ВОПРОСЫ ТЕОРИИ

Structural Change and Output Decline in Transition Economies

G. Duchene

The paper discusses the factors which explain the spread of the output decline across various industries of the Former Soviet Union. Russia and Ukraine are compared on the period 1990-95. Several traditional explanations, such as the move away from military oriented production, the replacement of the planner's preferences by consumer preferences, the disruption of the intrаnsoviet trade relations, the change in the relative price of products when countries opened to foreign trade, and the change in factor endowments due to the split of the FSU, are all examined. Although some of these factors do have an influence on the relative growth (decline) of various industries ikn both countries, they fail to explain most of the variance of this growth (decline). Another explanatory factor is thus envisaged, namely the quality content of each industry. Quality is measured by two characteristics, the diversity (number of products made by a given industry) and the variety (Grubel-Lloyd ratio or degree of intra-industry trade), both indicators beeing measured for a typical western economy. The tests show that both Ukraine and Russia are weak at producing high quality complex goods and relatively better off producing standard homogenous commodities. The quality shock thus appears more important than the price shock to explain the dramatic decline of some ex-soviet industries.

Introduction

Usually, the slump which has occurred in all transition economies in the first years after their liberalization is interpreted in macroeconomic terms as the necessary result of the structural adjustment and tightening of financial conditions inherent with the transition to market process itself. This explains why this slump is expected to be of short duration, depending marginally on the radical or gradualist policies adopted; the fact that in many CEECs, the growth has resumed from one to three years after the first reforms measures is thus considered a positive test of the traditional macroeconomic hypothesis.

However, some transition economies remain outside this scheme, as output decline goes on deeper and longer than expected, particularly in the CIS. In 1990,

Gerard Duchene - professor of economics at Paris Universities and director of the ROSES Institute on transition economics.

the prospects for growth in the FSU (A Study of the Soviet Economy, 1991) were a 10% decline of GDP and 20% decline of industrial output in the first year after reforms ("radical" scenario), after which growth would resume; a "conservative" scenario showed a 5% per year decline of GDP and 10% per year decline of industrial output during three years after the reforms, before growth comes back. Needless to say that neither of these scenario has been realised in any of FSU countries, and that the 50% (Russia) or 67% (Ukraine) industrial output decline between 1990 and 1994 or 1995 cannot be explained by the split of the FSU nor by the slow ways of reforms, even taken together. Indeed, it seems that other factors than strictly macroeconomic are here at stake, and that there is some kind of structural inability to adapt to new patterns of production.

The question of macroeconomic versus structural change has been posed at the outset of CEECs transition (Borensztein-Ostry 1993). Establishing that the growth rates of various industry sectors in several countries depended more on common *national* factors than on common *sectoral* factors, the authors showed that macroeconomic adjustment played the first role in the output decline. Of special concern was the fact that this work demonstrated that there was no relation between sectors output change and the estimates of the change in domestic resource costs resulting from the transition to world prices (Hare-Hugues 1991). Similar tests on Russia using world prices value-added coefficients were proceeded by Duchene-Senik (1991) without any more success in demonstrating an impact of relative prices change on sectors output. From there stemmed a feeling of no rationale to structural change in transition (except of course the development of services[1]).

All these tests were however built essentially on the basis of a very limited period of time (often one year after the beginning of transition) and a limited number of sectors (usually less than 20 for studies on CEECs). They concerned mainly the analysis of the immediate post-shock period. Now, some experience has been accumulated and the probability grows that some kind of structural change appears more clearly. Unfortunately, cross-sectoral studies remain rare. The lack of reliable data may be put forward, since the only detailed data concern industry production: it may seem insufficient to base a general analysis of output decline on the economic sector on which everyone agrees to say that it is the best candidate for the largest decline. In fact, what may be analyzed through detailed industrial output data is the relative decline of various sectors. The idea of structural change is that, whatever the overall decline in GDP or global industrial output, the pattern of industrial production might change during the transition, and that a diffenciated picture might arise through the emergence of market relations.

Another reason for focusing on industry is that it constitutes the bulk of tradeables, and that its evolution is closely related to the immersion of transition economies into world trade. In this perspective, the analysis of relative declines

[1] The main reason for the development of services in transition economies is their voluntary underdevelopment in the former communist system There are however macroeconomic factors which play in the other direction, in particular the strong real exchange rate depreciation which occurs at the beginning of the transition process and which makes the price for non tradables decrease in relation to tradables. The pent up demand for services has revealed stronger in transition CEECs than this negative effect. After a while, when the gradual real re-appreciation of the currency begins, it favours the development of services (as non tradables become dearer).

across sectors of industry may be carried out in the framework of the specialization theory. Implicitly, this is the tenet of the pieces of Leontief style comparative statics which have been already developed by Hare-Hugues or Duchene-Senik. No attention thus far has been however devoted to the fact that specialization theory might not be adequate to explain the foreign trade behaviour of transition countries and that the framework of imperfect competition theory, product differenciation, and intra-industry trade might be a serious competitor to the traditional explanations.

Our aim is to come back to a sectoral approach to growth (decline) and to renew it by focusing on this specialization/differenciation effects, using as an example the experience of industrial output decline in Russia and Ukraine, two countries on which we hold detailed sectors output data. The rest of the paper is presented the following way.

The first four sections develop the analysis in the framework of specialization and show its limits; the last two sections thus turn to the framework of product differenciation. A first section assumes that the pattern of output should change in relation to changes in domestic demand and provides negative tests of this hypothesis; a second section shows that switches in foreign demand were much more important to drive industrial ouput than the preceding factors and provides a positive test for one of the two countries; a third section turns to the supply side and to the effects of relative price shifts on costs and profitability, and provides a positive test for the other country. A fourth section introduces the effects of changes in factor endowments which resulted from the unequal sharing in natural resources between NISs, and the Dutch disease/Dutch recovery effect which should have taken place in these conditions. A fifth section abandons the perspective of specialization to turn to an imperfect competition framework: the issue of product quality is introduced as a possible explanation for relative sectoral output declines and some positive tests are provided. At last a sixth section draws conclusions and poses the general problem of what is the main shock the transition economies have to answer.

1. Changes in domestic demand

The first event which has taken place in the transition process in the FSU - and at a lesser degree in CEECs, even before price liberalization, is the vanishing of detailed central administrative planning. In the same time, consumer sovereignty took gradually the lead. This resulted in a profound change in the preferences driving post-communist economies at the end of the eighties.

The main characteristics of the FSU was the imposition of a specific pattern of production, different of what the population would have wished (Findlay-Wellisz 1986): what would have been the necessity of the cumbersome system of central administrative planning if its aim had been to answer to "people's needs"? One may assume that the main difference between planners preferences and consumer's preferences was the implicit time preference of these agents, as well as specific preferences for foreign security; the planner always had a lower preference for the present and a higher preference for security than the consumers. The specificity of the planner's set of preferences appeared for instance in the well known "priorities" of planning: "productive" (goods) sectors had priority over "improductive" sectors (consumer services), "sector A" (producer goods) had priority over "sector B" (consumer

goods), and "heavy industry" (for investment and military needs) had priority over other industry sectors.

The gradual disappearance of central planning and its replacement by a new set of preferences worked as a first domestic demand shock on transition economies. The expected effect of this shock on sectoral output should have been a shift away from investment and military oriented sectors towards consumption oriented sectors.

A first test of this assumption consists in observing the sectors shares or growth rates during the transition process. As has been said, reliable data are hardly available partly because high inflation and rapid relative price changes make consistent output series difficult to establish. We have compiled a specific set of industrial output data based on physical production series (circa 300 items for each country) weighted by constant 1990 dollar prices. Input output data and foreign trade conversion coefficients for 1990 have been used as a benchmark to ensure the scope consistency of the estimates. Similar data bases have been also recently established for agriculture. It is added in all data and calculations below as one more "industry".

For Russia, the resulting estimates for industry as a whole and for large sectors correspond rather precisely to the officially published data (in the same format). For Ukraine, the results differ rather widely, however it is probable that the revision of past performance statistics in this country will stick more to our estimates than to the official ones. In the same time, this method of output estimation gives output indices for more disaggregated sub-sectors (but not all of them, as there may be a lack of physical data for certain branches) as presented in Annex[2)].

