from a worsening of the terms of trade, because the nickel price – despite its volatility – does not show a declining trend on world markets.

New Caledonia has a few main trade partners (table 4): metropolitan France, Singapore, Australia and China were the main suppliers in 2009 whereas metropolitan France, China, Japan and Taiwan were the main clients. Trade between New Caledonia and the euro area (or the European Union) is predominant: it amounts to roughly 42% of total trade on average over the period 2000-2009 (47% of imports and 36% of exports).

[8] There is still a debt owed to the French State of 34 billion F.XPF (Chambre Territoriale des Comptes de la Nouvelle-Calédonie, 2008).

Table 4. Foreign trade of New Caledonia by partner country in 2009 (%)

	Share in total imports of goods		Share in total exports of goods		Balance of trade (in % of GDP)
	2009	Average 2000-2009	2009	Average 2000-2009	2009
Euro area (12)	41,7	46,9	39,2	36,4	-7,7
EU-27	45,5	50,4	39,3	36,6	-8,8
France	29,3	35,1	27,6	20,2	-5,4
Germany	4,0	3,9	0,0	0,1	-1,2
Belgium	1,6	1,5	0,4	2,7	-0,4
Spain	1,3	1,6	6,6	8,2	0,4
United-Kingdom	1,8	1,9	0,0	0,0	-0,5
Italy	3,6	3,0	2,2	3,5	-0,8
Netherlands	0,5	0,6	2,4	0,9	0,1
South Africa	0,2	0,1	2,2	2,6	0,2
Canada	0,6	0,4	0,0	0,0	-0,2
United States	4,4	3,7	2,6	2,7	-1,0
China	7,6	4,3	13,3	5,5	-0,7
Indonesia	0,7	0,7	0,0	0,0	-0,2
Japan	3,1	3,1	12,9	20,7	0,6
South Korea	2,4	2,0	9,0	6,8	0,4
Singapore	13,0	11,6	0,0	0,0	-3,8
Taiwan	0,5	0,6	10,5	13,9	1,1
Thailand	2,3	1,5	0,0	0,0	-0,7
Australia	9,6	11,3	7,3	6,3	-2,0
New Zealand	4,3	4,6	0,1	0,1	-1,2
Fidji Islands	0,16	0,14	0,04	0,06	-0,04
French Polynesia	0,10	0,12	0,20	0,23	-0,01
Papua New Guinea	0,05	0,09	0,02	0,01	-0,01
Solomon Islands	0,03	0,02	0,00	0,00	-0,01
Vanuatu	0,16	0,12	0,21	0,66	-0,02
Wallis and Futuna	0,00	0,00	0,74	0,83	0,09

Source: own calculations using ISEE data (trade statistics).

3. Equilibrium exchange rate model of New Caledonia

Autonomy of New Caledonia would imply a decrease or a loss of public transfers from the French State. What should be the exchange rate of the franc XPF/euro so that the current account balance is not in disequilibrium? We first shall define the equilibrium exchange rate. Then we will assess it assuming a decline in transfers (or suppression over time).

In the standard case, the supply of exports is in domestic currency whereas the demand for imports is in foreign currency. We need to express the current account balance (CAB) using only one currency unit for exports and imports, namely the domestic currency. The CAB is the trade balance (value of imports minus value of exports) plus net income (R) and net transfers (TR):

$$CAB = P \cdot X - e \cdot P^* \cdot IM + e \cdot R + e \cdot TR \quad (1)$$

where X is the volume of exports, IM the volume of imports, P the domestic price level expressed in domestic currency, P^* the foreign price level in foreign currency, e the nominal

exchange rate defined as units of domestic currency per unit of foreign currency (for instance, 1 euro = e F. XPF). If net income and transfers are denominated in foreign currency, then we need to convert them in domestic currency multiplying their value by the exchange rate. The cover rate CR in value terms is, ignoring net incomes:

