



## Export diversification in the franc zone: its extent, sophistication and dynamics

### Introduction

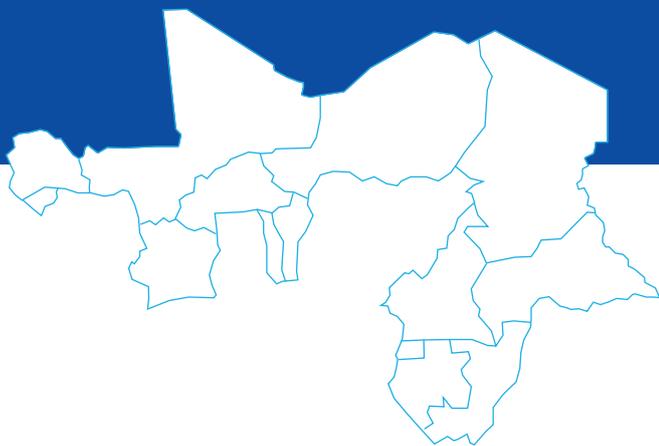
It is now a widely recognised fact in the economic literature that the level of per capita income and the degree of sectoral concentration of economic activity evolve together over the long term. The empirical research of Imbs and Wacziarg (2003) has notably shown that production diversification and wealth go hand in hand in countries with a low per capita income. More recently, various studies have found that export diversification is similarly linked to per capita income (Klinger and Lederman, 2006; Hesse, 2009; Cadot *et al.*, 2011): export diversification increases as per capita income rises, at least up to a certain level of income.<sup>[1]</sup>

This type of approach, however, does not exhaust the analysis of the phenomenon of export diversification. More specifically, it does not allow an investigation of how export structures evolve over the short and medium term. Yet, these time scales can in fact prove useful to more clearly identify the factors that impede diversification. It is thus on this aspect of export diversification that the present study will focus.

Christophe Cottet ([cottetc@afd.fr](mailto:cottetc@afd.fr))  
 Nicole Madariaga ([madariagan@afd.fr](mailto:madariagan@afd.fr))  
*Macroeconomic Analysis  
 and Country Risk Unit  
 Research Department, AFD*  
 Nicolas Jégou  
*Administrator at INSEE*

Much of the research on this aspect of export diversification has above all addressed industrialised or emerging countries (Rodrik, 2006; Besedes and Prusa, 2011), which is all the more regrettable given that high degrees of export concentration heighten the vulnerability of the poorest countries. This paper therefore examines a group of countries

[1] Above a certain level of income, this relationship is reversed. However, the level of per capita income above which this turning point occurs is high (from USD 20,000 to 22,000 per capita according to Cadot *et al.*, 2011); at low per capita income levels, the relationship is thus positive. The United Nations Economic Commission for Africa (UNECA, 2007) confirms that export diversification trends upwards with the income of African countries.



that are particularly concerned in this respect: the countries of the franc zone. Two main reasons underlie this choice. First, detailed analyses on export diversification in franc zone countries are very few and far between,<sup>[2]</sup> most likely due to the poor quality of the data available for this zone. And yet, export concentration appears to be one of the core explanatory factors for their disappointing growth rates in recent years (IMF, 2010; Osakwe, 2007). Second, as Easterly and Reshef (2010) show for several African countries, a low degree of export diversification does not necessarily imply that diversification dynamics are absent. The export bases of even the poorest countries are revived and sometimes enhanced by the emergence of new goods. To our knowledge, this question has never been addressed in the case of the franc zone countries.

Drawing on recent findings in the empirical literature on export diversification, this study proposes to move beyond the standard analysis of the degree of diversification in the franc zone countries based on the classic measures (Herfindahl index, Theil index, etc.). These are in fact poorly adapted to deal with short- and medium-term dynamics (slow moving indicator, non-linearity of the diversification process, no capture of export sophistication, etc.).

With the new analytical tools for studying the dynamics of diversification, a better understanding can be gained of what leads to blockages in the diversification process. When a country's export sector has a very weakly diversified export sector, greater diversification implies either creating and promoting new export lines (referred to as the extensive margin),<sup>[3]</sup> or also increasing or maintaining the levels of existing exports (in this case, we refer to the intensive margin). Moreover, by pointing up the link between economic

growth and the level of "implied" productivity of exported goods, many empirical studies (Hausmann and Rodrik, 2003; Hausmann *et al.*, 2006; Rodrik, 2006; Hausmann and Klinger, 2006) have recently refocused the debate on analysing the content of diversification.

After substantial treatment of the most frequently used international trade database, the study draws on all of the related literature to create original measures. These are designed to give a better understanding of the dynamics of export diversification in franc zone countries between 1995 and 2007. Three main findings emerge from our study:

- *diversification processes in the franc zone are very heterogeneous.* When compared at an international scale, the exports of franc zone countries all appear to be highly concentrated; on the other hand, their diversification processes seem much more differentiated as soon as they are analysed on a country-by-country basis;
- *for an equivalent per capita income, the franc zone countries are characterised more by a low rate of industrial export growth than by a low level of diversification.* This distinctive feature appears to be a blocking factor for the growth of exports and the economy as a whole;
- *new export products have contributed only slightly to total export growth.* Contrary to other sub-Saharan African countries, the difficulties encountered in supporting and promoting new products in the franc zone curb the emergence of new sustainable export products; export dynamics then crucially depend on the performance of the traditional export base.

[2] One of the rare studies that has come to our attention on this subject and zone is the paper by the Banque de France (2007) on the countries of the Central African Economic and Monetary Community (CEMAC).

[3] See Cadot *et al.* (2009) and Besedes and Prusa (2011) for a brief survey of the related literature.

# Table of contents

After a cursory review of recent developments in the related literature, the second part of this paper proposes three measures of export diversification. The third part focuses on how the data are chosen and treated, which are particularly sensitive issues in the franc zone. To conclude, the fourth part presents the results of this study.

|  |           |
|--|-----------|
| <b>1 / MEASURING DIVERSIFICATION: THREE INDICATORS FOR THREE DIMENSIONS OF THE PROCESS</b>                           | <b>4</b>  |
| 1.1. Traditional indices: a measure of export vulnerability that neglects sophistication and capacity for innovation | 4         |
| 1.2. Capturing the type and level of exported products: the value of industrial exports as a share of the population | 5         |
| 1.3. Diversification dynamics and the capacity to export new products  | 7         |
| <b>2 / CHOICE AND TREATMENT OF THE DATABASE</b>  | <b>10</b> |
| 2.1. The statistical limits of Comtrade  | 10        |
| 2.2. BACI: a database adapted to franc zone countries after treatment of re-exports                                  | 11        |
| 2.3. Modification of how the data are aggregated at product level  | 12        |
| <b>3 / RESULTS</b>   | <b>13</b> |
| 3.1. Exports more concentrated than elsewhere, in line with the level of wealth of the franc zone countries          | 13        |
| 3.2. The dynamics of export sophistication differ considerably across the franc zone countries                       | 16        |
| 3.3. Do franc zone countries manage to create "Big Hits"?  | 19        |
| <b>CONCLUSION</b>  | <b>26</b> |
| <b>APPENDIX</b>  | <b>28</b> |
| INDICES AND DATA PRESENTATION  |           |
| LIST OF ACRONYMS AND ABBREVIATIONS   | 30        |
| REFERENCES   | 30        |

# 1 / Measuring diversification: three indicators for three dimensions of the process

Beyond the classic export diversification indices, we propose two novel measures that enable a deeper analysis of diversification dynamics in franc zone countries: a measure of technological sophistication and measure of export base renewal.

## 1.1. Traditional indices: a measure of export vulnerability that neglects sophistication and capacity for innovation

The first and most frequently captured dimension of diversification is the weight of each sector in total exports. According to this approach, the less a country depends on a limited number of export goods, the more it is diversified. And conversely, when a large share of a country's exports is made up of one or more goods, exports are deemed to be concentrated and constitute a source of vulnerability. The theoretical link between diversification and a reduction in vulnerability is akin to the link whereby risk in a financial portfolio is expected to decrease when the portfolio is diversified. As Imbs and Wacziarg (2003) point out, "the law of large numbers suggest[s] that diversification should help dampen the effects of "sector-specific shocks" (p.63). Moreover, at low levels of development, countries generally specialise in products derived from their natural resource endowments. This type of specialisation reinforces the vulnerability associated with a high degree of concentration given the instability of prices, production conditions and demand for this type of commodity.

We have chosen to measure this dimension of diversification using the Herfindahl index. This synthetic indicator of export diversification is among the most commonly used, along with the Gini and the Theil entropy indices (Cadot *et al.*, 2009). Out of the three indices (briefly characterised in Table 7 in the Appendix), we opted for the Herfindahl index as it is the easiest to programme and the most widely used in the export diversification literature.<sup>[4]</sup> The index is computed as follows:

$$H = \sum_i s_i^2 \quad (1)$$

where  $s_i = x_i / \sum x_i$  is the share of the export line  $i$  in total exports, with  $x_i$  being the value of the exported good  $i$ . It is then normalised for simplicity:

$$H' = H - \frac{1}{n} / 1 - \frac{1}{n} \quad (2)$$

where  $n$  corresponds to the total number of export lines. This index is not strictly speaking a diversification index but, on the contrary, an export concentration index:  $H'$  is in fact equal to 0 when diversification is maximal ( $n$  lines exported in equal quantities), and tends to 1 as concentration reaches a maximum (one single export line). Interpreted in terms of vulnerability, when the index is equal to 1, the country is thus entirely dependent on a single product for its exports.

[4] Our conclusions are not modified by the choice of this index, as the three indices yield very similar results.



At this stage, it should be pointed out that the Herfindahl index needs to be used somewhat cautiously when interpreting differences and trajectories in franc zone diversification, and this on two counts:

- owing to its quadratic form, the Herfindahl index gives a very heavy weighting to products that account for a large share of total exports and, more specifically, to the main export product.<sup>[5]</sup> One consequence of this, which is problematic for our study, is that the Herfindahl index is not very sensitive to the appearance of new export products. In fact, these need to account for a significant share of total exports to cause a marked decrease in the Herfindahl index;
- the Herfindahl index provides no information on the capacity to incorporate technological content into export products.

## 1.2. Capturing the type and level of exported products: the value of industrial exports as a share of the population

### 1.2.1. Export sophistication is crucial to diversification

Although the Herfindahl index does capture the level of diversification, it says nothing on how the nature of this diversification evolves, particularly the distribution between primary and processed goods and, thus, on the technological content of exported goods. Yet, in the literature, the nature of diversification is considered to be an important question. Export of agricultural products per se has long been, and still is, regarded as a factor of weak or “bad” growth. Prebisch (1959) thus emitted the hypothesis that, over a long time period, the price of non-processed goods, taken as a whole, would decrease relative to the price of manufactured goods, thus impoverishing the country

exporting them. As a result, research into the consequences of concentration levels have ultimately dovetailed with studies dealing with the different types of specialisation: a high degree of export concentration most often gives rise to hyper-specialisation in natural resources or primary products.<sup>[6]</sup> It is then critical that an economy become industrialised to broaden out the export base.