Sectors shares and growth of industry Russia and Ukraine 1990-1995 (%)

	RUSSIA				UKRAINE			
	1990	**1992**	**1995**	***95/90***	**1990**	**1992**	**1995**	***95/90***
Power	7.4	9.2	12.2	*81.0*	7.3	8.5	14.4	*65.2*
Fuels	18.3	20.8	25.2	*67.8*	16.5	16.2	20.7	*41.3*
Ferrous metals	6.1	6.0	6.9	*55.3*	14.4	15.0	18.3	*41.7*
Chemistry	4.8	4.8	4.7	*48.1*	4.6	4.6	4.6	*33.0*
MBMW	33.4	30.2	21.9	*32.2*	29.8	28.6	14.1	*15.6*
Wood-paper	3.3	3.4	2.8	*41.6*	2.3	2.3	2.1	*29.6*
Const.mat.	2.7	2.6	2.1	*37.9*	3.0	3.5	2.9	*32.4*
Light	3.5	2.6	1.2	*17.1*	4.4	4.2	1.7	*12.6*
Food	7.6	7.6	7.3	*47.0*	14.0	13.4	17.4	*40.8*
Non ferrous	8.3	8.3	11.3	*67.1*	1.9			
Other	4.6				1.8			
TOTAL IND.	100.0	100.0	100.0	*49.2*	100.0	100.0	100.0	*32.9*
Solid fuel	2.1	2.3	2.8	*66.5*	7.0	7.8	10.3	*48.5*
Oth.fuels	16.2	18.5	22.3	*68.0*	9.5	8.4	10.4	*36.0*
AGRICULT.	17.7	21.9	26.3	*73.2*	28.0	29.7	55.5	*65.1*

Sources: data compiled by the author.

[2)] Estimates of the monthly and quarterly outputs of industry and agriculture in Ukraine, based on this method, are regularly published in the Tacis-financed macroeconomic bulletin *Ukrainian Economic Trends*.

This table gives a first insight in the evolution of both countries industry. It is built in an aggregate one-digit nomenclature corresponding to the official presentation of output data in the countries under review. As one may see, in both countries the best performing sector (or the least badly performing) is power, the worse performance is obtained in light industry. Food industry, which appears to be a good candidate as a consumer oriented sector, performs in both countries better than average.

Nevertheless, it is difficult to judge whether consumer oriented sectors really perform better than investment oriented ones because the output of many sectors, beginning by power itself (or gas) partly goes to consumption and partly to other productive or final demand; on the other hand, apparently consumer oriented sectors like light and food industry may have - in certain subsectors - productive uses which have little to do with consumer needs. Moreover, it is clear that one cannot estimate consumption orientation only by the direct performance of some sectors, because all sectors are interdependent and may contribute directly or indirectly to various final uses.

The only way to assess whether the economies under review have "turned" towards consumption is to use the standard input-output technique in order to check whether the sectors contributing directly or indirectly to consumption have grown more (declined less) than the ones which contribute for instance to investment or military expenditure. The first step is thus to determine what are the contributions of each industry necessary to produce either a unit of military final demand (Coef MILI), or of investment final demand (Coef INV), or of consumption final demand (Coef CONSO); and the second step is to test a regression of relative growth (declines) of branches output on these contributions (see Annex). The expected results are: the higher the productive coefficient for consumption, the highest should be the growth of the sector; the higher the coefficients for investment or military, the lowest should be the growth of the sector.

The results are rather deceiving, as shown by the table below: both tested relations should be rejected. There is no significant relation between sectors growth and each of the mentioned sets of coefficients; the coefficients for military expenditure are non significant in both countries; the relation is particularly bad for Ukraine; only investment and consumption are weakly significant in Russia, but consumption has the wrong sign.

Regression of sectors growth rates (1995/1990) on contributions to domestic demand

		Explanatory variables			
	Constant	Consumption	Investment	Military	R2/F/DF
Growth Russia	96.1	-55.0	-70.9	-79.5	0.15
t statistics	5.4	-2.8	-3.1	-1.7	3
Average of the variable	44.1	0.472	0.316	0.046	55
Growth Ukraine	42.6	-6.4	-22.0	-6.4	0.05
t statistics	2.3	-0.3	-1.0	-0.1	1
Average of the variable	32.6	0.480	0.307	0.038	60

Note: in this table as in all tables of the same format below, the last column (R2/F/DF) shows, in this order, the coefficient of correlation, the Fisher test and the number of degrees of freedom. Regressions have been drawn directly on the level of the variables. The average of the dependent variable is indicated at the bottom of the first column.

The poor quality of these results is easy to explain: even if domestic demand changes, there is no need that production changes in the same direction, since foreign trade may fill the gap which arises, especially in conditions where the demand shift is rapid and industry is not ready to answer. We thus turn now to foreign trade factors.

2. Transition to open economy: the re-direction of trade effect

The same line of reasoning as in the previous section may be applied to foreign demand. The FSU was a relatively closed economy which has rather abruptly opened to trade with the rest of the world. In the system of FSU economic statistics, the trade of each ex-republic was divided between intra-FSU trade and trade with the rest of the world. In fact, it would have been more correct to separate ex-Comecon trade from the rest of the world, as this trade had an intermediate status between the two kinds of trades already mentioned.

Intra FSU trade appeared essentially as the result of central planning; the planner fixed these trade flows as a part of the current relations of procurement and delivery of products, as if the ex-republics were a part of an integrated economic set (which they were in fact). No or very few attention was given to comparative advantage or any economic considerations in this planning: there are well known examples of neglect of transport costs, let alone the principles of regional planning of production capacities, which might have resulted in an artificial development of trade links between republics. In contrast, trade with western countries was subject to restrictions of all kinds; however, despite its relatively small size compared to FSU trade, western trade was probably more rationally established (that is corresponded to comparative advantages) than trade with the FSU. The principal feature which remains is that there was a very intense trade on one side, with enhancing factors, and a relatively small trade, hindered by a number of restrictions, on the other side.

This situation has dramatically changed from 1992. The liberalisation of trade with the west and the emergence of a new demand for FSU exportables and new supply of FSU importables has gone together with the establishment of new barriers to trade between NISs. Accounting for the weak enforcement of tariff and non tariff restrictions both with the west and in FSU trade and despite the many rapid changes in trade legislation, one may consider that the degree of opening of the NISs has become approximately equal in both directions, a fact which represents a major change in comparison to the pre-transition period.

The effect of the opening of a new (and very wide) area for trade have been widely analysed and documented for FSU in terms of the gravity model (Vavilov-Vyugin 1991, Gros-Goncjarz 1994, Maurel 1995). All these studies demonstrate that both the proximity and comparative economic weight of the European Union play a major role of attraction to the FSU potential trade, as was the case for CEECs from 1990. In the same time, the potential attraction of new independent states to each other appears very weak in comparison, despite their geographic proximity and possible specific regional trade or payments arrangements.

What may be the expected effect of this potential redirection of trade on industry sectors output? This question refers implicitly to the underlying logic of the gravity model and more precisely to the status of the GDPs in the gravity equation

(in this first step, we do not include relative prices as an argument of the gravity equation). It is clear that the bilateral trade flows accounted for in the determination of any gravity equation coefficients on the world level contain both intra-industry trade and specialized trade, but that the implicit rationale underlying the gravity equations relies on the imperfect competition - intra-industry trade. However, the fact that the regional distribution of a country's exports would be related to the partner countries GDPs even when trade is specialized (inter-industry) is also indisputable (Hummels-Levinsohn 1993), although not yet clearly explained. In result, independently of the predominance of inter- or intra-industry trade, the opening of a new area of trade should act for a given country as a demand incentive to the production of exportables towards the newly open area. So that the expected effect of the liberalization of foreign trade with the west in the FSU should go in the direction of a reduction of FSU oriented output of exportables and of a development of western oriented output of exportables.

Regression of sectors growth rates (1995/1990) on contributions to foreign demand

		Explanatory variables		
	Constant	RoW exports	FSU exports	R2/F/DF
Growth Russia	40.5	87.6	-34.5	0.10
t statistics	8.7	2.5	-1.3	3
Average of the variable	44.1	0.104	0.161	56
Growth Ukraine	31.8	122.9	-70.0	0.20
t statistics	7.1	3.8	-2.9	8
Average of the variable	32.6	0.103	0.171	61

In order to test this relationship, we use the same procedure as in the first section. Direct and indirect production coefficients by sectors aiming to answer to the basket of FSU exports and to the basket of Rest of World exports have been determined at the disaggregated level (see Coef X FSU and Coef X RoW in Annex). We then test a regression of sectors output growth on these coefficients, expecting a positive relation for the rest of the world and a negative one for FSU exports. The results are presented in the table above.