$$CR = \frac{P \cdot X + e \cdot TR}{e \cdot P^* \cdot IM} \tag{2}$$

The CAB is in equilibrium ($CR = 1$) if $P \cdot X + e \cdot TR = e \cdot P^* \cdot IM$ or equivalently $e \cdot TR = e \cdot P^* \cdot IM - P \cdot X$. Without any transfers, $e \cdot P^* \cdot IM$ must equal $P \cdot X$. In case of a decrease of transfers received, let's say 25%, then in order to maintain the equilibrium of the CAB, there should be a 25% decline in the value of imports (assuming an initial equilibrium situation). The latter could be brought about by a decrease of the volume of imports (IM), an increase of foreign prices (P^*) or a rise of the nominal exchange rate (e) meaning a devaluation of the franc XPF (implying higher import prices). The extent of devaluation would not necessarily be equal to 25% because it would lead to a decline in imported volumes whose extent would depend on the price elasticity of the demand for imports. If the CAB was initially in deficit, then the size of the devaluation would have to be larger.

The Caledonian case is more complex than the standard case, because we need to take into account two main specificities:

- Exports of nickel products amount to 70% of total exports on average (table 2 supra) and are denominated in U.S. dollars.
- Metropolitan public transfers received are denominated in euros.

There are two bilateral exchange rates of the franc XPF to be considered: with regard to the U.S. dollar (for most of the exports and for more than half of imports) and with regard to the euro (for transfers and for more than 40% of imports). A devaluation of the franc XPF with regard to the euro would not have any effect on the value of exports but on the value of transfers (if there were still any) and on the value of a given part of imports.

We thus define two exchange rates: 1 euro = e_1 F. XPF and 1 dollar = e_2 F. XPF. The price level of imported goods from the euro zone denominated in euros is P^*_1 and the price level of imported goods from the dollar zone in dollars is P^*_2. For exports, P_n stands for the price of nickel in dollars and P_x is the price level of other exported goods in franc XPF. The real exchange rate ε is defined as the ratio of prices of foreign imported goods to prices of domestic exported goods. There are two bilateral real exchange rates depending on whether goods are imported from the euro zone (ε_1) or the dollar zone (ε_2):

$$\varepsilon_1 = \frac{e_1 \cdot P^*_1}{P_x} \text{ and } \varepsilon_2 = \frac{e_2 \cdot P^*_2}{P_x} \tag{3}$$

The share of trade with the euro zone in total trade of New Caledonia is α, and that of trade with the dollar zone is $(1 - \alpha)$.[9] We write a real "effective" exchange rate, ε:

[9] We ignore trade denominated in other foreign currencies.

$$\varepsilon = \alpha \cdot \frac{e_1 \cdot P^*_1}{P_x} + (1-\alpha) \cdot \frac{e_2 \cdot P^*_2}{P_x} \quad (4)$$

The CAB can be expressed as follows (in F. XPF):

$$CAB = \beta \cdot (e_2 \cdot P_n) \cdot X_n + (1-\beta) \cdot P_x \cdot X - \alpha \cdot (e_1 \cdot P^*_1) \cdot IM_1 - (1-\alpha)(e_2 \cdot P^*_2) \cdot IM_2 + e_1 \cdot TR \quad (5)$$

where X_n and X are respectively the export volumes of nickel and of goods and services except nickel, β is the share of nickel exports in total exports and $(1 - \beta)$ the share of exports of goods and services except nickel in total exports, IM_1 and IM_2 denote import volumes from the euro zone and the dollar zone respectively, and TR are public transfers received from metropolitan France denominated in euros.[10]

Export and import functions are:

$$X_n = Y^{*\lambda_x} \text{ and } X = Y^{*\lambda_x} \cdot \varepsilon^{E_x} \quad (6)$$

$$IM_1 = Y^{\lambda_{im}} \cdot \varepsilon_1^{-E_{im}} \text{ and } IM_2 = Y^{\lambda_{im}} \cdot \varepsilon_2^{-E_{im}} \quad (7)$$

where Y and Y^* are respectively domestic and foreign GDP, parameters λ_x and λ_{im} are income elasticities of exports and imports respectively, and parameters E_x and E_{im} are price elasticities of exports and imports respectively (in absolute value). For simplication, we assume that elasticities of imports are identical whether imported goods are from the euro zone or the dollar zone.