The challenge of developing industrial exports does not, however, simply involve increasing the level of diversification. In their unequivocally titled paper (“What You Export Matters”), Hausmann *et al.* (2007) show that any effort able to shift the export base towards higher value-added activities leads to higher economic growth in the future.<sup>[7]</sup> Thus, “countries become what they produce” (p.2). The authors attribute the dynamic effect of the mode of specialisation to what Hausmann and Rodrik (2003) term the absorption of “discovery costs”: a country’s economic growth gains pace when entrepreneurs can readily access production practices that incorporate technological know-how. This is conducive to the diffusion of new production techniques and facilitates a diversification of production.

The appropriation of such knowledge, however, entails a very costly discovery process due to the uncertainty involved in making a success of investment in the production and exportation of a new product. Once this discovery cost has been absorbed by the very first innovator(s), other national entrepreneurs will likely be prompted to step up their investments in those sectors already identified as yielding high returns. This imitation would then induce a transfer of resources from low-productivity activities to high-productivity activities, which is a key factor for increasing economic growth. It is thus the rhythm at which investments accumulate in the discovery process that enables a country to move away from a trade specialisation predicted by its factor endowments. The authors thus suggest that “[a] country’s fundamentals

[5] If we take the Congo, where crude oil accounts for 86% of exports, its Herfindahl index attributes 99.7 % of the country’s exports to oil. As such, price variations or statistical errors that affect the main export product may translate into large index variations, which will be wrongly interpreted as evidence of diversification. This problem is obviously less pronounced in countries with a more diversified export base.

[6] Since the work of Sachs and Warner (1997), this pathway to global integration is perceived as extremely negative and has given rise to a large body of literature on what is now commonly termed the “natural resource curse” (Gylfason, 2008).

[7] To reach this conclusion, Hausmann *et al.* (2007) examine the econometric relationship between economic growth and “a measure of the productivity level associated with a country’s specialization pattern”.

general allow it to produce more sophisticated goods than it currently produces” (Hausmann *et al.*, 2007, p. 24).

This new direction taken by the literature has important implications. First of all, the fact that a country exports industrial products can be important in the long run, even if these remain limited during a first phase. They show that investment in discovery has been made, stimulating the appropriation and diffusion of such discoveries. Moreover, this literature also prompts fresh thinking on the criticisms levelled against the strategies of moving up the value chains, which are not always seen as leading to true diversification. Products along the same chain are effectively all sensitive to the same types of shocks (variations in the raw materials prices, etc.). The literature on “product space” in fact shows that, while technological leaps are possible, these are most likely to occur at an initial stage along the same chain (Hidalgo *et al.*, 2007).<sup>[8]</sup> Although developing a value chain can indeed mean that exports become highly vulnerable to the shocks affecting the products on which they are based, it can also produce accelerated future growth if it helps to reduce discovery costs.

### 1.2.2. *The level of industrial exports as a share of the population as a measure of export sophistication*

To address some of the limits of the Herfindahl index, we propose a new index allowing export sophistication to be measured. This expresses the real value of industrial exports as a share of the population (see Box 1 for a justification of the ratio’s denominator):

$$I_{indus} = \frac{\sum_{i \in K} x_i}{POP}$$

where  $K$  covers the subgroup of industrial products and  $POP$  is the population of the country. This index makes it possible to distinguish export products other than the agricultural and extractive products that make up the predominant share of the franc zone countries’ export baskets.  $I_{indus}$  thus allows us to capture the diversification potential of the industrial sector, even if this sector is marginal – which the Herfindahl index is not able to do. This measure is supplemented by an analysis of both the value chain to which the export products belong and their level of technology (cf. section 3 for this decomposition). This cross analysis makes it possible to assess the broadening out of the “product space”.

---

[8] The literature on product space examines the probability that a country exporting a specific type of good will launch another type of good. This probability is a measure of the technological proximity between different goods. Thus, certain export specialisations foster diversification towards a very broad range of products, whereas the type of specialisation in the franc zone countries generally limits diversification to moving up the value chains.

## Box

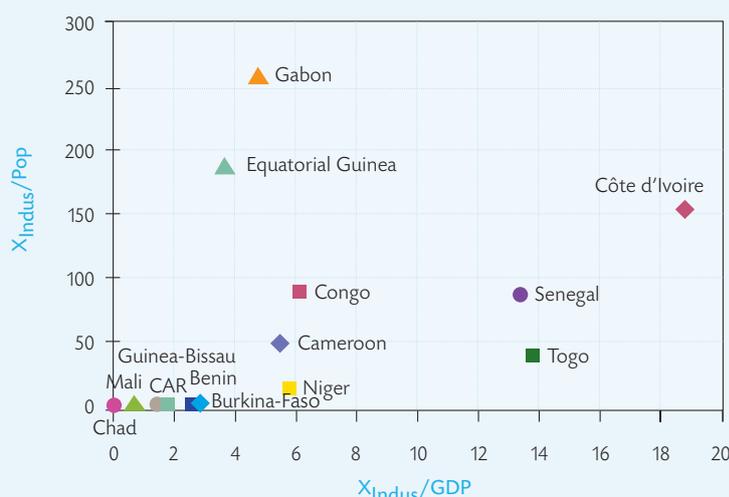
1

### Why relate the level of industrial exports to population rather than gross domestic product (GDP)?

As an international comparison of industrial export levels per se provides no direct economic interpretation, we computed ratios giving these levels as a share of the population of the individual zone franc countries. But why choose population rather than GDP? The reason lies in the marked differences between these countries' production structures. The oil-producing countries have a much higher GDP per capita than the non-oil countries. Consequently, the ratio of their industrial exports to GDP automatically tends to be weaker and masks the value of their industrial exports. This can be seen in Figure 1 illustrating the case of two oil-exporting countries, Gabon and Equatorial Guinea. These two countries are positioned very differently depending on the chosen denominator. Expressed as a ratio of the population, the level of their industrial exports is very high, whereas as a ratio to GDP it appears to be average.

Figure 1

Comparison of the real average value of industrial exports as a ratio of the population (in USD per capita) and to GDP (in %) between 2002 and 2006



Source : Comtrade, AMR calculations.

## 1.3.

### Diversification dynamics and the capacity to export new products

#### 1.3.1. Central to export diversification is the capacity to export new products

It is likely that, in its first stages, diversification will not come about within a group of already exported products (by a rebalancing of the shares of each product within a fixed basket of export goods), but rather due to the export of new products (cf. Cadot *et al.*, 2011).

For countries with a low level of diversification, as is the case of most franc zone countries, the capacity to create new export lines is thus crucial. This creative capacity is all the more important as moving up the value-added chain – which stimulates economic growth – mainly occurs by creating new export lines. If the new export lines are sustained over time and consolidated, this can substantially change a country's export structure and foster economic growth.

- *Deepening the traditional analysis of diversification*

In line with Melitz's (2003) groundbreaking article, a good many studies decompose export growth according to whether it is due to the export of new products (referred to as the extensive margin) or based on the increased export of existing products (referred to as the intensive margin). Depending on which margin is dominant, export growth may be driven by either diversification (at the extensive margin) or specialisation through the intensification of existing exports (at the intensive margin). When the extensive margin dominates the intensive margin (as shown by Hummels and Klenow, 2005; Pham and Martin, 2007; or Cadot *et al.*, 2011), the emergence of new export products may drive economic growth, particularly if these correspond to a move up the value chain (Hausmann and Klinger, 2006) or stem from a patented innovation or simple imitation (Klinger and Lederman, 2006). The supremacy of the extensive margin over the intensive margin depends on (i) the discovery costs of new products for entrepreneurs (Hausmann and Rodrik, 2003) and (ii) the failure rate of new export lines<sup>[9]</sup> (Besedes and Prusa, 2011). Conversely, when the intensive margin accounts for most of the export growth (Helpman *et al.*, 2008; Brenton and Newfarmer, 2009), this may reflect specialisation, or further concentration, of the export base, especially when the extensive margin is negligible. Various studies have sought to test empirically which of the two margins is dominant in long-term global export growth.

- *Export diversification in poor countries: the question of the "Big Hits"*

The start-up of new export lines is not necessarily an end in itself. Nor is it a guarantee of export diversification. To be successful, diversification also requires that the new products, once launched, become sustainable over time. This thus leads to alternating phases of diversification and intensification or concentration. Ultimately, the long-run diversification pathway appears more or less linear. But there may be pheno-

mena such as the so-called "Big Hits", whereby a few key products become the engines of export growth. Foregrounded by Easterly and Reshef (2010), these Big Hits, typically associated with industrialised countries, have also boosted exports in many sub-Saharan African countries: coffee and handicraft in Rwanda, coffee and flowers in Uganda, and fish in Tanzania. As Amiti and Freund (2010) also show for China, this country's export success hinges more on specialisation in certain manufactured products than on diversification. This success was fostered by state industrial policies that structured China's export profile along the lines of those of countries on average three times as rich as itself (in terms of GDP), rather than those in countries with similar competitive advantages (Rodrik, 2006).<sup>[10]</sup> Nevertheless, Easterly and Reshef (2010) show that specialising in manufactured products is not the sole and obligatory avenue to growth, as the studies on the "natural resource curse" would seem to suggest. Certainly, many developing countries have grounded their export successes on agricultural products or natural resources, bolstered by the effects of reputation, quality or promotion, which partly cut them loose from the constraint of global price variations.

Recent literature on extensive and intensive margins has developed a more detailed analysis of diversification than the simple observations realised by the standard diversification measures. Applied to the franc zone countries, this analysis will provide valuable information on the different stages of diversification or specialisation stages experienced by these countries' export structures. It can help to identify reshufflings of the export base, characterised by a low intensive margin caused by the decline of key traditional exports, combined with a high extensive margin. It is also possible to identify moves up the production chain that are based on natural resources already exported in high volumes (the cocoa or oil sectors, for example).

[9] A survival rate of over two years for new products would be particularly low.

[10] However, if China has successfully improved the technological content of its exports, this is mainly because it imports intermediary products, thus reducing the real technological content of the value-added of Chinese exports (Amiti and Freund, 2010).