As seen in the table, the results are not very neat for Russia, where only RoW exportables (direct and indirect) have a significant coefficient. The first tested relation is to be rejected. In comparison, the results appear a little better for Ukraine, where the correlation is a little higher and the coefficients are significant with the right sign. There is here a good and rather paradoxical evidence that the structure of the Ukrainian economy - of output, not only exports - has switched at least partly to western oriented production, and that this country has operated this switch more than Russia.

Recalling the results obtained in section 1, one may be striked by the fact that - although non significant - the coefficients for domestic demand were all negative (including for consumption oriented output), and that the coefficient for FSU trade - which appears somehow also as a kind of domestic demand - is also negative. The question arises whether there would not be an overall decline of output oriented towards domestic demand versus a growth of output oriented towards "real" (western) foreign demand. Such a relation would represent directly the process of

opening to foreign trade. This relationship has also been tested, however it does not lead to any firm conclusion and we do not reproduce it here.

The results obtained so far for Russia are rather deceiving, but the issue of openness to foreign trade is far from being completed, since one has not analysed yet the second major component of this issue, namely the change in prices, towards which we turn now.

3. Transition to open economy: the relative price shock

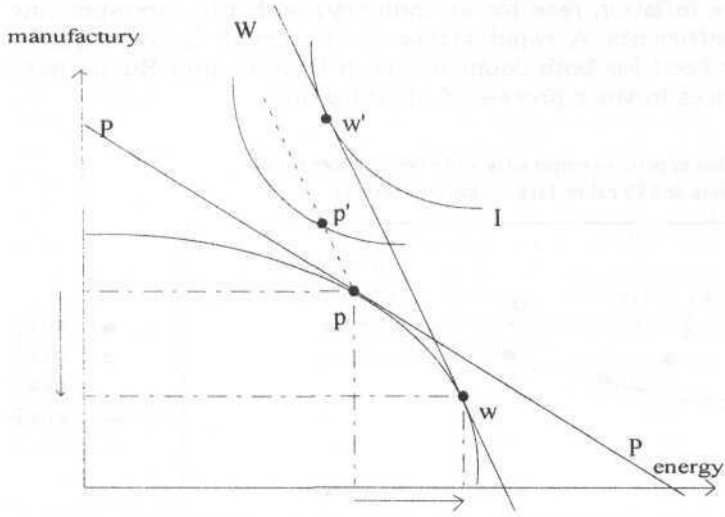
Starting with a demand of exportables - supply of importables concept, the previous section turned mainly towards a demand led effect of foreign trade on production. In the present section, the question at stake has also both demand and supply implications, but it will be oriented mostly towards the supply side aspects.

While opening to western trade, all FSU economies - as well as CEECs two years earlier - have implicitly accepted that the prices which would govern both their foreign trade and internal market relations be governed by the world prices instead of the traditional system of soviet or Comecon prices. Notice that for CEECs, this change in relative prices was masked by the well known rule of Comecon price determination according to which intra-Comecon mutual deliveries were priced at a level corresponding to the average of world prices during the five previous years; in fact, if Comecon prices were correctly determined for raw materials, including energy, they were clearly overvalued for most of manufactured goods, so that the price of energy relative to manufactured goods was undervalued, although at a lesser degree that in the FSU.

Inside the FSU, the most conspicuous feature of the price system was indeed the extravagantly low price of energy, especially relative to manufactured consumer goods (mainly light and food industries). This fact has been widely documented by the data collected on the so-called "coefficients of efficiency of foreign trade" used by the soviet (or CEECs) planners to account for price differences between "foreign trade prices" (equal to world prices in trade between FSU and western countries) and "domestic prices" (Duchene-Senik 1991 for FSU, Hare-Hugues 1991 for CEECs). These coefficients, presented as dollar/domestic rubles ratios, are given for Russia (Dol/rub RU) and Ukrain (Dol/rub UK) in Annex.

The effect of passing from the old structure of relative prices to the new structure deals both with demand and supply of goods. This twin effect may be represented in the oversimplified framework of international specialization (see graph below). The graph represents the production frontier of the FSU, with energy represented on the horizontal axis and manufactured goods on the vertical axis; the line WW represents the relative world price and the points w and w' the equilibrium which would occur for production and consumption (and thus for exports and imports) in a context of open trade. Now, in the former regime, the planner fixed the output mix according to his own priorities at point p on the production frontier, where the structure of output is more "diversified" than in w in accordance to the principle of self-sufficiency for all kinds of products. We assume that beeing at point p, the planner also fixed the relative price of goods along PP (planned prices), tangent to the production frontier. This assumption, which is not self evident because prices looked quite arbitrary, is related to the fact that all industry sectors in the FSU had approximately the same level of profitability when measured in old

domestic producer prices (Duchene, 1993). As paradoxical as it may seem, soviet prices had a certain degree of rationality in a closed economy context.



However, the planner was not completely cut off from the rest of the world and knew that it was possible to trade a part of the energy produced against manufactured goods, and to do that at the world price; so doing, he also knew that he could easily raise the level of welfare (whether his or the population's), and he was thus able to fix the consumption mix at point p'. At this point p', there is no need that (consumer) prices equilibrate the market, and the availability of goods may be regulated by shortages and rationing.

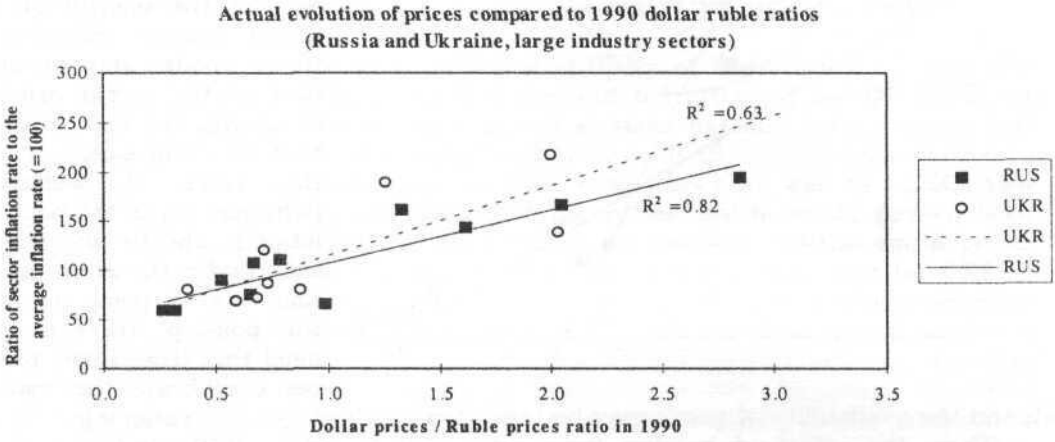
Thus, the effect of passing from prices PP to prices WW (and also the abandonment of planning), other things beeing equal, leads to a shift of production from point p to point w, whatever the changes in consumption and demand: the opportunity cost of producing manufactures rises and their output should decline, whereas the output of energy should relatively rise. This supply effect is the one which is of interest to us in the present context.

The reality is however a little more complex than this simple presentation, because outputs of each product are not dependent only on primary resources, and the change of relative prices changes both the prices of inputs and outputs. It is thus the value added ratio of each sector which changes with relative prices. This line of reasoning has been developed already a long time by Hare Hugues (1991) and Duchene Senik (1991): it may occur that certain otherwise prosperous sectors find themselves in a position where they produce negative value-added if they go on producing at the new set of prices.

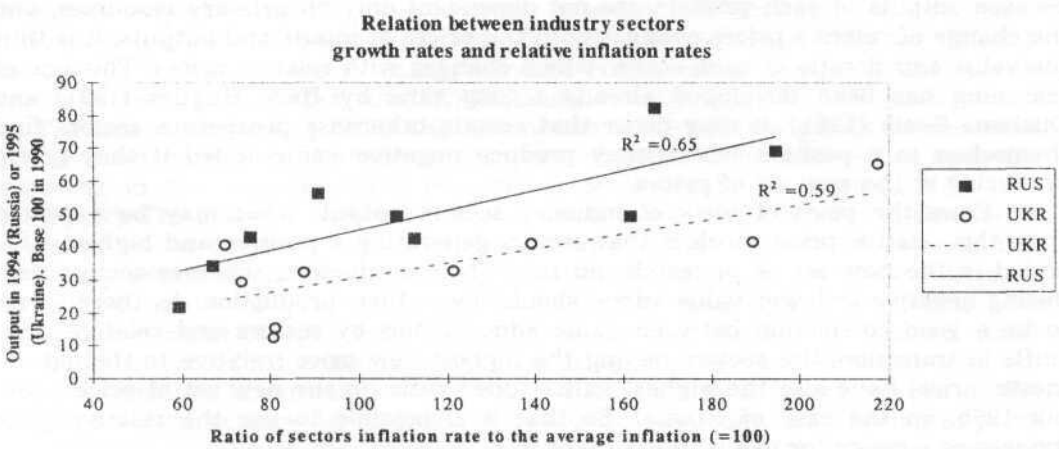
From the point of view of industry sectors output, what may be expected from this relative price shock is that sectors generating a positive and higher value added in the new set of prices should raise their production, whereas sectors producing negative or lower value added should lower their production. As there seems to be a good correlation between value added ratios by sectors and relative price shifts in transition, the sectors having the highest new price (relative to the old domestic price) have also the highest value-added ratio (in the new set of prices) (Senik 1995, on the case of Russia). So that it is possible to use the relative price indexes as a proxy for value added ratios.

