The Economic Consequences of Export Instability in Developing Countries: A Survey(*)

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Abstract

In this note we provide a brief survey of the literature about the effects of exports instability in developing countries, mainly focused on commodity dependent economies. Whatever the nature of instability, exports instability generate major disturbances in those economies. Exports instability is often considered as a major source of macroeconomic instability that is welfare costly. Exports instability is also risk generating for individual economic agents who take it into account in their economic decisions but cannot get rid of it in the absence of appropriate credit and insurance devices.

We thus examine the macroeconomic consequences of export instability, first in the short term, using the Dutch Disease framework, and second its effects on growth. We then examine the effects of instability from a microeconomic point of view.

Résumé

Nous proposons une revue de la littérature des effets de l'instabilité des recettes d'exportations dans les pays en développement, principalement sur les pays exportateurs de produits primaires.

Dans la 1ère partie nous nous intéressons aux conséquences macro-économiques à court terme de l'instabilité des exportations à travers le modèle du syndrome hollandais. Nous étudions ensuite ses conséquences en termes de croissance.

Dans la 2ème partie nous nous intéressons aux conséquences micro-économiques du risque. Nous nous intéressons à l'attitude et au comportement des ménages agricoles dans un environnement à risque.

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I. Macroeconomic Consequences of Exports Earnings Instability

International trade theory argues that developing countries benefit from primary specialization because of the existence of comparative advantages and the utilization of the countries' relative abundant factors. Moreover, the latter specialization promote foreign direct investments flows. But at the same time, international specialization implies a high commodity dependence which is criticized by some development economists. One of the arguments underlines the negative effects of the exports earnings instability and more particularly the cost of commodity prices unpredictability. Price variability induce macroeconomic fluctuations mainly defined as the national income instability that may result in a gap between the potential and effective advantages from international specialization.

The traditional economic development theory underlines the negative effect of macroeconomic instability (see presentation in Guillaumont 1985). In the short term, according to Myrdal (1958), exports price instability generate inflation as there exists a sluggish downward reaction of prices. Moreover, the fiscal deficit reacts counter cyclically to economic activity. The latter phenomenon sounds optimal but unfortunately there exists a ratchet effect and hence a positive correlation between fiscal deficits and exports earnings instability. In the long term, according to Nurkse (1962) and previously to Keynes (1938), macroeconomic instability generates uncertainty which has a negative impact on investment decisions and technological improvements. We can notice that Keynes thought that uncertainty is true where there is no scientific basis on which to form any calculable probability. Recent development in the risk literature favor calculable risk.

The latter arguments are notably counterbalanced by Hirschman (1958) and Friedman (1954, 1957) using different arguments. For the former, in the short term, shortcuts in exports earnings reduce drastically manufactured imports and hence favors a domestic production[1]. For the latter, income instability favors the saving rate according to the permanent income theory. Liberalization of primary products markets shifts the burden of exports earnings from the public agent to the private ones. Hence the permanent income thesis is a central argument in the commodity risk management debate[2].

This section explores the recent developments of economic theory on the subject on exports earnings instability macroeconomic effects. In the short term, the literature stresses the link between primary exports instability and competitiveness. In the long term, primary exports earnings instability may influence economic growth.

Short Term Effects.

The Dutch Disease analyses.

The theoretical framework is that of a small dependent economy (Salter, 1959) facing an unexpected and temporary increase in primary exports earnings. The result is a fall in the competitiveness of the traditional tradable sector (manufactured goods). The economic

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[1] This of course supposes the positive benefits from import substitution strategies on economic growth. But the latter appear to be highly improbable.

[2] This question must be treated separately from the question concerning the effects of liberalization on the magnitude of risk (Cf. for example Sarris, 1999 for wheat).

phenomenon is known as the Dutch Disease (Corden and Neary, 1982 and Neary and Van Wijnbergen, 1986).

Let us sketch briefly the main hypotheses. The economy is relying on the activity of three sectors. Two are tradable of which prices are determined exogenously: agriculture or mining sector and manufactured goods sector. The third sector is non tradable and mainly covers services and local industry[3]. There exists two production factors (labor and capital). Labor can move from one sector to another whereas capital is sector specific[4]. Factors cannot move abroad[5]. Other assumptions are the full employment of production factors, the perfect price flexibility and constant returns to scale[6]. The model is real[7] and hence the interesting price is the ratio between the traditional tradable (non booming) sector price and the non tradable one: this is the real exchange rate which is interpreted a competitiveness indicator.