### 1.3.2. Extensive and intensive margins: an analysis of export growth dynamics

The third measure aims to supplement the findings of the two previous indices by decomposing export growth into one part based on the export of new products (extensive margin) and another part based on an increase in the export of traditional products (intensive margin). By way of reminder, the extensive margin quantifies the expansion of the panel of goods exported, whereas the intensive margin assesses the intensification in the export of already exported goods.

The concepts of extensive and intensive margins are measured in various ways in the export diversification literature. Some authors rely on the decomposition of an entropy index<sup>[11]</sup> (Cadot *et al.*, 2011), while some differentiate the two margins with the help of an export duration model<sup>[12]</sup> (Besedes and Prusa, 2011), and others incorporate the geographic dimension into the definition of the extensive margin<sup>[13]</sup> (Amurgo-Pacheco and Pierola, 2008). The methods we chose to measure the extensive and intensive margins draw on the work of Easterly and Reshef (2010) and Amiti and Freund (2010). They decompose export growth as follows:

$$\frac{x_t - x_{t-1}}{x_{t-1}} = \underbrace{\frac{t_t - t_{t-1}}{x_{t-1}}}_{\text{Intensive margin}} + \underbrace{\frac{n_t - d_{t-1}}{x_{t-1}}}_{\text{Extensive margin}} \quad (4)$$

where  $x_{t-1}$  are total exports for the period  $t-1$  and  $x_t$  the exports for period  $t$ .

The intensive margin is measured by export growth due to so-called “traditional” products (designated as  $t$ ) that were exported at  $t-1$  and  $t$ .

The extensive margin is measured by the increase in exports due to the net export of new products, in other words, the difference between the new goods exported ( $n$ ) at period  $t$  and the goods that had exited exports ( $d$ ) since the period  $t-1$ .

In our study,  $t-1$  covers the period 1995–1997 and  $t$  corresponds to the period 2005–2007.

These three-year averages allow us to smooth eventual irregularities in reporting or exceptional exports of new products when calculating the extensive margin. In addition, we have eliminated goods that account for less than 0.3% of total exports as these are likely to reflect reporting errors. If these goods are taken to be active in the export base in the initial period, this could introduce a downward bias into the measurement of the extensive margin. Eliminating these thus helps to limit this risk.

The novel aspect of this study is to decompose the intensive margin in such a way as to differentiate the contribution to export growth of products that were just emerging in the 1995–1997 period from that of key traditional export products at the beginning of the same period. We have thus distinguished three types of goods in the second term of equation (4):

- goods with low export levels ( $t_L$ ) in period  $t-1$ , which would thus represent between 0.3 and 2% of total exports;
- goods with moderate export levels ( $t_M$ ) in period  $t-1$ , which would thus represent between 2 and 10% of total exports; and
- key traditional export products ( $t_K$ ) in period  $t-1$ , which would thus represent over 10% of total exports.

[11] With two subgroups of products: the group of new export products (extensive margin) between two points in time and the group of products that were exported at the two points in time (intensive margin).

[12] The export duration model in fact allows the entry and exit rates (their difference defines the extensive margin) to be measured and introduces the notion of the survival rate for new products, which makes it possible to assess the extensive margin’s capacity to change into a “sustainable” intensive margin.

[13] The extensive margin thus measures the share of export growth attributable to the export of new products and/or to new destinations.

The second term of equation (4) can thus be rewritten as follows:

$$\frac{t_t - t_{t-1}}{x_{t-1}} = \underbrace{\frac{t_{Lt} - t_{Lt-1}}{x_{t-1}}}_{\text{Low}} + \underbrace{\frac{t_{Mt} - t_{Mt-1}}{x_{t-1}}}_{\text{Moderate}} + \underbrace{\frac{t_{Kt} - t_{Kt-1}}{x_{t-1}}}_{\text{Key}} \quad (5)$$

This decomposition of the intensive margin allows us to identify whether, among the traditional goods, it is the key products or rather the Big Hits that have fostered export growth. Beyond the question of the relative values of the extensive and intensive margins, the technological content of the products constituting these margins is also an avenue that should be further explored so as to identify what impact they have on the dynamic of global exports.

## 2/ Choice and treatment of the database

### 2.1. The statistical limits of Comtrade

The Commodity Trade Statistics Database (Comtrade) of the United Nations Conference on Trade and Development (UNCTAD) is the most commonly used to analyse export diversification. It classifies exports by country, product and year.<sup>[14]</sup> However, the database does have three important limitations:

- *Comtrade is characterised by large gaps in the data and the uneven quality of its reported data.* For example, a country may not provide data for a given year, which is often the case for franc zone countries: a third of the reporting base (country/year) for the zone (from 1995 to 2007) is affected by missing data. Moreover, the problem of the quality of the information provided to Comtrade seems relatively acute for franc zone countries. Informal trade flows, which are sizeable in this sub-region, are by definition not taken into account. On top of these limits, weak statistical systems are a further source of error regarding the amount of trade carried out or the classification of goods (cf. Table 8 in the Appendix);

- *discrepancies between import and export values do not allow the systematic use of “mirror” data in order to compensate for the limits of the export data.* For the same flow, UNCTAD is supposed to record the data provided by both the exporter and importer (“mirror” data). Import data from the trading partner can thus substitute export data in case of missing data. Two problems nonetheless arise here. Firstly, as export flows are reported forward on board (FOB), there may be a potentially significant discrepancy compared to the value of import flows, which in fact include cost, insurance and freight (CIF).<sup>[15]</sup> Secondly, mirror data are themselves sometimes subject to substantial errors or reporting gaps when the importing country is itself an unreliable reporter. This also holds true for industrialised countries, whose statistical system is deemed to be more reliable. These countries sometimes “fail” to declare all or part of the export value of “sensitive” products (gold or uranium, for example). In total, the value of the flows that are reported by only one partner (imports or exports) represents nearly 33% of the value of total flows.

[14] See the website <http://comtrade.un.org/>. Each year, participating countries are required to submit data on their exports and imports of goods, specifying the trade partner, the dollar amount involved and the volume of the transaction, as well as the classification of the good according to an internationally harmonised system. Since 1992, this classification of goods has used the nomenclature of the Harmonized System (HS) defined by the World Customs Organization (WCO). This covers more than 5,000 product groups at the 6-digit level of disaggregation. Table 9 in the Appendix gives a line example (which we will hereafter refer to as a flow) of a file retrieved from Comtrade.

[15] Anderson and Wincoop (2004) have calculated that cost, insurance and freight accounted on average for 8% of the FOB value of the good, but that this value depends on the distance between the trading partners and the nature of the good.



- *export data are likely to include re-exports.* Re-export involves the export of goods that transit through a country without undergoing any further processing within that country. They do not therefore belong to the diversification process strictly speaking, which supposes that the productive base evolves. Re-exports are especially present in countries with ports, such as Benin or Togo, that serve as logistic platforms for the sub-region. Re-exports must nevertheless be identified as very few African countries actually report them as such.

## 2.2. BACI: a database adapted to franc zone countries after treatment of re-exports

Comtrade's various limits mean that statistical treatment is required in order to increase its reliability. Several bodies offer corrected versions of this database, but only the *Centre d'études prospectives et d'informations internationales* (CEPII) produces a dataset covering all of the franc zone countries (cf. Table 1). For our work, we thus chose to use the *Base pour l'analyse du commerce international* (BACI – International Trade Database at the Product-Level). Moreover, BACI's key contribution is that it reconciles mirror figures in two steps so as to optimise the information contained in the export and import data series. First, the CIF-reported imports have their transport costs removed to enable comparisons with FOB-reported exports.<sup>[16]</sup> Secondly, the mirror export and import data are "reconciled" by averaging the two values, weighted by the reliability of each country's reporting.<sup>[17]</sup> When only the importer or exporter has provided data for a goods flow, these data are conserved once they have had CIF costs removed.

We did however carry out two treatment steps on BACI data. The most important involved the problem of re-exports that is still present in BACI. We thus made line-by-line corrections, deleting the flows that were obviously re-exports. Three criteria were used to identify these flows: (i) the product is clearly not manufactured by the country (refined petroleum, tanks or helicopters); (ii) the flow appears in only one single year; and, (iii) in the case of countries with ports, the assumption of re-exporting is strengthened when the partner country is reputed to be a re-export destination (exports from Benin to Nigeria, for example). As a second step, exports values expressed in current dollars were deflated by the American consumer price index. The data is thus expressed in constant 2000 dollars.

[16] The CIF/FOB factor is estimated by regressing the ratio of importer-reported to exporter-reported data, according to the good under consideration, the distance between the two trading partners and their landlockedness. This correction coefficient correction averages 3.3%.

[17] See Gaulier and Zignago (2010) for a more detailed explanation of the method used.

Table

1

## Description of the international trade databases decomposed at product level

|                              | COMTRADE  | NBER-UN                | CHELEM                                    | BACI  |
|------------------------------|-----------|------------------------|---|---|
| Period                       | 1962-2009 | 1962-2000              | 1967-2005                                 | 1995-2007   |
| Countries/zones covered      | 170       | 72                     | 82  | 239   |
| Franc zone countries covered | 14        | 0                      | 3   | 14  |
| Classification               | HS 6      | SITC 4                 | CHELEM                                    | HS 6  |
| Treatment of re-exports      | No        | No                     | Yes, if possible                          | Yes, if possible                                      |
| Treatment of mirror data     | None      | Importer-reported data | According to reliability of the reporting | Average according to the reliability of the reporting |
| Treatment of CIF/FOB         | No        | No                     | Yes                                       | Yes   |

Source : Feenstra et al. (2005) for NBER-UN, De Saint-Vaulry (2008) for CHELEM and Gaulier and Zignago (2010) for BACI.

### 2.3. Modification of how the data are aggregated at product level

As indicated in Table 2, all the databases have their own product classification system. Like Comtrade, BACI categorises products according to sectors of activity (animal products, textile products, machines, transport, etc.) based on the nomenclature of the internationally "Harmonized System" (HS). The level of aggregation adopted by BACI is HS6, equivalent to a 6-digit codification, which is the most detailed possible (5,053 product references). This level of disaggregation raises problems on several counts. First of all, the HS was mainly established for customs tariffs purposes and the extremely detailed distinctions made between the products sometimes involve nuances that are irrelevant to our study. For example, a country may appear diversified quite simply because it exports textiles with different types of printed patterns. Furthermore, the level of disaggregation varies depending on the sectors, which may again bias the

assessment of the level of diversification in the franc zone countries. Finally, because of this sector-based approach, the way in which BACI aggregates data does not allow the products to be grouped according to their technological content. This type of grouping is nonetheless necessary to analyse the kind of diversification that interests us.