It remains that this process of output restructuring may take place only if prices actually went in the direction indicated by the initial coefficients. This relation is difficult to check at a disaggregated level because of the unavailability of detailed

data on sectors prices. Nevertheless, it is possible to make one's mind on a more aggregate level by a comparison of relative inflation rates (ratio of inflation rate for a given sector to the average inflation rate for all industry) with the corresponding re-aggregated conversion coefficients. A rapid glance at the graph below suggests that the correlation is rather good for both countries: both Ukraine and Russia have adjusted to relative world prices in their process of liberalization.



It will thus be possible to test a relationship on a more disaggregated basis between output growth by sectors and conversion (dollar/ruble) coefficients of 1990, taken as a proxy for relative price change between 1990 and 1994 or 1995. Before that, one may use the same aggregate format to check whether sectoral growth rates are linked to actual relative price moves, as presented in the graph below.



The results are striking: there is a really nice correlation (although symbolic because of the small number of observations) between the two variables, which al-

lows to try the more disaggregated relation between growth rates and conversion coefficients.

Recall that we expect a positive relation of the growth rate of industry sectors to the dollar ruble conversion coefficients. The coefficients at the disaggregate level slightly differ from one country to the other: for large sectors, the diversity of coefficients is explained by the aggregation effect; for small sectors, the difference comes first from the fact that the product mix is also not the same in the same sector for both countries, and second from a difference of nature of products: for instance, the coefficient for gas reflects in Russia the producers price whereas in Ukraine it reflects the import price which includes large transport and distribution costs. The results of the regressions are given in the following table.

Regression of sectors growth rates 1995/1990 on dollar / ruble coefficients of 1990

	Constant	Explanatory variables		R2/F/DF
		k Russia	k Ukraine	
Growth Russia	32.1	13.9		0.21
t statistics	8.2	3.9		15
Average of the variable	44.1	0.866		57
Growth Ukraine	25.9		7.1	0.09
t statistics	6.8		2.4	6
Average of the variable	32.6		0.933	62

Both tested relations appear valid, although weakly for the second. This time, Russia appears with better results than Ukraine, even if the slope of regression for Ukraine is also significantly positive. The fact that Ukraine is less sensitive to relative prices shifts than Russia is mainly due to the behaviour of energy prices: with the same higher energy prices, Russia may relatively raise its energy production whereas Ukraine cannot.

We remain however with the results of sections 2 and 3, that is with Russia's output reacting to prices and Ukraine's output reacting more to demand. induces to assume that one country, Russia, is subject to a rationale of specialization, whereas the other, Ukraine, might be in a logic of product differenciation and intra-industry trade development. It would be plausible that there is a link between the sensitivity of these countries to various foreign explanatory factors (prices and demand), if a third foreign factor of structural change could explain why one country turns to inter-industry specialization and the other to intra-industry trade. One possible candidate factor, which becomes thus the next topic we have to review, is the change in factor endowments of both countries.

4. Changes in factor endowments

The shock we are going to analyse in this section is often forgotten by the studies of transition in the CIS, or considered implicit and evident, or else mixed with the issue of the previous section. In fact it is really an independent feature which deserves a specific analysis and allows to draw significant conclusions. The idea which is developed here is that both ex-republics, Russia and Ukraine (as well as all other smaller sisters), shared at least partially in FSU time a common factor

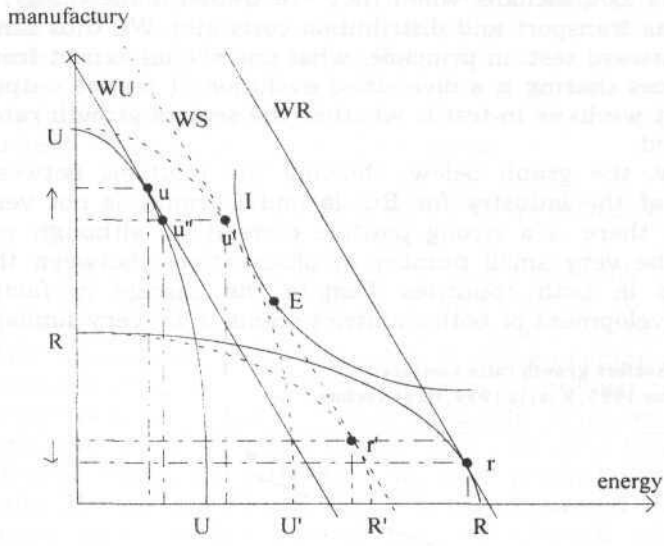
endowment. After the split, the factor endowment of each of the NIS changed by comparison to the former common one (this was probably the main reason for Russia to split), and this change should have some major implications on the sectoral output.

If one comes back to the simple two-products-one-factor diagram of specialization of section 3, with the same distinction between energy and manufactured goods, and recalling that the graph represents the FSU, one may see that there is a welfare gain from the sale of energy and purchase of manufactures at world prices. This "energy rent" of the FSU was shared relatively equally in the FSU, that is all ex-republics benefitted this rent, as the standard of living and the general level of development were more or less the same in all parts of the FSU; this might be opposed for Central Asian republics, but it was approximately true for Russia and Ukraine. One may indeed consider that the indifference curve represented on the graph of section 3 is common to both ex-republics.

Notice that this sharing should occur whatever the relative price level of energy is, which means that even if energy was traded inside FSU at relative world prices, there would have been a sharing of the rent. The degree of redistribution would be even higher in this case, relative to the case when relative prices are planned at a level less favourable to energy: in this last case, a part of redistribution goes through domestic prices, a factor which has already been analyzed in the preceding section, but another part (the so-called "net income of foreign trade" in ex-soviet budget terminology, which represented around 10% of FSU GDP in the eighties) remained to be shared outside the price mechanism.

Everything is thus (in the FSU case) as if the energy non-producing republics actually produced energy (at least the part corresponding to their share in the energy rent), and as if the energy producing republic (Russia) produced less than in fact it produced. One may represent this logic of natural resources sharing on the following graph, assuming for simplicity that goods are traded at their world price inside the country. Let RR be the frontier of production possibilities of Russia and UU the frontier of Ukraine (Russia is more endowed in energy than Ukraine). Let WR and WU be the world relative prices, leading to equilibria r and u on the frontiers. In these conditions, it is clear that the two countries cannot reach the same indifference curve. In FSU conditions however, the countries have to be on a common point of consumer equilibrium, let say on indifference curve I on a price line WS (S is for Soviet). How will they get there?

A simple way would be to transfer a lump sum subsidy from Russia to Ukraine and then nothing would change except that the consumption equilibrium would be in E. However, in conditions of central planning of FSU as a whole, the planner will consider implicitly that Ukraine's production frontier is not UU but UU' tangent to WS whereas Russia's frontier is not RR but RR' also tangent to WS: everything appears as if a part of the energy produced by Russia were in fact produced by Ukraine, which allows both countries to find their consumption equilibrium at point E. Notice that all this would hold with the planned price system instead of world prices under certain conditions.



Now, this has important consequences in terms of substitution effect on both countries: the equilibrium points on curves RR' and UU' become now r' and u'. Finding itself richer in oil, Ukraine will tend to produce less manufactures than at u and Russia, finding itself poorer, will produce more manufactures. Of course, Ukraine does not produce all of the energy at point u' but gets for free the horizontal gap between its real production frontier UU and the theoretical one UU', so that its real production point will be at u".