The Dutch Disease summarizes two effects. There exists first a spending effect and secondly a resource effect. An unexpected increase of primary exports earnings boosts the national income and consequently increases the domestic demand. The main reaction is a labor demand increase and hence wages. Wages increases reduce profits in the traditional (manufactured goods) exports sector as output prices are exogenous and increase non tradable prices. In the traditional tradable sector, the negative consequences of the spending effect is reinforced by the resource effect as defined as labor flows from the traditional tradable and non tradable to the booming sector[8]. There is a decrease of the real exchange rate, *i. e.* an appreciation, which reduces the country's competitiveness.

We can notice that the Dutch Disease only concerns a temporary increase in exports' earnings. If the latter is permanent, the real exchange rate appreciation can be only diagnosed as the "normal" reaction of the economy. When the boom is temporary the inter sectoral reallocation of resources raises difficulties as there are adjustment costs. For example, desindustrialization may be induce permanent lags in technological knowledge accumulation or a permanent lag with respect to competitors production costs (scale economies).

The Role of the Public Agents.

Recently, the literature delivers an interpretation that relies more on the poor public management of exports earnings.

We can first notice that the public agent benefited from the boom through the marketing boards or Caisses de Stabilisation (Côte d'Ivoire, Madagascar) of which resources were mainly considered as para-fiscal revenues, and fiscal receipts. Tanzi (1986), underlines three types of reaction of the public agent.

1. It can first consider that the boom is transitory and hence saved and invested on international capital markets (Cf. the Cameroon experience described by Devarajan and de Melo, 1987). This latter behavior was seldom observed though optimal according to the permanent income theory (Combes, 1993).

[3] We may take into account semi tradable goods (Devarajan and de Melo, 1987).
[4] Corden (1984) introduces non specific factors.
[5] Bruno and Sachs (1982) relax the latter assumption.
[6] Nowak (1992) relaxes the more restrictive hypotheses.
[7] Edwards (1982) deals with nominal variables.
[8] The net effect on the non tradable sector is thus ambiguous.

2. The public agent may save the boom but increase domestic investments (Cf. the Ivorian experience described by Davis, 1983). The latter behavior raises two kinds of problems: low returns on public investments and the existence of recurrent spendings.

3. The public agent may increase public expenditures instead of savings (Cf. the case of Madagascar in Guillaumont and Guillaumont, 1990). The economic problem consists in the existence of a ratchet effect of public current expenses when the prices are falling (Combes, 1993).

We can also notice that in several countries the boom benefited to the private sector (Cf. Bevan, Collier and Gunning for the Kenyan experience, and Cuddington, 1986 for the case of Columbia). Coffee producers in Kenya correctly appreciated the temporary character of exports increases. But the imperfect character of capital markets resulting in poor investment opportunities has resulted in a boom on the building sector which is non tradable. In Columbia, saving rates did not increase because of financial repression (negative real interest rates). Primary products markets liberalization may be ineffective when there exists imperfections.

More generally, according to Davis (1995), the Dutch Disease is mainly the result of poor public reactions to exports earnings instability. In fact, the public agent is responsible for the impoverishment of the potential positive effects of exports booms with the implementation of interventionist and protection measures. Roemer (1985) stresses that the Dutch Disease stimulates lobbying activities which raise custom taxes, generate imports quotas, wages rigidities, etc. But according to Collier, Gunning and associates (1999) public reactions tend now to be better.

Long Term Effects.

Theoretical Analyses.

In so far as exports earnings instability generates risk, it modifies the aggregate reaction of agents and hence has an influence on economic growth. Theoretical analyses on that subject were proposed by Kemp and Liviatan (1973) and Eaton (1979). They deliver a static analysis focused on the instantaneous effects of risk on factors allocation. A dynamic analysis is delivered by Brock (1991), which appears to be better suited to a detailed analysis of the effects of instability on growth.

The dynamic framework of Brock is relies on several hypotheses: an infinite lived representative agent and a neoclassical technology (constant returns to scale, factors substitutability, exogenous labor supply, etc.). The main characteristic of the model consists in an random production activity because of exogenous random shocks. The income drawn from production activities finances imports of consumption and investment goods and the accumulation of foreign capital riskless assets. The representative agent is risk averse in the sense that it tries to get rid of it (Arrow, 1971) and prudent as risk modifies its optimal behavior when confronted with a mean preserving increase[9] in the exogenous risk (Kimball, 1991)[10].

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[9] Cf. Rothschild and Stiglitz (1970, 1971).