Using (6) and (7) in (5), the CAB writes,

$$CAB = \beta \cdot e_2 \cdot P_n \cdot Y^{*\lambda_x} + (1-\beta) \cdot P_x \cdot Y^{*\lambda_x} \cdot \varepsilon^{E_x} - \alpha \cdot e_1 \cdot P^*_1 \cdot Y^{\lambda_{im}} \cdot \varepsilon_1^{-E_{im}} - (1-\alpha) \cdot e_2 \cdot P^*_2 \cdot Y^{\lambda_{im}} \cdot \varepsilon_2^{-E_{im}} + e_1 \cdot TR \quad (8)$$

Using (3) and (4), and expressing variables in growth rates (with Δ the operator of first difference), the change in the CAB is:

$$\frac{\Delta CAB}{CAB} = \beta \cdot \frac{\Delta P_n}{P_n} + B \cdot \frac{\Delta P_x}{P_x} + [1 - \alpha \cdot (1-A)] \cdot \frac{\Delta e_1}{e_1} + [\beta - (1-\alpha) \cdot (1-A)] \cdot \frac{\Delta e_2}{e_2} - (1-B)[\alpha \cdot \frac{\Delta P^*_1}{P^*_1} + (1-\alpha) \cdot \frac{\Delta P^*_2}{P^*_2}] + \lambda_x \cdot \frac{\Delta Y^*}{Y^*} - \lambda_{im} \cdot \frac{\Delta Y}{Y} + \frac{\Delta TR}{TR} \quad (9)$$

with

$$A = (1-\beta) \cdot E_x - E_{im}$$

$$B = (1-\beta) \cdot (1-E_x) - E_{im}$$

A devaluation of the franc XPF with regard to the euro (higher e_1) improves the CAB depending on the value of price elasticity of imports and exports of goods and services except nickel.

[10] We ignore current transfers to the rest of the world and net incomes.

The term $\left[\lambda_x \cdot \frac{\Delta Y^*}{Y^*} - \lambda_{im} \cdot \frac{\Delta Y}{Y}\right]$ expresses the external constraint (Krugman, 1989): if domestic economic growth is faster than abroad, then the current account deteriorates except if the income elasticity of exports is sufficiently higher than the income elasticity of imports.

In order to maintain the CAB in equilibrium, the change in the exchange rate should be[11]:

$$\frac{\Delta \bar{e}_1}{\bar{e}_1} = \frac{1}{1-\alpha\cdot[1-A]}\cdot\left[(1-B)\cdot\left[\alpha\cdot\frac{\Delta P^*_1}{P^*_1}+(1-\alpha)\cdot\frac{\Delta P^*_2}{P^*_2}\right]+[(1-\alpha)\cdot(1-A)-\beta]\cdot\frac{\Delta e_2}{e_2}-\beta\cdot\frac{\Delta P_n}{P_n}-B\cdot\frac{\Delta P_x}{P_x}+\lambda_{im}\cdot\frac{\Delta Y}{Y}-\lambda_x\cdot\frac{\Delta Y^*}{Y^*}-\frac{\Delta TR}{TR}\right] \quad (10)$$

One can verify easily that a decline in transfers (*TR*) implies a rise in the exchange rate, that is a devaluation of the franc XPF against euro. The size of the devaluation itself depends on the share of imported goods from the euro zone, the share of exported goods except nickel in total exports and the price elasticities of foreign trade, everything else being equal.

4. Data, simulations and results

In order to calibrate the model, one needs to know the value of foreign trade elasticities. The price elasticity of the demand for imports would be low if the domestic country were highly dependent on external trade in order to meet domestic demand for goods. It would be high if there were a domestic production that could be a substitute for imports. Concerning the price elasticity of the supply of exports, it would be low if there were not any substitutes, if the supply of goods were inelastic (in the short term) or if competition did not depend on price but on product quality. On the contrary, it would be high if domestic country produced standard goods for which price competition matters most in international trade. With regard to income elasticities, Krugman (1989) found that in industrialized countries, λ_x tends to be high and λ_{im} tends to be low, especially in countries where economic growth is faster (a faster economic growth enables a country to diversify the structure of production and better meet world demand). In general, income elasticities of imports and exports are low if the local production does not fit well domestic demand and world demand respectively.