In case the countries split, all conditions are thus fulfilled in order that Russia suffers a Dutch disease effect, whereas Ukraine should suffer the reverse, that is a "Dutch recovery" effect. Output of manufactures should lower in Russia, in the same time as the welfare of this country rises (again other things being equal, that is without macroeconomic adjustment costs which would anyway lower the whole production frontier). On the other side, the Ukrainian output of manufactures should rise. One may wonder whether a similar effect sould have been expected from the disintegration of the ex-Comecon; the answer is negative, as the planning processes of CEECs were independent of FSU planning, and real comparative advantages were probably exploited more intensively than inside the FSU.

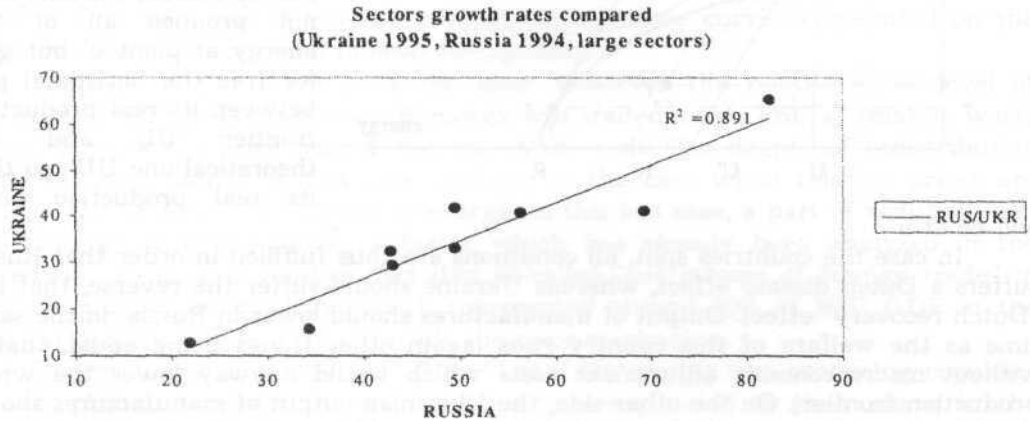
This twin effect might be an explanation for the paradox of differentiated sensitivity to foreign trade factors which we exposed in the preceding section: if Russia has to reduce its production of manufactures and expand its production of energy (other things beeing equal), it answers to a logic of trade specialization and should be sensible to relative price moves. If Ukraine has to expand its production of manufactures and reduce its production of energy, it may do so by entering the imperfect competition market of European manufactures, and would thus be more sensitive to foreign demand factors than to relative prices.

The kind of test one should propose to check the Dutch disease/Dutch recovery effects should be in terms of inverse evolutions of the real exchange rates of Russia and Ukraine. In the FSU split, Russia benefits a net increment of wealth and Ukraine suffers a net loss; these new international positions should drive Russia to appreciate its real exchange rate (the price of its non tradables in terms of tradables) and Ukraine to depreciate it. As an effect, one may expect a relatively higher growth of non-tradables (services) in Russia than in Ukraine.

It has not been possible to collect adequate data on services in both countries in order to test this kind of relation (accounting for the fact that all products, be

they internationally tradables or not, include, when they are traded domestically, a non-tradable component such as transport and distribution costs etc). We thus limit ourselves to a rather straightforward test: in principle, what one should expect from the canceling of natural resources sharing is a diversified evolution of sectors output in Russia and Ukraine. So what we have to test is whether the sectors growth rates in both countries are non-related.

From this point of view, the graph below, showing the relations between growth rates of large sectors of the industry for Russia and Ukraine, is not very encouraging. As one may see, there is a strong positive correlation, although not really significant because of the very small number of observations, between the evolutions of industry sectors in both countries. Despite the change in factor endowments, the pattern of development of both countries seems to be very similar.



A similar test may be proceeded at the disaggregate sectors level. The following table presents the results.

The correlation is positive although not quite significant. It confirms however the first result that the development in both countries is similar in the transition period. This in turn implies that there has not been a Dutch disease versus Dutch recovery effect, nor any tentative relative specialization of one of the countries relative to the other.

Regression of sectors growth rates of Russia and Ukraine

	Constant	Growth Ukraine	Growth Russia	R2/F/DF
Growth Russia	24.2	0.660		0.53
t statistics	6.9	7.7		59
Average of the variable	47.0	34.5		52
Growth Ukraine	-3.2		0.803	0.53
t statistics	-0.6		7.7	59
Average of the variable	34.5		47.0	52

Coming back to our initial question, whether the sensitivity of Ukraine to foreign demand factors (section 2) and of Russia to relative prices factors (section 3) could not be explained by the change in factor endowments of these countries, the

results of our analysis comes to a deadlock. More precisely, both Ukraine and Russia seem to follow the same specialization pattern, a feature which, independently of *a priori* differences in factor endowments, could be related to relative price changes alone, if only Ukraine's growth showed a dependence to relative price changes. As this is not not the case (although the test is not negative, its significance remains limited), we have to turn to other causes.

5. The issue of product quality

Let sum up the questions we have posed and answers we have obtained thus far. We started asking whether the change in domestic demand had direct consequences on the structure of production. We discovered that this did not take place, and pointed to the possibility that the opening of FSU to western trade had a dominant influence on the restructuring of production. We then tested two possible foreign factors of change, demand and relative prices, the second one beeing related with traditional specialization and inter-industry trade, and the first one allowing either specialization or a framework of product differenciation and intra-industry trade. Having established that Ukraine answered more to the first rationale and Russia more to the second one, we checked whether the change in factor endowments would not be an explanation of this difference and found that both countries followed in fact similar paths of structural change. As relative price changes alone are not able to explain this (especially for Ukraine), we are looking for a new feature which would explain both the similarity of sectoral evolutions and the differences in sensitivity to prices or demand.

So far, we remained in the specialization framework, although some results might have pointed to the influence of the product differenciation framework. We turn now more openly to this last conceptual framework by raising the question of the adaptation of the output of our countries to modern forms of competition. If for instance it appeared that these countries share a common mis-adaptation of their products to the existing close and attracting European markets, then we would get the beginning of the explanation we are looking for.

The issue of quality of FSU products (and in general ex-Comecon products) is raised already a long time, and intrinsically linked with the problems of the international valuation of output and growth performance of the former communist system. In the seventies, when the question of who subsidized whom in the Comecon (Marreese-Vanous 1978), the argument of the low quality of equipments or consumer goods FSU received from CEECs in exchange for "hard goods" (oil and gas) was used to show that subsidies intra-Comecon went East to West despite or more precisely because all these goods were valued at a "world price" which had a reality for raw materials only.

After transition took place, the easy invasion of CEECs and the FSU by not so high quality western (or southern) consumer products, both food and non-food, without much resistance from domestic producers, showed that these producers suffered a deep unability to compete on quality. This could however seem normal as, as have been said earlier, consumer products were never a priority of centrally planned economies. Less normal is that the same story takes place with equipment goods, which were always the main dish of pre-transition period. The complex

procedures of certification play here a major role either to evidence the low quality of ex-soviet equipments, or to cut them from potential markets.

Despite this overwhelming evidence that product quality might play a role in the evolution of output of post-transition economies, there is at our knowledge no work other than monographic on this topic. The explanation is clearly that quality is of the brand of concepts which is rather difficult to measure for obvious reasons, especially when inter-industry comparisons are at stake. If we wished to test a relationship between sectoral output growth and quality performance, we would need sectoral quality indices which are difficult even to imagine. It seems thus that the issue of quality may be treated only qualitatively, which of course would be rather disappointing.

There is however a way out of this measurement deadlock. As one uses to measure comparative advantage by resorting to "revealed advantages", we suggest to measure quality by "revealed quality". As is known, imperfect competition markets, characterized by product differenciation, leads in international trade to intra-industry trade. Pure specialization and inter-industry trade are possible only in conditions of product homogeneity. We can thus assume at first that there is a direct relation between the degree of intra-industry trade and product differenciation, and accept for instance Grubel-Loyd ratios as measures of "revealed differenciation".

But may we assume that what makes quality is product differenciation? When one says about soviet-type products that they are of poor quality, what is implied is in fact that these products - although their Lancaster-type technical characteristics may correspond more or less to western standards - are not integrated in the oligopoly market in the sense that their overall distance from consumer preferences makes them unreceivable by consumers. From the product definition and conception to its marketing, passing by the fulfillment of technical or other requirements, by the packaging, the advertising and trade marks, the distribution network, the terms and reliability of delivery, the after-sale service, what is lacking in the soviet-type product - be it consumer or investment or intermediate goods - is all these elements which make a product a demanded brand among a variety of brands; all this is product differenciation or variety. We can assume that soviet-type products - even complex ones - were by their conception un-differenciated products.