[10] From a technical point of view, the latter hypothesis means that the marginal utility is convex.

We now use the latter framework to study the effects of instability on savings, investments, the economic growth and welfare.

The effects of risk on savings is different as the risk is a labor income risk or a capital income risk. The effects of labor income risks on savings are non ambiguous when the labor supply is exogenous (Leland, 1968): the prudent agent increases its savings when confronted to an increase in risk. The latter behavior is interpreted as a self insurance against the effects of risk in so far as it is used as a buffer stock when the income is cut off. The effects of capital income risks on savings are ambiguous. Their effect is different as a unit of capital may disappear. So an increase can have two opposite effects. It has a positive income effect and a negative substitution effect (Sandmo, 1970). The income effect corresponds to the agent's behavior that increases its saving when the risk increases. The substitution effect describes the response of the agent that reduces its own exposition to risk. If the agent is "very prudent", the income effect overcomes the substitution effect and thus increases savings. We may conjecture that poor agents are very prudent as the consequences of an increase in risk may endanger their own existences.

The Brock's model uses a perfect capital market hypothesis. We may doubt the latter in developing countries and thus we may guess the existence of liquidity constraints (Deaton, 1991). Instead of being determined by permanent income, current consumption depends on current income. Liquidity constraints increase precautionary savings in so far as rationed credit supply have disastrous effects on welfare[11].

Savings can either be used to the domestic financing of investments or the purchase of non risky foreign assets. Thus savings and investments in a open economy may have different evolutions. A simple portfolio analysis allows to show that an increase in risk discourages the risk averse agent to invest in the country. More precisely, the latter negative effect of risk on domestic investments is reinforced when investment decisions are irreversible (sunk costs, cf. Pindyck, 1991 and Dixit, 1994). This negative effect of risk on the amount of investments can be counterbalanced by a positive effect of risk investments returns. Portfolio analyses justify the positive link between growth and risk in the following manner: the agents have the opportunity to choose between risky but high return investments versus less risky but low return investments.

The steady state growth is exogenous as it depends on the population growth and technical progress. Hence risk does not influence asymptotic economic growth rate. Risk does only affect the transitionary (or non steady state) economic growth (Barro and Sala-i-Martin, 1996). The latter characteristic is an obvious limit of the neoclassical growth theory. But, recent developments allow for the endogeneisation of technical progress and labor supply. In the latter case, risk may modify the steady state growth. On the one side, a lower investment rate may irreversibly reduce the technical progress under the hypothesis that the technical progress is proportional to the amount of factors. On the other side, risk may inhibit the labor supply.

In the neoclassical model, risk has a negative influence on the steady state capital per capita. The steady state income per capita and welfare are thus reduced.

[11] We can also notice that a non prudent agent submitted to liquidity constraints also constitutes precautionary savings (Deaton, 1992). From a technical point of view, prudence is sufficient but non necessary condition for precautionary savings. Liquidity constraints generate a discontinuity in the marginal utility function that plays the same role than the convexity hypothesis. The threat of subsistence crises also have similar effects.

Empirical Analyses.

The empirical literature devoted to the effects of risk on growth is abundant. The usual manner of conducting those analyses is an econometric analysis on international data. The results are very scattered. Three pieces of explanation may be proposed for.

- Most studies do not separate the *ex ante* instability (perceived or expected instability) from *ex post* instability (measured or global instability). Deméocq and Guillaumont, (1989) show the crucial role played by perceived instability (risk).

- Most studies calculate the instability indices as the difference between a deterministic trend and the observed values of exports' earnings. This measure is biased if the trend is stochastic (Nelson and Kang, 1981).

- Samples are very diverse.

Knudsen and Parnes (1975, 28 developing countries, 1958-68), Yotopoulos and Nugent (1976, 38 developing countries, 1949-67) and Lim (1976, 1968-73) show that exports earnings instability boosts savings. Moran (1983) delivers non conclusive results on the 1954-75 period. Deméocq and Guillaumont (1989) find a negative reaction of savings to instability between 1970 and 1981 and a positive one between 1960 and 1970. Such a diversity may be explained by the different attitudes of the public agent in the risk management. Combes (1993, 22 developing countries exporting mainly agricultural products, panel data, 1972-84) shows that the private income instability increases private savings. Combes (1993, international data, 40 developing countries exporting mainly agricultural products) obtains different types of results:

- Negative reaction of global savings (Public and private) to exports earnings instability in the 70's and 80's,

- The latter is the result of domestic price stabilization policies. When international prices are high (70s), public taxes are important and hence global savings are negatively affected by a poor public management.