What are the foreign trade elasticities of New Caledonia? Given heavy fixed investments in the nickel industry, price elasticity of the supply of exports is very low in the short term, a bit less low in the long term. For the rest of exports (including aquafarming), a third of exports deals with farmed shrimp whose market is highly competitive. Yet, Caledonian exporters aim at high-end niche products (IEOM, 2005), for which demand is little elastic. With regard to demand for imports, low elasticities derive from the predominance of imports of intermediate goods and capital goods, which are not produced locally but are essential to commodity industry and processing industry. According to a recent study by IEOM (2012), the long-term price elasticity is estimated to be 0.6 for Caledonian imports (not statistically significant though) and 0.3 for Caledonian exports (nickel) in absolute value. We propose to set the price

[11] We take the nominal exchange rate in order to study the devaluation case. One can also draw from equation (8) the real exchange rate which is consistent with the CAB equilibrium.

elasticities to 0.30 (E_x and E_{im}) in the baseline scenario. We will also study the case with a higher value of 0.55 (in such a case, the Marshall-Lerner condition just holds).

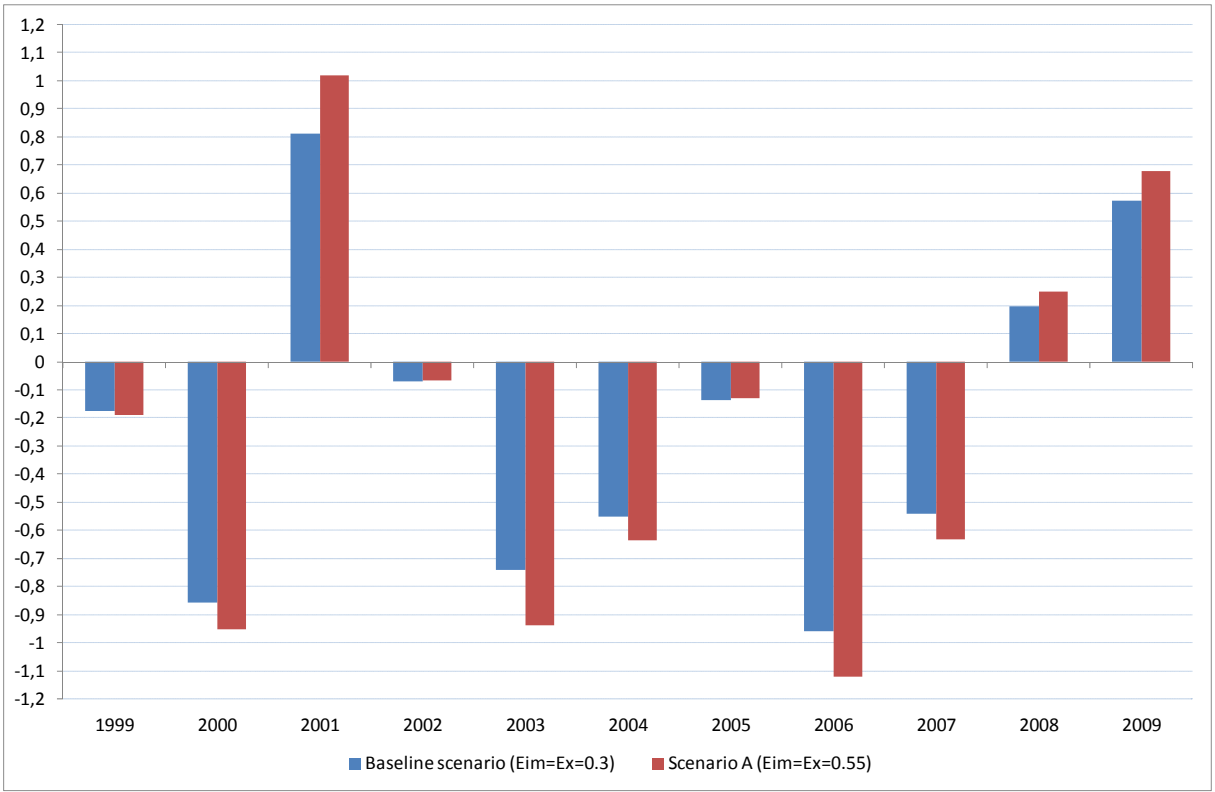
According to Tokarick (2010), the long-term income elasticity of imports of New Caledonia is estimated to be 1.79 and that of exports to 1.15. We use these estimates ($\lambda_{im} = 1.79$ and $\lambda_x = 1.15$). This means that the external constraint is relatively strong: given that $\lambda_{im} > \lambda_x$, in order to prevent the CAB from worsening, domestic economy should grow slower than the rest of the world. In other words, for a domestic GDP growth rate equal to (and *a fortiori* higher than) the world GDP growth rate, there should be a devaluation of the exchange rate F.XPF/euro in order to prevent the CAB from worsening, everything else being equal.