If this assumption holds, then a sectoral measure of quality may be found in the "revealed differenciation". But revealed by whom? Of course one cannot rely on the measure of intra-industry trade degree of the FSU economies themselves, as these economies were not integrated in the process of international trade until very recently. We have to resort to a kind of objective measure of the quality of the products which are already integrated in the world trade, and define thus an index, characterizing each industry sector, of the standard *western* degree of quality. This ratio would define for a given industry the weight of the quality factor which has to be reached by transition firms in order to participate not only in international trade but also in their own domestic trade where they have to compete with potential western imports. Needless to say that some industries would be highly "qualitative" whereas others (raw materials and so on) would be more "un-differenciated", and that these kinds of industries require various abilities from their respective producers.

We thus suggest to calculate Grubel-Lloyd ratios for each industry sector (in our disaggregated 100 branches nomenclature) on the basis of European trade data. These data are easily available with an 8 digit precision which allows full confidence

on the reliability of the measure of intra-industry trade degree. Having defined these ratios, we would test whether the relative growth of transition economies sectors are related to these ratios and in what direction. What is expected is of course that more "qualitative" sectors would suffer more than "undifferenciated" ones in the course of transition to market and opening up to international trade.

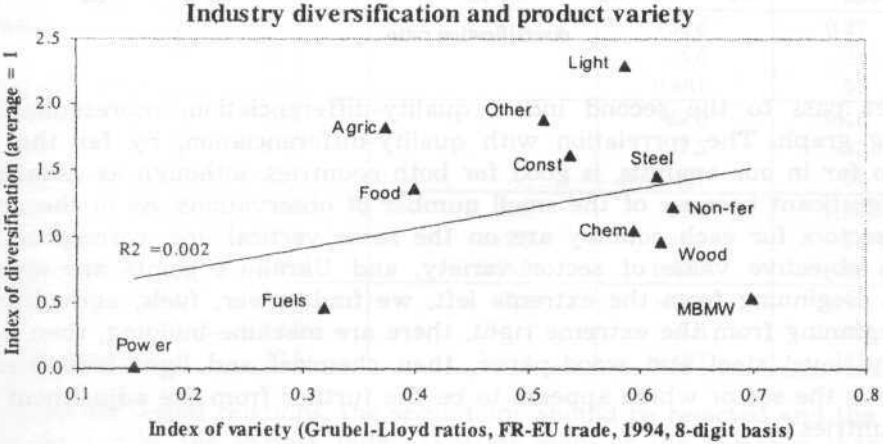
Now, quality is a polysemic word and one can define another concept of it (and probably many others). Differenciation or variety is often opposed to diversification, in the sense that there are industries which produce one type of product (for instance automobiles) but with many various models - this is variety -, whereas others (for instance basic chemical industry) may produce a great number of various products, each of which beeing rather undifferenciated at an 8 digit level - and this would be diversification. One may say that diversification also reflects quality in some sense.

We thus propose a second measure of quality, as objective as the preceding one, focusing on diversity of output in an industry. The measurement concept we suggest is to refer to the number of 8-digits positions of the European trade classification (HS) in a given industry sector. In order to make these numbers, which range from 1 to 594 (over a total of around 12000 positions), comparable, and to give account for the fact that there are bigger and smaller sectors, we build the index (ni/Ti)/(n/T), where ni and n are the number of positions respectively in sector i and for all sectors, and Ti and T are the trade flows respectively of sector i and of all sectors.

We remain with two indexes of quality, one is the variety or differenciation index v (Grubel-Loyd ratios), and the other is the diversification index d (defined above). These indexes have been calculated on the case of France, taken as an average European country, and are shown in Annex.

It is important first to note that there is nearly no relation between v and d ratios, as is shown on the graph below at the aggregate level of industry sectors. For instance, power is both non diversified and non differenciated, light industry is both diversified and differenciated, but agriculture is diversified and weakly differenciated and machine building (soviet definition, that is including durables and transport means) is non diversified but very differenciated.

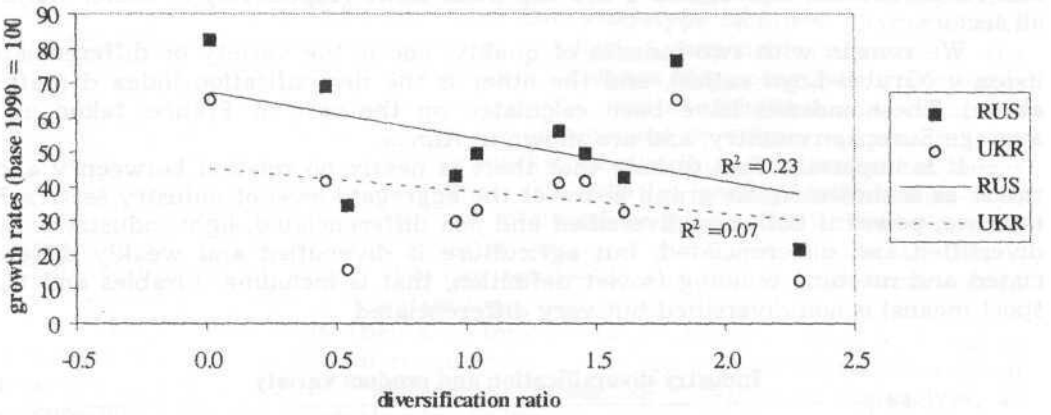
Industry diversification and product variety



Now we can proceed to the tests of sectoral growth against each of the index, beginning by a visual analysis at the aggregated level. First, the relation of sectoral growth rates with the diversification index is represented on the graph on the following page. There are some missing observations because growth rates are not available for all sectors mentioned in the preceding table (non ferrous metals and other branches of industry).

The correlation is rather good for Russia, worse for Ukraine. The Ukrainian fitted line is lower than the one for Russia because growth rates are globally lower for the former country. Sectors on the right of the graph are (beginning from the extreme right) light industry and agriculture, followed by a group of three which are construction materials, steel and food. Sectors on the left of the graph are (beginning from the extreme left): power, fuels and machine building. Although we have defined and measured quality-diversification in this way, it appears rather clearly that the place of agriculture and machine building does not fit neither with the general trend of the graph, nor with the intuitive perception of quality.

Growth rates of Russia and Ukraine compared to diversification ratios



Let pass to the second index, quality-differenciation, represented on the following graph. The correlation with quality-differenciation, by far the best fit found so far in our analysis, is good for both countries, although as usual it is not really significant because of the small number of observations. As in the preceding graph, sectors for each country are on the same vertical line, corresponding to a common objective value of sector variety, and Ukraine's points are lower than Russia's. Beginning from the extreme left, we find power, fuels, agriculture, then food. Beginning from the extreme right, there are machine-building, then nearly at the same level steel and wood-paper, then chemical and light industries. Light industry is the sector which appears to be the further from the adjustment line for both countries.

We now pass to the tests at the more disaggregated level. Three tests are proceeded for each of the countries: one for each of the quality indexes, the third one for both indexes taken together. The six estimations are presented in the table below.

Regression of sectors growth rates on quality indexes

	Constant	Explanatory variables		R2/F/DF
		Diversification	Variety	
Growth Russia	53.3	-6.1		0.11
t statistics	12.1	-2.6		7
Average of the variable	44.1	1.518		57
Growth Ukraine	36.6	-2.7		0.02
t statistics	8.0	-1.1		1
Average of the variable	32.6	1.488		62
Growth Russia	71.3		-56.6	0.27
t statistics	11.1		-4.6	21
Average of the variable	44.1		0.481	57
Growth Ukraine	73.3		-82.0	**0.46**
t statistics	12.3		-7.3	53
Average of the variable	32.6		0.497	62
Growth Russia	79.0	-5.6	-54.8	**0.36**
t statistics	11.9	-2.8	-4.7	16
Average of the variable	44.1	1.518	0.481	56
Growth Ukraine	76.7	-2.4	-81.7	0.48
t statistics	12.0	-1.3	-7.3	28
Average of the variable	32.6	1.488	0.497	61

Among the six tested relations, the second one should be rejected and the first one is weak. As a rule, the variety index explains more of the variance than the

diversification index, especially in the case of Ukraine, where the regression is good even with variety as the sole explanatory factor. For Russia, the quality-diversification index is a significant but weak explanatory variable when taken alone, and remains a significant complement to the other factor when estimated along with quality-variety. On the whole, the visual evidences presented in the graphs are confirmed and complemented by the tests at the more disaggregated level.