- Precautionary savings exist for private agents but not for the public agent. When domestic stabilization is important, the effects of exports earnings instability on savings are negative. The negative effect of exports earnings instability on public savings may be the result of the existence of a ratchet effect that consists in an asymetrical reaction of the public agent to increases and decreases of prices. The ratchet effect overcomes the permanent income effect.

Kenen and Voivodas (1972) and Ozler and Harrigan (1988, 26 developing countries, 1963-82) find a negative effect of instability on investments.

The empirical analyses of the effects of instability on growth completed during the three previous decades exhibit very different results, for instance: there either exists a positive effect (Yotopoulos and Nugent, 1976), or a nil effect (Mc Bean, 1966 and Kenen and Voivodas, 1972) or a negative effect (Glezakos, 1973, Voivodas, 1974, Lancieri, 1978, Moran, 1983, Deméocq and Guillaumont, 1985, Ozler and Harrigan, 1988). Such a diversity may be due to a changing period coverage and often to the lack of an appropriate model. In a neoclassical framework; we must adopt the scheme of the *beta* convergence (Barro, 1991):

countries converge to the steady state which depends among other factors on instability. When the latter framework is retained, a negative effect of instability on growth is obtained (Guillaumont, 1994, Guillaumont, Guillaumont, Brun, 1997 on the 1970-90 period, Dawes, 1996). Ramey and Ramey (1995) separate the unpredictable and predictable components of growth volatility as the former may be considered as a risk variable. They thus find an empirical negative relationship between risk and economic growth. The latter results do not contradict those obtained on African countries samples (Gymah-Brempong, 1991). It can be interpreted as a transitory negative effect of instability on economic growth that is obviously permanent when it concerns welfare. Finally, the empirical analyses of the effects of price instability on growth tend to deliver a negative link (Lutz, 1994 and Guillaumont, Guillaumont Jeanneney and alii, 1999).

To summarize, international data empirical studies and theoretical analyses (Dutch Disease) tend show more and more clearly that exports earnings instability have a negative influence on growth. This is particularly true for African economies (little open economies). Theoretical advances in the comprehension of the effects of instability has been greatly improved by the use of stochastic control tools. Instability indexes are better defined notably when weighted by international trade (Deméocq and Guillaumont, 1989, Guillaumont, 1994 and Dawes, 1996). The results seem to be more robust when embedding appropriate control variables (exports growth and initial income per capita).

II. Some Microeconomic Analyses.

We first consider the microeconomic consequences of risk and then the risk management behavior of producers.

Microeconomic Consequences of Risk on Producers Behaviors.

In that kind of analysis the preliminary question is whether the price instability generates an income instability. In price-taker countries, the answer is obviously positive. Whatever the origins of the price instability (supply or demand shocks), the prices and quantities instability play in an additive way on the producers instability income. In price-maker countries exporting tradable goods or in the case non tradable goods, there are two different two cases, the case of a demand instability and the case of a supply instability. In the former case, prices and quantities are positively correlated, and thus the price instability favors the income instability. In the latter and most interesting case, the price instability may stabilize income (Newbery and Stiglitz, 1981). The price instability may favor producers when price-demand elasticities take some particular values: the price instability generates a higher and less instable income for some particular values of demand price-demand elasticities[12]. In the other cases, the price instability decreases (increases) the average income and instability at the same time[13].

The next question is the influence of instability of producers welfare. Pioneering works are based on the traditional marshallian surplus concept (Waugh, 1944, Oi, 1961, Massel, 1969). Recent developments use preferably the cost-benefit analysis. The cost of risk is then

[12] The price-demand elasticity must belong to the [0.5;1] interval.
[13] Theoretical analyses of the effects of risk on economic agents are comparative static exercises. They can be made with different definitions of risk increases: mean (income) preserving or mean utility preserving increases of risk. In that latter case, one may calculate the amount of money that is necessary to compensate for an increase of risk. That amount of money depends on producers risk aversion.

defined as the amount that the producers are willing to pay to get rid of the instability through a formal or informal insurance scheme (risk premium). The cost of risk depends positively on the risk aversion. But a high cost of risk does not mean that a stabilization procedure must be implemented because of the costs of such a procedure, at a national level (Bonjean, 1994 in the Ivoirian case, Braverman and al. 1990 in the Brazilian case) or at an international level (Newbery and Stiglitz, 1981).