All of these limits led us to undertake two types of aggregation. As a first step, we re-aggregated the HS4 data (4 digits), making it possible to reduce the number of categories to 1,222 and thus to mitigate the bias induced by too detailed a level of disaggregation. This aggregation seems indispensable for a satisfactory interpretation of our indicators and complies with the literature on the subject (see notably Cadot *et al.*, 2011). In a second step, we differentiated the products on the basis of their degree of technological intensity by referring to the CEPII classification for its CHELEM database (see Table 2 for details on this matching).



Table

2

## Classification of products by level of technology, based on CEPII classification

|                         |  |  |
|-------------------------|--|--|
| Industrial products     | High-technology products   | Medical and precision instruments  |
|                         |  | Pharmaceuticals<br>Radio, TV and communication<br>Office, accounting and computing<br>Aircraft and spacecraft  |
|                         | Medium-high-technology products  | Railroad and other transport equipment<br>Motor vehicles, trailers<br>Other electrical machines and apparatus<br>Machinery and equipment<br>Chemicals (excl. pharmaceuticals)  |
|                         | Medium-low-technology products   | Rubber and plastic products<br>Ships and boats<br>Basic and cast non-ferrous articles<br>Other non-metallic mineral products<br>Other manufacturing and recycled products<br>Fabricated metallic products exc. machines<br>Basic and cast iron and steel<br>Coke, refined petroleum products, nuclear fuel |
| Low-technology products | Paper and printed products<br>Textiles, leather and footwear<br>Food products, beverages, tobacco<br>Wood and wood products (excl. furniture), straw |  |
| Non-industrial products | Non-manufactured products  |  |

Source : CHELEM database.

## 3 / Results

### 3.1. Exports more concentrated than elsewhere, in line with the level of wealth of the franc zone countries

Exports from the franc zone countries are considered to be very concentrated on a limited number of products with high technological content, which confirms the statistics reported in Table 3, showing the average share of the top five export products as a percentage of total exports, for the time spell 2002-2006, as well as the level of total exports as a share of GDP. Averaged out, the share of the top-ranked export

good in total exports is 55%: this thus represents more than half of total exports in 8 out of 14 franc zone countries. In most of the oil-exporting countries, oil very much dominates total exports (Equatorial Guinea: 91 %; Chad: 90 %; Congo: 81 %; Gabon: 74 %). The top-ranked export product is no less dominant in some non-oil countries such as Guinea Bissau (72 %; cashew nuts), Burkina Faso (67 %; cotton) or Mali (62 %; gold). The Côte d'Ivoire, Senegal and Togo are exceptions, with a top-ranked export product accounting for substantially less than half total exports.

Table

3

Shares of the five top export products in the franc zone countries in total exports (%; averages for 2002-2006)

| Share of the first good under 50% of total exports |                      |                  |              | Share of the first good over 50% of total exports |                      |                  |             |
|--|----------------------|------------------|--------------|---|----------------------|------------------|-------------|
| Country  | Main goods           | Share of exports | Exports/ GDP | Country   | Main goods           | Share of exports | Exports/GDP |
| Senegal  | Refined petroleum    | 16               | 17           | Central African Republic                          | Diamonds             | 51               | 13          |
|  | Phosphoric acid      | 11               |              |   | Rough wood           | 27               |             |
|  | Molluscs             | 6                |              |   | Cotton               | 7                |             |
|  | Fresh fish           | 4                |              |   | Sawn wood            | 6                |             |
|  | Ground-nut oil       | 4                |              |   | Coffee               | 1                |             |
| Togo   | Cement               | 16               | 28           | Mali  | Gold                 | 62               | 21          |
|  | Phosphate            | 12               |              |   | Cotton               | 24               |             |
|  | Cotton               | 11               |              |   | Bovine animals       | 3                |             |
|  | Cocoa beans          | 9                |              |   | Boats                | 2                |             |
|  | Boats                | 4                |              |   | Sheep and goats      | 1                |             |
| Côte d'Ivoire                                      | Cocoa beans          | 28               | 39           | Burkina Faso                                      | Cotton               | 67               | 8           |
|  | Refined petroleum    | 14               |              |   | Oilseed              | 5                |             |
|  | Crude oil            | 7                |              |   | Sugar                | 3                |             |
|  | Cocoa butter         | 5                |              |   | Cigarettes           | 2                |             |
|  | Sawn wood            | 3                |              |   | Fruit                | 1                |             |
| Niger  | Radioactive products | 32               | 12           | Guinea-Bissau                                     | Cashew nuts          | 72               | 15          |
|  | Uranium              | 23               |              |   | Crude oil            | 10               |             |
|  | Gold                 | 7                |              |   | Frozen fish          | 5                |             |
|  | Onions, garlic...    | 5                |              |   | Molluscs             | 2                |             |
|  | Sheep and goats      | 5                |              |   | Cotton               | 1                |             |
| Cameroon   | Crude oil            | 43               | 19           | Gabon   | Crude oil            | 74               | 49          |
|  | Sawn wood            | 12               |              |   | Rough wood           | 10               |             |
|  | Refined petroleum    | 7                |              |   | Manganese            | 5                |             |
|  | Bananas              | 7                |              |   | Sheets for veneering | 3                |             |
|  | Cocoa beans          | 6                |              |   | Sawn wood            | 2                |             |
| Benin  | Cotton               | 44               | 9            | Congo   | Crude oil            | 81               | 62          |
|  | Coconut              | 8                |              |   | Rough wood           | 5                |             |
|  | Copper scrap         | 4                |              |   | Refined petroleum    | 4                |             |
|  | Cigarettes           | 4                |              |   | Gas                  | 2                |             |
|  | Meat                 | 3                |              |   | Cobalt               | 2                |             |
|  |                      |                  |              | Chad  | Crude oil            | 90               | 15          |
|  |                      |                  |              |   | Cotton               | 7                |             |
|  |                      |                  |              |   | Gum Arabic           | 2                |             |
|  |                      |                  |              | Equatorial Guinea                                 | Crude oil            | 91               | 60          |
|  |                      |                  |              |   | Methanol             | 4                |             |
|  |                      |                  |              |   | Rough wood           | 2                |             |
|  |                      |                  |              |   | Gas                  | 2                |             |

Source : BACI with treatment by the authors; authors' calculations.

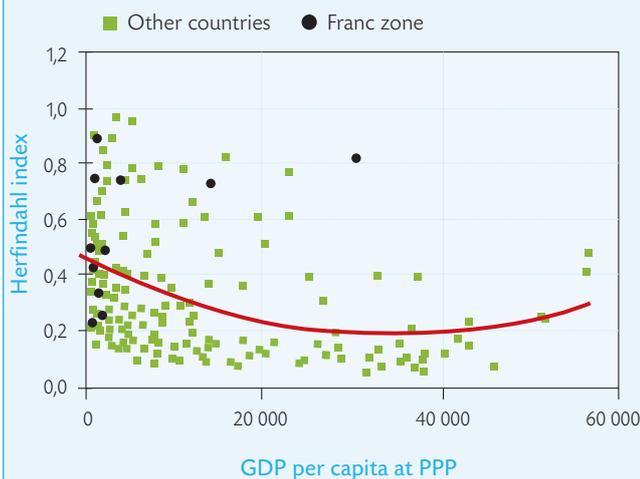


How does their export concentration fare when compared internationally? Figure 2 shows that franc zone country exports are among the most concentrated in the world. However, it should be noted that the average level of export concentration is close to that for countries with a similar level of per capita income. Certainly, in line with theoretical findings on the linkage

between export diversification and the level of wealth (Hesse, 2009; Cadot *et al.*, 2011), franc zone countries (just like other low per-capita income countries) are for the most part mapped to the left and close to the U-curve (Figure 2). Only two oil-producing countries in the zone are exceptions with a particularly high export concentration given their per capita income.

Figure 2

Export concentration and GDP per capita at purchasing power parity (PPP) (average 2006-2009)

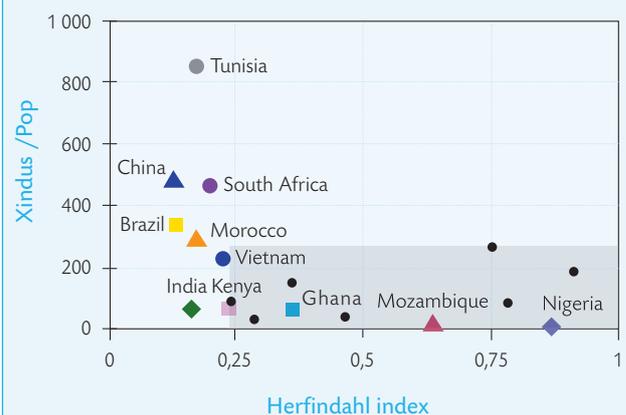


Sources : UNCTAD and International Monetary Fund (FMI). The red curve is a polynomial trend.

Yet, as we have seen, the Herfindahl index is not adequate for the purpose of characterising a country's export diversification, given that it does not capture the technological differences of the various export products and, by construction, under-evaluates the marginal export lines of countries whose exports are concentrated (cf. Table 3). The joint use of the Herfindahl index and the ratio of industrial exports to the population (cf. Figure 3) offers a partial response to these limits. This dual mapping confirms that the franc zone countries have a relatively higher degree of concentration than many other developing or emerging countries. In

Figure 3

Level of industrial exports to population and the Herfindahl index (average 2002-2006)



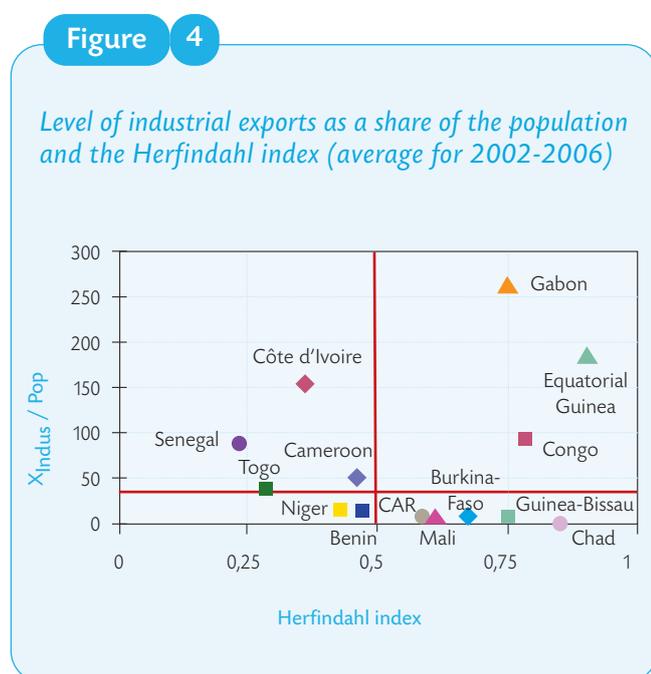
Source : BACI, AMR calculations. All of the franc zone countries, shown as black dots, are located in the shaded area.

addition, the level of sophistication also seems to be lower. The level of industrial exports as a share of the population is logically higher than in those countries at a more advanced stage of development. Yet, it can be seen that the franc zone countries are not substantially different from the other sub-Saharan African countries whose per capita income is similar to theirs. Thus, the export structure of the other sub-Saharan African countries in the sample (Ghana, Kenya, Mozambique, Nigeria) is more concentrated than that of the most diversified franc zone countries. Moreover, the industrial export ratios are equivalent

to – or lower than – those found for the franc zone countries. Consequently, all of the sub-Saharan African countries are located in the shaded area of Figure 3 that delimits the maximal levels reached by the diversification indicators for the franc zone countries.