The meaning of these tests is that there is a relatively strong negative correlation between the growth rates of industry sectors and the degree of quality required on average in the west: sectors where quality counts are failures for FSU transition economies, whereas the successes (other things beeing equal, that is the less declining sectors) of FSU industry are in sectors where products are undifferenciated and non diversified (this in the case of Russia).

Coming back to the aggregated level in order to give a concrete picture of this result, this means that the less declining sectors would be for both countries: power, fuels, agriculture and food. this corresponds nearly precisely to what actually happened (see Table in section 1, where one sees that steel has been the third performing sector in Ukraine). However, the results are not so illustrative for the most declining sectors. These would be (beginning by the largest declines, as determined by the application of the coefficients of the best estimation to the value of the variables at the disaggregated level, and then by aggregation of the calculated results):

- for Russia: light, steel, non ferrous and machine building;
- for Ukraine: machine-building, and then a group of five including non ferrous, wood, steel, chemistry and light;

it is clear that these lists do not fit with the actual growth rates. In particular, the inclusion of steel in both lists (and especially for Ukraine) is outplaced.

Finally and more seriously, there seems to be a conflict for Ukraine between the negative dependence of sectors growth on variety and one result we got at section 2 about the positive dependence of growth on western demand. All these questions, as well as a tentative synthesis of the results obtained so far make the object of the following and final section.

6. Price shock and quality shock compared

Synthetizing the results obtained thus far, one may give the following explanations of the behaviours of Russia and Ukraine in the adaptation of their industrial structure to market conditions.

In the case of Russia, relative prices moves play a major role: the country has a neat comparative advantage on raw materials, especially energy which was poorly exploited before transition; indeed, these raw material sectors were the ones where the dollar ruble ratios were the farthest from the world prices, and where they progressed the most. The decline in manufactures output which results both from this relative price change and from a Dutch disease effect, was enhanced by the impact of poor quality competitiveness, which hindered still more the possibilities of developing manufactures output. All these factors, whether related to specialization or to the integration in imperfect competition markets, go in the same direction. These processes are expressed in the following combined regression, which adds the factors of relative price shock and of quality shock.

Regression of sectors growth rates of Russia on foreign variables					
		Explanatory variables			
	Constant	Variety	Diversity	Relat.prices	R2/F/DF
Growth Russia	65.4	-48.2	-3.8	8.8	0.43
t statistics	8.1	-4.2	-1.9	2.7	14
Average of the variable	44.1	0.481	1.518	0.866	55

All along the text, the tests have been proceeded directly on the variables (and not on their log); elasticities have to be calculated on the basis of the direct results. The elasticity of each of the explanatory variables is -0.40 for variety, -0.13 for diversity and 0.14 for the relative price ratio, which implies that the global effect of quality (variety and diversity taken together) is much larger than the effect of relative prices.

As for Ukraine, the situation is more complex. This country was not able to play on any easy comparative advantage because it has a relatively small raw materials endowment, let alone energy. The "specialization" which emerges for it would thus be on manufactures, mainly steel, on which there is a high western demand and on which FSU demand is a little less depressed than on other products. But steel is a highly differenciated product (at least as it appears from Grubel-Lloyd ratios) and moreover, it does not benefit a large effect of relative price change, as this sector was priced already relatively high before transition. So Ukraine finds itself drawn into an imperfect market of a product on which it has little ability to compete on quality grounds. As a result, the determinants of sectoral output growth, although they seemingly combine contradictory factors, would look the following way.

Regression of sectors growth rates of Ukraine on foreign variables					
		Explanatory variables			
	Constant	Variety	Exports RoW	Exports FSU	R2/F/DF
Growth Ukraine	68.7	-72.0	65.8	-42.2	0.52
t statistics	10.0	-6.2	2.4	-2.2	21
Average of the variable	32.6	0.497	0.103	0.171	60

The elasticities of each of the variable is 1.1 for variety, 0.23 for exports to rest of world and 0.22 for exports to FSU, so that again the effect of quality is greater than the combined effect of the demand factors.

Both these results point to the existence of a very important common factor of structural change in both countries, namely the variety attached to each sector. Everything is as if the "quality shock" was more important for FSU countries than the relative price shock. The presence of this factor is the main culprit for the similarity of development patterns in both countries, despite the existence of various other driving forces in each country. If this analysis is correct, it has some important consequences for the future development of FSU countries and sheds some light on the causes of the deep slump these countries are crossing (hopefully, the equivalent analysis would not lead to the same results in CEECs, and it is thought that their case would show a positive relation between sectors growth and variety indexes, although this has to be checked).

First, the main consequence of the analysis for FSU countries is that the industrial output recovery is not at the corner of the street. If growth depends so much on adaptation to quality factors, then there is a long way to go to restructure the enterprises - both from the technical and management-organization standpoints, which implies their transition from the status of mere factories to a real status of enterprises - to market conditions to which they seem to be totally unadapted. This is not so serious for Russia, which is able to draw large incomes from its specialization pattern, but it is a matter of life or death for other FSU countries. In any case, this process will be a long one.

Second, the main cause of this dramatic situation is that the only way which would have been able to draw the countries from the deadlock they are locked in would have been through a complete openness of their capital to foreign investments and take overs. As is known, such was not the policy adopted neither by Russia, nor by Ukraine. The former country has operated mainly a closed privatization (often formal), and the latter one has permanently delayed any serious privatization measure. In this sense, the conclusions of the present paper rejoin the ones of the paper by Gros and Vandille 1996.

Annex

Code	Industries	RUS 95/90, %	UKR 95/90, %	Coef MILI	Coef INV	Coef CONSO	Coef X FSU	Coef X RoW	Diver-sif.ra-tio	Varie-ty (GL)	Dol/ rub RU	Dol/ rub UK
001	Power & heat	81,0	65,2	0,054	0,295	0,362	0,143	0,112	0,012	0,151	2,04	2,04
002	Crude Oil	58,9	69,1	0,043	0,231	0,228	0,372	0,401	0,025	0,009	3,40	3,40
003	Refined oil	63,1	29,5	0,055	0,288	0,294	0,208	0,240	0,477	0,419	3,30	4,690
004	Gas	92,5	66,9	0,053	0,268	0,279	0,236	0,271	0,869	0,380	3,61	5,65
005	Coal	66,5	48,5	0,043	0,290	0,230	0,185	0,209	1,163	0,066	1,20	1,21
006	Oil shales	52,2	na	0,051	0,449	0,284	0,109	0,075	na	na	1,20	1,00
007	Peat	84,6	na	0,048	0,182	0,469	0,076	0,073	0,699	0,061	0,60	0,57
008	Iron ores	73,2	47,9	0,050	0,505	0,113	0,240	0,266	3,084	0,279	1,00	1,00
009	Steel	55,9	41,5	0,052	0,590	0,131	0,263	0,157	1,549	0,621	1,40	1,34
010	Coke	na	45,0	0,070	0,443	0,161	0,282	0,239	2,904	0,537	1,24	1,09
011	Refractory materials	na	na	0,066	0,650	0,115	0,245	0,102	3,386	0,727	1,08	1,08
012	Metal products	34,7	10,9	0,061	0,533	0,224	0,360	0,083	1,268	0,611	0,98	0,99
013	Non ferrous ores	na	na	0,166	0,361	0,161	0,269	0,182	7,400	0,296	1,58	1,58
014	Non ferrous metals	67,1	na	0,128	0,374	0,164	0,290	0,199	1,085	0,638	1,62	1,62
015	Mineral chemi-cal products	na	na	0,111	0,124	0,357	0,343	0,306	5,006	0,631	1,10	1,10
016	Basic chemistry products	55,2	49,5	0,206	0,151	0,356	0,228	0,177	2,434	0,402	0,55	0,50
017	Chemical fibers	31,3	30,8	0,051	0,130	0,633	0,326	0,110	2,149	0,837	0,64	0,86
018	Synthetic resins and plastics	59,1	18,7	0,075	0,305	0,352	0,357	0,155	0,387	0,576	0,80	1,15
019	Plastic wares, fiberglass	na	na	0,082	0,348	0,415	0,202	0,068	0,780	0,681	0,62	0,62
020	Paints, varnishes	na	na	0,047	0,453	0,264	0,230	0,059	0,701	0,770	0,76	0,76
021	Synthetic dyes	na	6,6	0,077	0,193	0,380	0,420	0,187	0,835	0,634	0,81	0,81
022	Synthetic rub-ber	na	na	0,118	0,259	0,307	0,428	0,189	0,765	0,644	0,71	0,71
023	Organic chemi-cals	38,1	25,6	0,088	0,238	0,332	0,353	0,227	1,660	0,509	0,72	0,70
024	Tyres	42,0	51,5	0,138	0,303	0,291	0,245	0,106	1,591	0,589	0,98	1,00
025	Rubber-asbestos	0,0	15,6	0,160	0,275	0,405	0,247	0,068	0,618	0,605	0,82	0,68
026	Other chemicals	0,0	12,7	0,038	0,089	0,648	0,135	0,108	0,826	0,653	0,74	0,83
027	Energy Machi-nery & Equip-ment	35,2	18,7	0,046	0,792	0,070	0,229	0,032	0,565	0,618	0,80	0,91
028	Metallurgical M&E	na	na	0,014	0,320	0,024	0,227	0,588	na	na	0,83	0,83
029	Mining M&E	20,6	21,1	0,027	0,752	0,071	0,179	0,073	1,410	0,695	0,99	0,80
030	Hoisting M&E	20,3	6,9	0,012	0,839	0,059	0,152	0,056	1,203	0,639	0,89	0,91
031	Railway M&E	31,2	na	0,050	0,785	0,058	0,127	0,044	0,499	0,799	0,90	0,95
032	Electrotechnical	17,9	31,0	0,080	0,572	0,144	0,214	0,097	1,076	0,644	0,85	0,85