Let us now consider the influence of instability on agricultural supply. On theoretical grounds, under the hypothesis of a risk averse producer, the effect of risk is ambiguous. An increase of the income risk may either favor the substitution of work into leisure (substitution effect) or make the producer work harder in order to achieve a certain level of income (income effect). It is possible to show that the income effect overcomes the substitution effect in the case of very risk averse producers (multiplicative risk scheme). Finally, risk has a negative influence on the agricultural supply as it is detrimental to the adoption of new production and environmentally preserving techniques. This is particularly true for the poorest producers (Newbery and Stiglitz, 1981). If we analyze the effects of risk by products, the effects of risk can be taken into account with a portfolio analysis: producers can compensate for an increase in risk with higher yielding agricultural choices.

There are few micro-econometric studies on the effects of risk. The reason is that there is very difficult to take into account the time dimension. Most econometric studies are thus based on specific agricultural products but at an aggregate level (developed and developing countries). They show the counterproductive effects of price instability on supply (Behrman, 1968, Just, 1974, Lin, 1977, Traill, 1978, Aradhyula and Holt, 1989, Antonovitz and Green, 1990, Guillaumont and Bonjean, 1995). Motel Combes (1996) extends earlier studies on livestock in Sahelian countries, distinguishing between two types of risk (price and climatic). International analyses on developing countries (Boussard and Gérard, 1994, Guillaumont and Combes, 1994 and most particularly on ACP countries, Guillaumont and Guillaumont Jeanneney, 1994) deliver analogous results.

The Management of Income Instability by Agricultural Households.

The income risk induces a loss of welfare when it is a source of consumption instability (Friedman, 1954). The consumption instability may be at least partially eliminated through the credit and insurance markets. But the latter opportunities are hardly realistic in very poor countries. The households can however insure themselves (autarkic households), diversify their activities or share the risk with other households.

According to the permanent income theory, when insurance opportunities are lacking, the households save their transitory receipts in order to compensate for future income shortcuts (buffer stock). Moreover, the households have an additional motive to save under the threat of income shortcuts (precautionary saving). A necessary condition for the existence of such a particular saving is that the households are prudent (Kimball, 1991). The precautionary saving is however bounded by the existence of an incompressible level of consumption. The precautionary saving is also imperfect in the sense that it does not prevent the households from the most severe income shortfalls. The poorest households are particularly exposed to income shocks especially when they are permanent (Deaton, 1990, 1991, Besley, 1995). Moreover, precautionary saving is subject to the multiplicative risks, *i.e.* risk on returns (Combes, 1993). Empirical studies show that agricultural households in developing countries have a precautionary saving and constitute buffer stocks (Wolpin, 1982, Bevan, Collier and Gunning, 1989, Paxson, 1992).

The agricultural households that are risk averse can diversify their activities. They especially diversify their activities by choosing different locations of their fields which is particularly important when rainfalls are very scattered (even at the village level). They also mix different types of speculation including non farming activities (Murdoch, 1992, Rosenzweig and Binswanger, 1993). The diversification of activities takes also the form of self consumption of foods. The latter can also be interpreted as a self insurance against risks as a decrease of the food price that is detrimental to the producer logically benefits to the consumer (Fafchamps, 1992). That kind of diversification is however costly as foods are characterized by low returns (Collier and Gunning, 1997). More generally, diversification activities prevent the households from benefiting from the specialization benefits.

The households can then react to risky situations with risk sharing activities (inter individual consumption smoothing) through informal credit devices (Udry, 1990) or social solidarity networks (Deaton, 1992). Some contractual labor arrangements are also considered as risk transferring tools towards risk neutral economic agents (sharecropping). But the latter are subject to the usual insurance versus incentive dilemma (Otsuka, Chuma and Hayami, 1992)[14].

All risk reducing and managing devices are costly as they diminish the consumption levels and the inter-temporal consumption smoothing. Such welfare costs may justify the public intervention especially towards the poorest. For instance, Jalan and Ravallion (1999) show that the marginal propensity to consume out current income is higher for less wealthy households in rural zones from southern China. The latter fact can naturally be considered as unfair but also as a deficiency of insurance and credit markets, that prevent peasants from achieving efficient production choices that are riskier but more productive[15].

[14] Under the hypothesis of imperfect and asymetric information (agency theory), insurance cannot complete since insurance has disincentive effects (moral hazard). Farming is very incentive for the landlord but very risky and perhaps unacceptable for the farmer. Waging is very sure for the worker but little encouraging for the landlord as he observes work time and non directly effort.

[15] A table summarizing the latter results (in french) is available upon request.

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