### 3.2. The dynamics of export sophistication differ considerably across the franc zone countries

Although, in global comparisons, the franc zone countries all appear to have highly concentrated export structures and export relatively few industrial products, this does not mean that they constitute a homogeneous bloc of exporters. Figure 4, which maps only the franc zone countries and the level of industrial exports as a share of the population, reveals considerable divergences across these countries.



Source : BACI, AMR calculations.  
Vertical red line: median of the Herfindahl index.  
Horizontal red line: median of the industrial exports to population.

We thus identified three groups of countries, according to their position relative to the median of the two indicators (in red on the graph) :

- *the countries that are the least concentrated and relatively diversified technologically speaking:* Cameroon, Côte d'Ivoire, Senegal and Togo show the lowest Herfindahl-index levels within the franc zone and the highest values for industrial exports as a share of the population. As indicated in Table 3, the second – and sometimes third – export product(s) for these countries in terms of share of total exports are in fact processed goods;
- *the countries that are highly concentrated and relatively diversified technologically speaking:* Congo, Gabon and Equatorial Guinea, whose exports are extremely concentrated, are also the countries with the highest level of export sophistication. Thus, although their exports are dominated by oil, these countries manage to export products with some technological content, even if they make up only a minor share of the country's export base. It should be remembered here that export rates vary considerably across franc zone countries (cf. Table 3): between 74 and 91% of GDP, depending on the countries, for the period 2002–2006, which represent much higher levels than those for Burkina Faso or Benin (9% of GDP), Senegal (18% of GDP) or Togo (28% of GDP) for instance. What is more, and contrary to what might be expected, these industrial exports are not limited to refined petroleum;
- *the countries with very little diversification:* the situation of the two previous country groups stands out from that of the remaining franc zone countries, which export no, or very few, industrial goods: Benin, Burkina Faso, Guinea-Bissau, Mali, Niger, Central African Republic and Chad. Moreover, most of these countries exhibit very high levels of concentration. Interpreting these differences in value on the Herfindahl index must nonetheless be relativized, given that the index fails to discriminate between variations in high values.

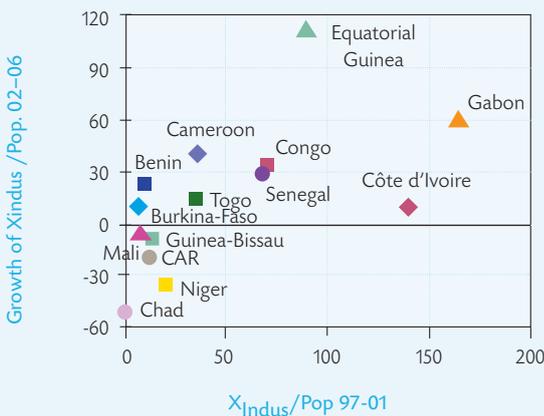


In addition to this snapshot of diversification, divergences in their dynamics also appear. Figure 5 shows that the growth in the value of industrial exports between the periods 1997–2001 and 2002–2006 differs sharply across the franc zone countries. The contrast is particularly sharp between the five countries (Guinea-Bissau, Mali, Niger, Central African Republic and Chad) that saw a drop in their industrial exports ratio between the two sub-periods and Equatorial

Guinea or Gabon, whose ratio increased by 50 %. What is also noticeable are disparities in technological diversification within the franc zone: the countries with an initially low level of industrial exports as a share of population experienced a low – or even negative – growth of this ratio between the two periods. Compared to the level in 1997–2001, the disparities in terms of industrial exports have thus widened in franc zone countries.

Figure 5

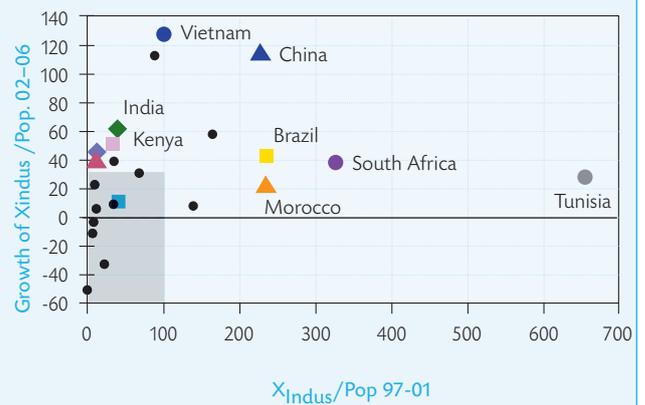
Growth rate of industrial exports as a share of the population between 2002–2006 and 1997–2001, and the level of the ratio in 1997–2001



Source : BACI, AMR calculations.

Figure 6

Growth rate of industrial exports as a share of the population between 2002–2006 and 1997–2001, and the level of the ratio in 1997–2001



Source : BACI, AMR calculations.  
All of the franc zone countries, shown as black dots, are located in the shaded area.

Table

4

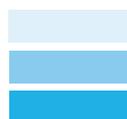
Average level and decomposition of industrial exports for seven franc zone countries in 2002–2006

|   | Country           | Total industrial exports |   | Main industrial goods exported |                                  |
|---|-------------------|--------------------------|---|--------------------------------|----------------------------------|
|   |                   | % of total exports       | Industrial exports<br>(constant 2000 USD<br>per capita) | Product name                   | % of total industrial<br>exports |
| Oil-producing and<br>industrialised countries | Gabon             | 10                       | 258   | Sheets for veneering           | 30                               |
|   |                   |                          |   | Sawn wood                      | 15                               |
|   |                   |                          |   | Refined petroleum              | 14                               |
|   | Equatorial Guinea | 7                        | 189   | Methanol                       | 60                               |
|   |                   |                          |   | Gas                            | 28                               |
|   |                   |                          |   | Sheets for veneering           | 7                                |
|   | Congo             | 9                        | 90  | Refined petroleum              | 47                               |
|   |                   |                          |   | Gas                            | 21                               |
|   |                   |                          |   | Sawn wood                      | 14                               |
| Relatively diversified countries              | Côte d'Ivoire     | 48                       | 152   | Refined petroleum              | 30                               |
|   |                   |                          |   | Cocoa paste                    | 11                               |
|   |                   |                          |   | Sawn wood                      | 7                                |
|   | Senegal           | 80                       | 88  | Refined petroleum              | 20                               |
|   |                   |                          |   | Phosphoric acid                | 14                               |
|   |                   |                          |   | Molluscs                       | 7                                |
|   | Cameroon          | 30                       | 49  | Sawn wood                      | 40                               |
|   |                   |                          |   | Refined petroleum              | 24                               |
|   |                   |                          |   | Gum Arabic                     | 7                                |
|   | Togo              | 49                       | 39  | Cement                         | 33                               |
|   |                   |                          |   | Frozen fish                    | 4                                |
|   |                   |                          |   |                                | Coffee                           |

Low-technology products:

Medium-low-technology products:

Medium-high-technology products:



Source : authors' calculations.

The technological classification of goods is based on CEPII (cf. Table 2)



It can also be seen in Table 4 that the three top industrial export products represent less than 60% of total industrial exports in the oil-producing countries (Congo, Gabon and Equatorial Guinea), whereas this share barely exceeds 40% in Senegal and Togo. Thus, among the countries exporting industrial products, the non-oil countries show a greater diversification of their industrial exports than the oil-producing countries. Also, the industrial exports of non-oil countries account for a much larger share of total exports than they do in oil-producing countries. More generally, the degree of industrial export concentration is higher in those countries whose total exports are also concentrated.

### 3.3. Do franc zone countries manage to create “Big Hits”?

#### 3.3.1. *Export growth hinges more on the traditional export base than on new products*

Weak diversification does not mean that the export base is stable. Thus one can observe shifts in the composition of the export basket, developments in the value chain as well as the creation of new export products. Disaggregating export growth in the franc zone countries between the period 1995–1997 and 2005–2007 into the share due to the increased export of traditional products (intensive margin), and the share due to the net creation of export products (extensive margin) thus enables a finer analysis of diversification dynamics (cf. section 2). The resulting calculations of the intensive and extensive margins for the franc zone countries are reported in Table 5.<sup>[18]</sup> The growth rates were calculated using the average export values for each sub-period.

As we saw in the previous section, there is a high degree of heterogeneity across the franc zone countries. In some countries, exports increased threefold (Congo and Mali), or even tenfold (Equatorial Guinea, and Chad) between the two periods; in other countries, on the contrary, they decreased (Guinea-Bissau, Niger and the Central African Republic) or hardly rose at all (Burkina Faso and Togo).

[18] By way of reminder, these calculations were carried out by removing all products that accounted for less than 0.3% of each country’s total exports.