As regards the other parameters of the model, we set the value of α by computing the share of trade with the euro zone in total trade of New Caledonia for each year and on average over the period 1999-2009.[12] We do the same for the parameter β: we compute the share of nickel exports in total exports of New Caledonia. For simulations, we also need statistical series of the variables of the model. We use *World Indicators* of the World Bank (F.XPF/dollar exchange rate), *World Economic Outlook* of the IMF database (foreign prices, world GDP) and data from ISEE (Caledonian economy, nickel price, public transfers from the metropolitan France). Our sample covers 1998-2009. For foreign prices P^*_1 (euro zone) and P^*_2 (dollar zone), we used GDP deflators. We computed the price level P^*_2 choosing the average of price levels of the United States, other advanced economies (except euro area and G7) and newly industrialized Asian economies. As for the prices of domestic export goods except nickel, P_x, we took the general price level, because there was not any other price statistics available. Variable Y^* stands for world GDP.

The model can be summarized by equation (10). We used it for making simulations over the period 1999-2009. Figure 2 displays the change in the equilibrium exchange rate of the franc XPF with regard to the euro, that is the exchange rate variation consistent with a CAB equilibrium (at least a CAB which does not worsen). There is little difference between the baseline scenario where $E_{im} = E_x = 0.3$ and scenario A where elasticities are higher. In both scenarios, the required adjustment of the exchange rate is always in the same way. According to the model, there should have been a revaluation of the franc XPF against the euro in 1999 (18% in the baseline scenario), in 2000 (86%), and over the period 2002-2007 (from 7% in 2002 to 96% in 2006), despite a strong external constraint which would require otherwise a devaluation in order to prevent the CAB from worsening. Indeed, the difference between $\lambda_{im} \cdot \Delta Y/Y$ and $\lambda_x \cdot \Delta Y^*/Y^*$ was on average 10% over 1999-2000 and 6% over 2002-2007. The required revaluation is partly due to a relatively slower rise of domestic prices than prices of main trade partners (this effect is weak though). Above all, it is due to the sharp increase of the value of nickel exports, given the rise of the nickel price (37% on yearly average, even 64% in 2006). Moreover, in 2000, 2003 and 2006, the increase of metropolitan public transfers received (+22%, + 9% and +11% respectively) would accentuate the size of the required revaluation.

[12] There are some missing data for 1999. Therefore, we set the value of α in 1999 to the same value as in 2000.

Figure 2. Equilibrium exchange rate of the F. XPF against euro (change in %)



For the other years, the model predicts a devaluation of the franc XPF against euro, which should be 81% in 2001, 20% in 2008 and 57% in 2009. And yet, during those years (except 2009), external constraint was weak (recession in 2001 and in 2008 in New Caledonia). The required devaluation is due to a loss of price competitiveness (except in 2009) and to a decline in the price of nickel (-31% in 2001 and in 2009, -43% in 2008). As regards transfers, their role is negligible in 2008-2009 (they increased by 3% and 1% respectively), but they accentuate the required devaluation in 2001 (because they decreased by 14% during that year).