Table 5

Decomposition of export growth between the periods 1995–1997 and 2005–2007, by margin type, in %

|                   | Growth of total exports | Type of diversification                        | Intensive Margin |          |             |           | Extensive Margin      |          |            |
|-------------------|-------------------------|--|------------------|----------|-------------|-----------|-----------------------|----------|------------|
|                   | a+e                     |  | Total<br>a=b+c+d | Low<br>b | Medium<br>c | High<br>d | Net creation<br>e=f+g | New<br>f | Exits<br>g |
| Equatorial Guinea | 2 372                   | Moving up the value chain                      | 2 202            | 7        | 16          | 2 179     | 170                   | 195      | -24        |
| Congo             | 262                     |  | 241              | 6        | 14          | 222       | 21                    | 22       | -2         |
| Chad              | 1 169                   | Reshuffling of existing exports                | -30              | 0        | 0           | -30       | 1 200                 | 1 203    | -3         |
| Benin             | 19                      |  | -19              | 9        | 4           | -32       | 38                    | 41       | -3         |
| Senegal           | 62                      | Diversification through new product            | 32               | 12       | 1           | 19        | 30                    | 40       | -10        |
| Mali              | 207                     | Consolidation of emerging exports              | 205              | 5        | 223         | -23       | 2                     | 10       | -8         |
| Côte d'Ivoire     | 52                      | Intensification of traditional export products | 53               | 24       | 5           | 24        | -1                    | 6        | -7         |
| Cameroon          | 43                      |  | 47               | 1        | 19          | 27        | -4                    | 1        | -5         |
| Gabon             | 28                      |  | 22               | 1        | 3           | 18        | 7                     | 8        | 1          |
| Togo              | 5                       | No diversification dynamics                    | -3               | 1        | 26          | -29       | 8                     | 25       | -17        |
| Burkina Faso      | 1                       |  | 6                | 1        | -4          | 9         | -5                    | 6        | -11        |
| Niger             | -19                     |  | -25              | 0        | 0           | -25       | 6                     | 16       | -10        |
| Guinea-Bissau     | -20                     |  | -10              | 0        | 0           | -10       | -9                    | 2        | -11        |
| CAR               | -38                     |  | -32              | 0        | 15          | -47       | -7                    | 3        | -10        |

Products with low export levels: from 0.3 to 2% of total exports in the period 1995–1997

Products with moderate export levels: from 2 to 10% of total exports in the period 1995–1997

Products with high export levels: de 10 à 100 % of total exports in the period 1995–1997



Those countries that experienced a decline or near stagnation of their exports are characterised by a low level of export diversification in terms of the Herfindahl index, except for Togo. This decrease is basically due to the decline of the top or two top export product(s) (column d) in the agricultural and/or extractive sectors: phosphate and cotton in Togo, diamonds and coffee in the Central African Republic, uranium in Niger or fish in Guinea-Bissau. The negative impact of the intensive margin is thus heavily dependent on changes in global commodity prices. Burkina Faso was more affected at the extensive margin, in connection with the disappearance of large amounts of livestock products at the beginning of the period (column g). In addition to the importance of the intensive margin for the key traditional export products, these countries face the problem of not having other export sectors to boost exports when the traditional products go into decline. Thus, a detailed analysis of the components of the extensive margin (columns f and g) show that many products exited the export basket between 1995–1997 and 2005–2007 without enough new export products being created. Moreover, in line with the findings of Besedes and Prusa (2011), survival rates are low: export products that were emerging in 1995–1997 did not survive in the medium run and were therefore not able to substitute the dwindling traditional products.

The other franc zone countries had an average growth rate of 468% between 1995–1997 and 2005–2007, equivalent to an average annual growth of 19%. The average intensive margin (+ 306%) for these countries is almost twice as high as the extensive margin (+ 163%).<sup>[19]</sup> In other words, the rise in total exports is explained in the main by the increased export of products that were already part of the export base at the beginning of the period rather than by the net creation of new export lines.

Looking at the decomposition of the intensive margin for these countries, it is very clear that, for most of them (Cameroon, Côte d'Ivoire, Gabon and Mali), the traditional export base is what has driven their growth during the period 1995–1997 (columns c and

d). The key traditional products (column d) are the most dynamic, except for Mali whose exports benefited from an increase in its sales of gold, which was not yet present among the key traditional products at the beginning of the period (average intensive margin, column c). Another striking point is that the intensive margin for products with low export levels in 1995–1997 (column b) is, on the whole, almost non-existent, except for Côte d'Ivoire and Senegal. This point shows that the franc zone countries find it difficult to sustain their emerging exports in the medium term – a finding that concurs with those of Hausmann and Rodrik (2003). These authors underline how difficult it is for the least wealthy countries – and *a fortiori* the least developed countries (LDCs) – to cross the financial and non-financial barriers linked to starting up new product lines. On first analysis, the export base of franc zone countries seems relatively stable between 1995 and 2007, and export growth appears to be driven mainly by an increase in the export of traditional goods, with no real emergence of Big Hits, such as those identified by Easterly and Reshef (2010) for other sub-Saharan African countries.

Yet, a more detailed reading of Table 5 does reveal a more nuanced picture by shedding light on some specific cases:

- export growth in Chad and Benin was driven solely by the extensive margin (column e); this is much more pronounced in Chad (1,200 percentage points) than in Benin (38 points). In parallel, the intensive margin of key traditional export products (column d) declined considerably, which evidences a reshuffling of the export bases of these two countries: the products that traditionally make up their export basket gave way to new products from the mid-1990s. In the case of Benin, the extensive margin is not sufficiently high to fuel a real dynamic of its overall exports (19% between the two periods, that is, 1.8% on average per year);

[19] These rates decrease very strongly as soon as one reasons in terms of median: the median growth rate for these countries is 62%, which is barely 5% of average annual growth, with a median intensive margin of 47% and a median extensive margin of 21%.

- Equatorial Guinea's exports have largely benefited from an increase in traditional export products (+2,179 points – column d) but also from the entry of new products (column e), which contributed 170 points to overall export growth. Thus, despite a sound traditional base, the country has clearly invested in new export lines by, as we shall see, moving up the value chains. To a lesser extent, Congo experienced a similar phenomenon (diversification by moving up the value chain), at the same time consolidating its traditional export base;
- Senegal stands out on account of the relatively homogeneous distribution of the margins that explain its export growth: (i) new export products, 40 percentage points (column f), (ii) products that are scarcely present in Senegalese exports in 1995–1997 (contributing 12 points to growth – column b) and (iii) the key products in the traditional export base (19 points – column d). The size of the extensive and intensive margins of the products with initially low levels of exports distinguish Senegal as the only country to have successfully created new export sectors likely to be sustained in its export base in the medium term;
- Côte d'Ivoire, another relatively diversified country (according to Herfindahl and the industrial exports ratio), has in fact done no more than intensify its existing exports. To be sure, the intensive margin has driven export growth (columns b and d), but a very substantial number of products exited between the two periods. In total, overall export dynamics were even weaker than for Senegal (+ 52% between the two sub-periods). This finding is perhaps linked to the socio-political unrest in Côte d'Ivoire over this period. It in fact seems that the political environment and economic stability are determining factors for a country's capacity to create and sustain new export lines.

### 3.3.2. *Some franc zone countries benefited from the emergence of new export lines*

The previous section pointed up the dominance of the intensive margin in export growth in franc zone countries. Nonetheless, some countries did benefit from the emergence of new export lines due to moves up the value chain or to a reshuffling of their export structure. In some countries, a growth in export products that had hardly emerged in 1995–1997 can be observed. We shall now look in detail at the different growth margins, and at the same time measure the technological content of export products.

- *Benin and Chad: a reshuffling of the export base but an equally high degree of vulnerability*

In Benin and Chad, the differentiated impact of the “traditional” intensive margin and the extensive margin pertains more to a reshuffling of the export structure than a real decline or stagnation of diversification. Certainly, both countries experienced a collapse of their key traditional export product, cotton, between 1995–1997. This decline was due to the diminishing global demand for cotton and the fall in world cotton prices. The “traditional” intensive margins thus had a detrimental impact on total export growth (around 30 percentage points in both countries). Their overall export growth was nonetheless positive, especially for Chad, thanks to successful new export lines. Chad in fact benefited from its oil exports, which were not yet active in 1995–1997, which increased its exports thirteen-fold. This is a case where an ailing product is replaced by another product that benefits from a growing demand and favourable price trend over the period. Benin's extensive margin for the most part depends on the export of “copper waste and scrap” (+ 19%), followed by rough wood (+ 6%). These reshuffling patterns confirm the conclusions based on the level and growth of the industrial export ratio: here the dependency on agricultural products has shifted to a dependency on extractive products, which means that these countries are still highly vulnerable to external shocks.



- *Congo and Equatorial Guinea: diversification by moving up the value chain*

Figures 7 and 8 present the top traditional products at the intensive margin in the Congo and Equatorial Guinea. They show, on the one hand, that these countries have successfully combined the dynamism of a traditional export product (“traditional” intensive margin) and the swift take-off of new export products (extensive margin). On the other hand, it can be seen that these new products have taken advantage of a move up the production chain: in the gas industry in Equatorial Guinea and the copper and cobalt industries in the Congo. Although the extensive margins of these two countries are small compared to their intensive margins, they are above the median of those franc zone countries that have dynamic exports (*i.e.* all the countries except Burkina Faso, Guinea-Bissau, Niger, Central African Republic and Togo - cf. Table 5).

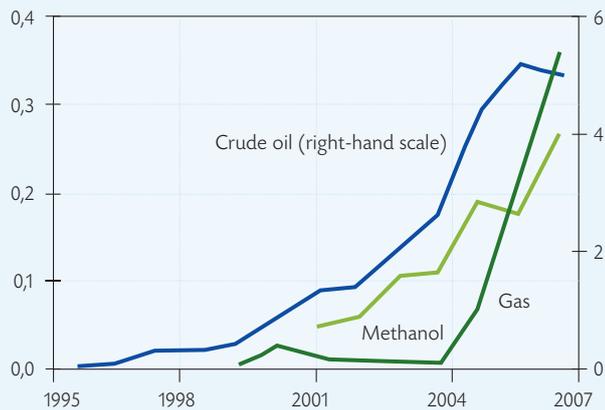
These new specialisations are interesting on several counts. To begin with, crude oil, on which both countries are highly dependent, has gone hand in hand with new exports that could well make their economies less vulnerable to global price fluctuations. The share of these new products is still relatively low but growing fast.<sup>[20]</sup> Moving up the production chain, these goods have benefited from an extended “product space” (Hidalgo *et al.*, 2007). This means that the countries have been able to incorporate technological content or increased value-added into the processing of the raw products (Hausmann and Klinger, 2006). In the case of Equatorial Guinea, for instance, methanol (conversion of gas to liquid fuel) is a medium-high technology product. The latency period between the take-off of gas production and methanol production can be clearly seen in Figure 7. This pattern of a specialisation based on sectoral linkages concurs with the findings of the World Bank (2002), Lederman and Maloney (2007) and Gelb (2010), who consider that an abundance of natural resources is in no way incompatible with technological advances or enhanced productivity.

The diversification models nonetheless remain fragile for at least two reasons. Firstly, the new goods, just as much as crude oil, will inexorably come up against the problem of dwindling reserves, since they involve the primary processing of extractive products. They are also subject to the same fluctuating international prices as crude oil. Secondly, gains in value-added and technological content in export diversification do not automatically translate into economic development. The challenge for countries like Equatorial Guinea is to successfully generate spillover effects that filter through to the rest of the economy and are conducive to job creation and poverty reduction.

[20] This dynamic holds particularly true for copper and gas and the related processed products. Although Congo’s primary processed cobalt products increased over the entire period, these have declined since 2004 (Figure 8).

Figure 7

Equatorial Guinea's exports of crude oil, gas and methanol from 1995 to 2007, in USD billions



Source : BACI, AMR calculations.

Blue lines: products that have driven export growth at the "traditional" intensive margin.

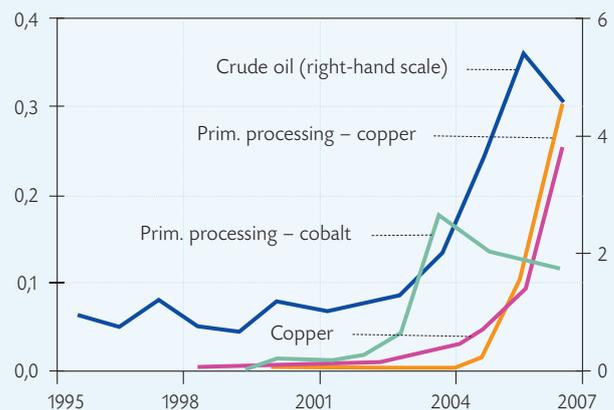
Lines in different shades of green: products at the extensive margin.

- Senegal: attempts at more "technological" diversification, which still lacks dynamism

Senegal, one of the more diversified franc zone countries, is driven by growth in key traditional export products as well as emerging export products in 1995–1997, and by growth in products launched between the two sub-periods. Its export base seams have undergone continuous diversification. Nonetheless, this has not brought about a stronger growth dynamic for overall exports than the dynamic present in other franc zone countries. The new export products in 2005–2007 account for the highest growth margin for Senegalese exports (+ 40% – column e). The country exported thirty new products, accounting for 25% of total exports. These are from diverse business sectors, including a few industrial sectors (agri-food, toiletries,

Figure 8

The Congo's exports of crude oil and primary copper and cobalt products from 1995 to 2007, in USD billions



cement – cf. Table 6), and more importantly involve several medium-high technology products.

Overall export growth (+ 62% growth, averaging out at an annual 4.9% in constant USD) nonetheless positions Senegal at the median level among those countries with strong export dynamics. This growth, in fact, is much less pronounced than that of the Congo, Equatorial Guinea, Mali or Chad. Efforts to diversity have clearly not generated any Big Hits likely to foster high export growth. Senegal still needs to support and promote these products, as well as their production facilities, in order to expand the different components of the intensive margin.



**Table 6** *Decomposition of the extensive and intensive margins for Senegal (in %).*

| Extensive Margin                                 |    | Intensive Margin                                 |    |
|--|----|--|----|
| Margin linked to new export products, including: | 40 | Products with low export levels                  | 12 |
| • agri-food industry                             | 11 | Products with moderate export levels, including: | 1  |
| • cement   | 7  | • phosphoric acid                                | 9  |
| • toiletries                                     | 4  | Products with a high export levels, including:   | 19 |
| • agricultural products                          | 4  | • refined petroleum                              | 23 |
|  |    | • ground-nut oil                                 | -4 |

Source : BACI, AMR calculations.

|                                 |  |
|---------------------------------|--|
| Non-manufactured products       |  |
| Low-technology products         |  |
| Medium-low-technology products  |  |
| Medium-high-technology products |  |

## Conclusion

The purpose of this paper is to shed fresh light on the dynamics of export diversification in the franc zone countries, using various measures inspired by the empirical literature on the subject. For this, we chose to use measures other than the conventional diversification indicators, such as the Herfindahl index, which has some serious limits. This study proposes two other measures of diversification: first, the ratio of industrial exports to the population, which makes it possible to assess the degree of export sophistication, and to decompose export growth into extensive and intensive margins, thus affording greater insight into the different forms of diversification.

Contrary to what is generally believed, the study shows that the franc zone countries are not all homogeneous in terms of export diversification. While some countries have not diversified their exports, others do exhibit a degree of diversification, even though the forms this takes is differentiated depending on the country. Some move up their value chains, others restructure their export baskets, while others successfully create new export lines from scratch. The different rhythms of diversification also give rise to considerable divergences in the growth dynamics for industrial exports in the franc zone: the countries that were initially the most industrialised in the zone are those whose industrial export growth was the most dynamic.

In the strand of recent research on the subject, the findings show that it is the intensive margin that contributes most to export growth in the franc zone countries, even though this remains limited. For some countries, this is explained by the decline of key exports in the traditional export base (Benin, Chad) combined with an adverse trend in the global demand and international prices for these products. In other countries, the weakness and obsolescence of the production facilities in the most diversified countries explains why they have found it difficult to provide a strong thrust for their traditional exports since 1995 (Côte d'Ivoire, Senegal). Thus, against the backdrop of globalisation and rising raw material prices, it is not enough to intensify existing export lines in order to sustain export diversification dynamics. At the

same time, the extensive margin is too weak, or even negative, to serve as a sound relay for the traditional export base (9 out of 14 countries have a negative or insignificant extensive margin). In some countries (Benin, Chad), the robust contribution of new export lines to total export growth has not in fact helped to reduce their vulnerability to external shocks: the growth of the extensive margin went hand in hand with a declining intensive margin. This simply led to a reshuffling of their export base, which is still underpinned by goods vulnerable to external shocks. Finally, the extensive margin, when indeed there is one, rarely involves products with technological content or products likely to move up the value-added chain. In fact, only Equatorial Guinea and, to a lesser extent, Senegal have managed to produce goods incorporating a moderately level of technology.

The insights gained into the different diversification pathways in the franc zone seem to indicate that if diversification is to be conducive to export growth it necessarily implies *(i)* a consolidation of the traditional export base together with *(ii)* the emergence of new export products that are *(iii)* likely to remain active in the country's export base. However, in the franc zone countries, the export dynamics systematically lack one of these three components. All in all, while some countries have followed diversification patterns geared towards more sophisticated products, persistent blockages prevent them from constructing exemplary diversification models within the zone. So what exactly are these blockages?

One example of a blockage is the case of Senegal, which is finding it hard to expand its exports despite a gradual diversification across the intensive and extensive margins. These margins are not supported by a modern production system capable of truly driving Senegalese exports: the share of exported good in GDP has dropped from 20.4% in 1995 to 14.8% in 2007. It seems that effective public policies aimed at consolidating the productive apparatus and the traditional export model are a precondition for the creation of new export lines, if emerging products are to be fostered and expanded in the mid- to long term.

A further example of a blockage is Equatorial Guinea.



Here, the effects of methanol exports are for the time being very limited in terms of job creation and sharing the benefits of growth. The country is still included in the list of LDCs (established by the United Nations – UN) despite an average per capita income of USD 11,000 at PPP for the 2002–2006 period. A new specialisation (methanol) based on capital-intensive production in a country where qualified labour is scarce raises the question of whether the local labour market will benefit from this new specialisation. The investment required to develop a new capital-intensive activity comes primarily from abroad. To what extent can these foreign capital inflows generate externalities for the economy as a whole? What imitation processes can national investors put in place? The diversification model of moving up the value chain and incorporating technological content also needs to be supported by adequate public education policies.

The results of our study highlight the need for effective state intervention. As Brenton *et al.* (2009) suggest, these policies are key to improving the country's international competitiveness and promoting new products abroad. This depends above all on capital investments and export support measures to ensure that market failings do not penalise the growth of emerging products. Moreover, if diversification is to translate into economic development, public social policies (mainly in the areas of education, health and redistribution of wealth) need to ensure that the effects of this export diversification are of benefit to all.

To conclude, we must emphasise that this study does not explore all the pathways leading to export diversification. The importance of the service industry in some developing and emerging countries (Mattoo, 2009) – notably financial services to businesses and especially tourist activities (Cattaneo, 2009; Lejárraga and Walkenhorst, 2009) – could in fact open up a new diversification trajectory conducive to export growth. Even though the share or the dynamics of the service industry were less pronounced than in other developing and emerging countries during the 2000s, services nonetheless accounted for over 10% of exports in nine franc zone countries, reaching up to 20 to 30% of total exports in Benin, Cameroon, Senegal and Togo<sup>[21]</sup>. As there is no database on services, with details by sector and trading partner, we were unable to undertake the same type of study as the one we completed on goods. However, for low-income countries, export diversification solely based on services does have limits in terms of economic growth. The example of emerging countries shows that service exports often call for the intensive use of skilled labour, which is a relatively scarce resource in the franc zone. For countries with the lowest levels of income, developing the export of services does not therefore seem to be a particularly important source of export diversification.

[21] Source: UNCTAD; the share of services in the exports of the other franc zone countries does not exceed 18%.

# Appendix

## Indices and data presentation

**Table 7** *The three main indicators for export diversification*

| Name                        | Formula  | Type of measure                           | Description of the measure  | Advantages   | Limits   |
|-----------------------------|--|---|---|--|--|
| Herfindahl                  | $H = \sqrt{\sum_i s_i^2}$                      | Concentration<br>(see note to the reader) | Measures the dispersion of the shares in the total exports of commodities | <ul style="list-style-type: none"> <li>- Simple to compute</li> <li>- Fast and intuitive interpretation</li> <li>- Conducive to international comparisons</li> </ul>                           | <ul style="list-style-type: none"> <li>- Not adapted to countries with highly concentrated exports</li> <li>- Level of technology not taken into account</li> <li>- Export content not taken into account</li> </ul>                                   |
| Gini                        | $G = 1 - \sum_i \frac{X_i - X_{i-1}}{n}$       | Concentration                             | Measures the inequality of distribution of the data concerned             | <ul style="list-style-type: none"> <li>- Simple to compute</li> </ul>  | <ul style="list-style-type: none"> <li>- Does not measure concentration strictly speaking, but rather the inequality of distribution</li> <li>- Level of technology not taken into account</li> <li>- Export content not taken into account</li> </ul> |
| Theil<br>(or entropy index) | $E = \sum_i s_i \ln\left(\frac{1}{s_i}\right)$ | Diversification                           | Measures the dispersion of shares in total exports                        | <ul style="list-style-type: none"> <li>- Can be disaggregated into subgroups of export commodities (cf. Cadot <i>et al.</i>, 2011) to separate out extensive and intensive margins)</li> </ul> | <ul style="list-style-type: none"> <li>- Much more complicated to interpret than the Herfindahl index</li> <li>- Level of technology not taken into account</li> <li>- Export content not taken into account</li> </ul>                                |

Source : based on Cadot *et al.* (2011).

$x_i$  designates the export value of the good  $i$

$s_i = x_i / \sum_i x_i$  designates the share of the export of good  $i$  in total exports

$X_i = \sum_{i=1}^i s_i$  calculates the combined share of the shares of the exported goods  $i$

A concentration indicator (diversification) has a high value when exports are concentrated (diversified).