In other respects, we can also use the model to assess the impact of a suppression of metropolitan public transfers (equivalent to a loss of credits in the CAB) or a decline in transfers on the equilibrium exchange rate (table 5). We undertook simulations using the change in variables between 1999 and 2009. The effective change in transfers is the one observed in reality. In the baseline scenario, the model predicts that there should be a revaluation of 159%, because between 1999 and 2009, the nickel price rose by 144% and publics transfers increased by 52%.[13] If the latter had not increased between 1999 and 2009, the required revaluation would have been 53%. If transfers had disappeared, then there should have been a devaluation of 149% (given low price elasticities of foreign trade). We notice that a decline in transfers does not necessarily imply a devaluation of the franc XPF against the euro. This is so because the effect on the exchange rate depends on several factors: the size of the decline in transfers, the variation of the nickel price, the external constraint and price competitiveness, as well as reference data (the period considered). The required adjustment of

[13] On annual average, over the period 1999-2009, revaluation would be 22%.

the exchange rate could be reduced if transfers were not suppressed once and for all, but reduced progressively over time. For example, a change in transfers of -30% would imply a devaluation of 7%, but a change in transfers of -25% would lead to a revaluation of 3%.

Table 5. Impact of a change in transfers on the equilibrium exchange rate F.XPF/euro (level 2009/1999)

Change in transfers	Impact on the exchange rate
Effective (+52%)	-159%
0%	-53%
-5%	-43%
-10%	-33%
-25%	-3%
-30%	7%
-40%	28%
-50%	48%
-100%	149%

5. Conclusion

New Caledonia is in a process of progressive emancipation. From an economic point of view, the question of independence leads to the question of economic autonomy without financial transfers from metropolitan France. In this paper, we studied this question looking at the sustainability of the current account deficit in the case where these transfers would disappear or be reduced drastically or progressively. This is an important issue for New Caledonia, because the current account balance is highly dependent on public transfers received from the French State and the nickel prices. Moreover, the current account is structurally in deficit because of a strong external constraint.

We built, calibrated and simulated a simple model of the equilibrium exchange rate of the franc XFP against the euro. We found that the franc XPF should be devalued by almost 150% in order to compensate for the loss of metropolitan public transfers. A decline in these transfers – instead of a suppression – would not necessarily imply a devaluation because the change in the equilibrium exchange rate depends on the size of the decline in transfers, the change in the nickel price, the external constraint, the price elasticities of foreign trade and the reference data (period considered). For example, a decline in transfers of 50% would imply a devaluation of 48%, but a decline in transfers of 25% would lead to a revaluation of 3%. The size of the exchange rate adjustment could be reduced if transfers were not suppressed at once but reduced progressively. Indeed, one should take into account that a decrease of the purchasing power of Caledonian people would be a consequence of the decline in metropolitan public transfers and the imported inflation resulting from the devaluation. Such consequences are studied in another work-in-progress.

References

Artus, J. (1978), "Methods of assessing the long-run equilibrium value of an exchange rate", *Journal of International Economics* **8**, 277–299.

CEROM (2008), *Les défis de la croissance calédonienne*, Nouméa.

Chambre Territoriale des Comptes de la Nouvelle-Calédonie (2008), *Rapport d'observations définitives établi à la suite de l'examen de la gestion des recettes fiscales et douanières de la Nouvelle-Calédonie*.

Clark, P. and R. MacDonald (2000), "Filtering the BEER – A permanent and transitory decomposition", IMF working paper number 144.

Egert, B. (2004), "Assessing equilibrium exchange rates in CEE acceding countries: Can we have DEER with BEER without FEER? A Critical Survey of the Literature", BOFIT discussion paper number 1.

Horowitz, L. S. (2004), "Toward a Viable Independence? The Koniambo Project and the Political Economy of Mining in New Caledonia", *The Contemporary Pacific* **16**, 287-319.

IEOM (2005), *La Nouvelle-Calédonie en 2004*, Rapport annuel.

IEOM (2012), "Déterminants des échanges de biens et compétitivité dans une économie mono-exportatrice: le cas de la Nouvelle-Calédonie", *Les Notes de l'Institut d'émission*, Août.

Krugman, P. (1989), "Differences in Income Elasticities and Trends in Real Exchange Rates", *European Economic Review* **33**, 1031-54.

Perret, C. (2002), *Perspectives de développement économique pour la Nouvelle-Calédonie*, Presses universitaires de Grenoble.

Tokarick, S. (2010), "A Method for Calculating Export Supply and Import Demand Elasticities", IMF working paper number 10/180.

Williamson, J. (1993), "Exchange Rate Management", *The Economic Journal* **103**, 188-97.