**Table 8** Example of a line retrieved from export data reported by Benin

| Period | Trade Flow | Reporter | Partner | Commodity Code | Code Description             | Trade Value | Trade Volume | Quantity Unit |
|--------|------------|----------|---------|----------------|------------------------------|-------------|--------------|---------------|
| 2005   | Export     | Benin    | China   | H1-5201        | Cotton, not carded or combed | 103806900   | 100599020    | Weight in kg  |

Source : Comtrade.

**Tableau 9** CEPII ranking of franc zone countries according to the quality of export data reporting (183 countries ranked)

| Country       | Rank | Country           | Rank |
|---------------|------|-------------------|------|
| Benin         | 60   | Cameroon          | 85   |
| Burkina Faso  | 145  | CAR               | 171  |
| Côte d'Ivoire | 77   | Congo             | 112  |
| Guinea-Bissau | n.d. | Gabon             | 130  |
| Mali          | 157  | Equatorial Guinea | n.d. |
| Niger         | 175  | Chad              | n.d. |
| Senegal       | 105  |                   |      |
| Togo          | 109  |                   |      |

Source : BACI (CEPII); taken from Gaulier and Zignago (2010).

# List of acronyms and abbreviations

|              |   |               |  |
|--------------|---|---------------|--|
| <b>AFD</b>   | <i>Agence Française de Développement</i><br>(French Development Agency)   | <b>FOB</b>    | Free on board  |
| <b>AMR</b>   | <i>Division Analyse macroéconomique et risque pays (AFD)</i>  | <b>GDP</b>    | Gross Domestic Product   |
| <b>BACI</b>  | <i>Base pour l'analyse du commerce international</i><br>(CEPII's International trade database)                          | <b>HS</b>     | Harmonized System  |
| <b>CEMAC</b> | <i>Communauté économique et monétaire de l'Afrique centrale</i><br>(Economic and Monetary Community of Central Africa)  | <b>INSEE</b>  | <i>Institut national de la statistique et des études économiques (France)</i><br>(National Institute of Statistics and Economic Studies) |
| <b>CEPII</b> | <i>Centre d'études prospectives et d'informations internationales</i><br>(Center for International Prospective Studies) | <b>LDC</b>    | Least Developed Countries  |
| <b>CIF</b>   | Cost, insurance and freight   | <b>PPP</b>    | Purchasing Power Parity  |
|              |   | <b>UN</b>     | United Nations   |
|              |   | <b>UNCTAD</b> | United Nations Conference on Trade and Development   |
|              |   | <b>WCO</b>    | World Customs Organisation   |

## References

- AMITI, M. and C. FREUND (2010)** "An Anatomy of China's Export Growth", in AMITI M. and C. FREUND (2010), *China's Growing Role in World Trade*, ed. R.C. Feenstra, and S.-J. Wei, The University of Chicago Press.
- AMURGO-PACHECO, A. and M.D. PIEROLA (2008)** "Patterns of Export Diversification in Developing Countries: Intensive and Extensive Margins", *Policy Research Working Paper Series No 4473*, World Bank, Washington DC.
- ANDERSON, J.E. and E. VAN WINCOOP (2004)** "Trade Costs", *Journal of Economic Literature*, American Economic Association, 42(3), pp. 691-751.
- BANQUE DE FRANCE (2007)** « Diversification économique en Afrique centrale : état des lieux et enseignements », *Rapport zone franc*, pp. 113-129, Paris.
- BESEDES, T. and T.J. PRUSA (2011)** "The Role of Extensive and Intensive Margins and Export Growth", *Journal of Development Economics*, Elsevier, 96(2), pp. 371-379.
- BRENTON, P. and R. NEWFARMER (2009)** "Watching More than the Discovery Channel to Diversify Exports" in NEWFARMER R., W. SHAW and P. WALKENHORST (2009), *Breaking Into New Markets: Merging Lessons for Export Diversification*, pp. 111-124, World Bank, Washington DC.
- BRENTON, P., R. NEWFARMER, W. SHAW and P. WALKENHORST (2009)** "Breaking Into New Markets: Overview" in NEWFARMER R., W. SHAW and P. WALKENHORST (2009), *Breaking Into New Markets: Merging Lessons for Export Diversification*, pp. 1-35, World Bank, Washington DC.



- CADOT, O., C. CARRÈRE and V. STRAUSS-KAHN (2011) "Export Diversification: What's Behind The Hump?", *Review of Economics and Statistics*, MIT Press, 93(2), pp. 590-605.
- CADOT, O., C. CARRÈRE and V. STRAUSS-KAHN (2009) "Trade Diversification, Income, and Growth: What Do We Know?", *Etudes et Documents* n° E2009.31, CERDI, University of Auvergne, Clermont-Ferrand.
- CATTANEO, O. (2009) "Tourism as a Strategy to Diversify Exports: Lessons from Mauritius" in NEWFARMER R., W. SHAW and P. WALKENHORST (2009), *Breaking Into New Markets: Merging Lessons for Export Diversification*, pp. 183-195, World Bank, Washington DC.
- EASTERLY, W. and A. RESHEF (2010) "African Export Successes: Surprises, Stylized Facts, and Explanations", *NBER Working Paper* No 16597, National Bureau of Economic Research, Inc.
- FEENSTRA, R.C., R.E. LIPSEY, H. DENG, A.C. MA and H. MO (2005) "World Trade Flows: 1962-2000", *NBER Working Paper* No 11040, National Bureau of Economic Research, Inc.
- GAULIER, G. and S. ZIGNAGO (2010) "BACI: International Trade Database at the Product-Level: the 1994-2007 Version", *Working Paper* n° 2010-23, CEPII, Paris.
- GELB, A. (2010) "Economic Diversification in Resource-Rich Countries", mimeo, <http://www.imf.org/external/np/seminars/eng/2010/afrfin/pdf/Gelb2.pdf>
- GYLFASON, T. (2008) "Development and Growth in Mineral-Rich Countries", *CEPR Discussion Papers* No 7031, London.
- HAUSMANN, R., J. HWANG and D. RODRIK (2007) "What You Export Matters", *Journal of Economic Growth*, Springer, 12(1), pp. 1-25.
- HAUSMANN, R. and B. KLINGER (2006) "Structural Transformation and Patterns of Comparative Advantage in the Product Space", *Working Paper* No 128, Center for International Development, Harvard University, Cambridge MA.
- HAUSMANN, R. and D. RODRIK (2003) "Economic Development as Self-Discovery", *Journal of Development Economics*, Elsevier, 72(2), pp. 603-633.
- HELPMAN, E., M. MELITZ and Y. RUBINSTEIN (2008) "Estimating Trade Flows: Trading Partners and Trading Volumes", *The Quarterly Journal of Economics*, Oxford Journals, 123(2), pp. 441-487.
- HESSE, H. (2009) "Export Diversification and Economic Growth", in NEWFARMER R., W. SHAW et P. WALKENHORST (2009), *Breaking Into New Markets: Merging Lessons for Export Diversification*, pp. 55-80, World Bank, Washington DC.
- HIDALGO, C.A., B. KLINGER, A.-L. BARABÁSI. and R. HAUSMANN (2007) "The Product Space Conditions the Development of Nations", *Science*, Science, 317(5837), pp. 482-487.
- HUMMELS, D. and O.J. KLENOW (2005) "The Variety and Quality of a Nation's Exports", *American Economic Review*, American Economic Association, 95(3), pp. 704-723.
- IMBS, J. and R. WACZIARG (2003) "Stages of Diversification", *American Economic Review*, American Economic Association, 93(1), pp. 63-86.
- IMF (2010) "The Quest for Higher Growth in the West African Economic and Monetary Union (WAEMU) and Implications for Fiscal Policy", in IMF (2010), *Regional Economic Outlook: Sub-Saharan Africa: resilience and risks*, IMF, Washington DC.
- KLINGER, B. and D. LEDERMAN (2006) "Diversification, Innovation, and Imitation Inside the Global Technological Frontier", *Research Policy Working Paper* No 3872, World Bank, Washington DC.
- LEDERMAN, D. and W.F. MALONEY (2007) *Natural Resources: Neither Curse nor Destiny*, World Bank and Stanford University Press, Washington DC.
- LEJÁRRAGA, I. and P. WALKENHORST (2009) "Fostering Productive Diversification Through Tourism" in NEWFARMER R., W. SHAW et P. WALKENHORST (2009), *Breaking Into New Markets: Merging Lessons for Export Diversification*, pp. 197-210, World Bank, Washington DC.



**MATTOO, A. (2009)** "Watching Exporting Services" in NEWFARMER R., W. SHAW and P. WALKENHORST (2009), *Breaking Into New Markets: Merging Lessons for Export Diversification*, pp.161-182, World Bank, Washington DC.

**MELITZ, M. (2003)** "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity", *Econometrica*, Econometric Society, 71(6), pp. 1695-1725.

**OSAKWE, P. (2007)** "Foreign Aid, Resources and Export Diversification in Africa: A New Test of Existing Theories", *Working Paper* No 2228, MPRA, University of Munich.

**PHAM, C. and W. MARTIN (2007)** "Extensive and Intensive Margin Growth and Developing Country Exports", *Working Paper*, World Bank, Washington DC.

**PREBISCH, R. (1959)** "Commercial Policy in Under-developed Countries", *American Economic Review*, American Economic Association, 49(2), pp. 251-273.

**RODRIK, D. (2006)** "What's So Special About China's Exports?", *NBER Working Paper* No 11947, National Bureau of Economic Research, Inc.

**SACHS, J. and A. WARNER (1997)** "Natural Resource Abundance and Economic Growth", *NBER Working Paper* No 5398, National Bureau of Economic Research, Inc.

**SAINT-VAULRY (DE), A. (2008)** « Base de données CHELEM – commerce international du CEPII ? », *Working Paper* No 2008-09, CEPII, Paris.

**UNECA (2007)** *Accelerating Africa's Development Through Diversification*, Addis-Abeba.

**WORLD BANK (2002)** *From Natural Resources to the Knowledge Economy: Trade and Job Quality*, World Bank, Washington DC.

## MACRODEV ("Macroeconomics and Development")

*This collection was launched by AFD's Research Department to present the work produced in the field of development macroeconomics by AFD's Macroeconomic and Country Risks Analysis Unit (RCH/AMR) and AFD Group economists. It publishes studies that focus on countries, regions or development-related macroeconomic issues.*

Director of Publications:

**Dov ZERAH**

Editorial Director:

**Alain HENRY**

Agence Française de Développement  
5, rue Roland Barthes – 75598 Paris cedex 12  
Tél. : 33 (1) 53 44 31 31 – [www.afd.fr](http://www.afd.fr)

Copyright: 2<sup>nd</sup> quarter 2012  
ISSN : 2116-4363