Code	Industries	RUS 95/90, %	UKR 95/90, %	Coef MILI	Coef INV	Coef CONSO	Coef X FSU	Coef X RoW	Diver-sif.ra-tio	Varie-ty (GL)	Dol/ rub RU	Dol/ rub UK
033	Cables	na	33,9	0,063	0,646	0,116	0,211	0,064	0,939	0,609	0,96	0,96
034	Chemical M&E	na	26,5	0,030	0,827	0,058	0,188	0,047	0,776	0,633	0,73	0,75
035	Metal cutting	10,4	10,1	0,001	0,858	0,002	0,157	0,092	3,443	0,583	0,71	0,75
036	Press forging	8,1	10,2	0,012	0,845	0,022	0,195	0,070	5,873	0,736	0,50	0,81
037	Casting	na	na	0,021	0,773	0,076	0,170	0,050	1,713	0,856	0,41	0,80
038	Tools	na	na	0,084	0,504	0,210	0,316	0,099	3,099	0,632	0,85	0,85
039	Abrasive materials	na	na	0,103	0,427	0,199	0,331	0,127	na	na	0,81	0,81
040	Precision intruments	na	na	0,172	0,445	0,112	0,141	0,099	0,662	0,757	0,45	0,45
041	Motor vehicles	44,7	28,5	0,053	0,479	0,202	0,292	0,185	0,139	0,744	1,01	1,05
042	Bearings	38,6	18,5	0,076	0,487	0,171	0,349	0,138	1,025	0,564	0,47	0,62
043	Tractors & agric	8,3	6,5	0,019	0,663	0,195	0,202	0,078	1,059	0,557	0,62	0,80
044	Roadbuilding	na	9,4	0,004	0,880	0,023	0,152	0,082	0,516	0,707	0,00	1,01
045	Municipal equip	na	na	0,008	0,819	0,046	0,151	0,017	0,725	0,483	1,13	1,13
046	Light ind M&E	10,1	6,6	0,008	0,704	0,202	0,407	0,048	1,724	0,569	0,66	0,94
047	Food ind M&E	na	na	0,001	0,723	0,177	0,157	0,081	1,385	0,630	0,72	0,72
048	M&E for trade	na	na	0,003	0,863	0,114	0,101	0,009	0,970	0,793	0,90	0,90
049	Printing M&E	na	na	0,009	0,681	0,092	0,177	0,152	1,914	0,581	0,71	0,71
050	Household appliances	24,4	40,5	0,006	0,143	0,704	0,135	0,147	1,480	0,484	0,75	0,71
051	Sanitary engeneering	na	17,4	0,013	0,794	0,057	0,102	0,024	1,106	0,808	0,44	0,70
052	Shipbuilding, civil	na	na	0,415	0,552	0,014	0,078	0,013	1,948	0,923	1,51	1,00
053	Electronics & radio-TV, civil	22,5	3,8	0,248	0,290	0,219	0,147	0,099	0,735	0,617	1,10	1,11
052-054	Ship,electronic & other military equipment	34,8	na	0,507	0,254	0,043	0,112	0,160	0,542	0,708	1,20	1,00
055	Metal structures	na	na	0,002	1,000	0,011	0,023	0,003	0,455	0,997	1,04	0,95
056	Metal wares	na	na	0,037	0,399	0,463	0,090	0,066	1,638	0,737	0,45	0,80
057	Repair of M&E	na	na	0,005	0,724	0,219	0,025	0,015	na	na	1,27	1,00
058	Logging	37,3	72,0	0,027	0,389	0,288	0,245	0,212	2,301	0,312	0,67	0,76
059	Saw milling	38,2	30,9	0,029	0,506	0,276	0,188	0,116	2,270	0,575	0,71	0,62
060	Plywood	52,7	22,3	0,039	0,280	0,391	0,153	0,196	3,363	0,561	0,73	0,72
061	Furniture	38,8	17,6	0,006	0,197	0,746	0,022	0,012	0,655	0,578	0,41	0,60
062	Paper and pulp	51,5	31,3	0,030	0,150	0,471	0,291	0,240	0,762	0,656	0,75	0,75
063	Wood chemistry	na	na	0,074	0,238	0,344	0,388	0,237	2,133	0,964	0,15	0,15
064	Cement	44,0	33,6	0,009	0,848	0,085	0,059	0,039	0,945	0,478	0,70	0,70
065	Asbestos cement	27,8	23,4	0,012	0,630	0,290	0,153	0,016	4,147	0,883	1,05	1,05
066	Roofing products	38,7	23,0	0,011	0,672	0,166	0,074	0,040	na	na	1,04	1,04
067	Prefab concrete	35,4	26,6	0,001	0,996	0,011	0,011	0,002	na	na	0,79	0,79
068	Wall materials	52,3	38,8	0,004	0,865	0,088	0,010	0,005	1,882	0,593	0,60	0,60

Code	Industries	RUS 95/90, %	UKR 95/90, %	Coef MILI	Coef INV	Coef CONSO	Coef X FSU	Coef X RoW	Diver-sif.ra-tio	Varie-ty (GL)	Dol/ rub RU	Dol/ rub UK
069	Ceramics	69,0	57,7	0,017	0,778	0,114	0,055	0,015	1,031	0,460	0,85	0,80
070	Polymer construction	64,9	22,8	0,019	0,635	0,188	0,100	0,021	1,561	0,561	0,62	0,65
071	Other const.mat.	27,9	na	0,010	0,880	0,068	0,041	0,031	3,245	0,436	0,90	0,90
072	Glass	45,9	39,7	0,044	0,361	0,529	0,176	0,066	1,438	0,582	0,62	0,65
073	Cotton fabrics	22,0	13,1	0,031	0,086	0,648	0,219	0,198	3,234	0,664	0,41	0,45
074	Flax	22,1	26,2	0,066	0,128	0,626	0,193	0,066	54,537	0,586	0,35	0,41
075	Wool	23,2	21,8	0,021	0,040	0,924	0,183	0,058	2,060	0,477	0,22	0,30
076	Silk	18,8	7,1	0,043	0,088	0,705	0,275	0,117	5,363	0,544	0,34	0,40
077	Hosiery & knit.	22,5	10,1	0,003	0,010	0,948	0,015	0,012	1,839	0,653	0,35	0,35
078	Other textile	na	13,2	0,025	0,130	0,637	0,140	0,065	2,610	0,542	0,31	0,35
079	Sewn goods	6,1	9,6	0,025	0,059	0,827	0,016	0,013	2,150	0,677	0,30	0,30
080	Leather, fur., shoes	13,6	11,4	0,016	0,082	0,664	0,109	0,167	1,924	0,487	0,34	0,50
081	Sugar	65,2	44,6	0,001	0,002	0,964	0,037	0,017	0,719	0,107	0,40	0,40
082	Bread, pasta	60,9	59,5	0,000	0,000	0,940	0,001	0,000	0,725	0,607	0,88	0,85
083	Confectionery	47,8	27,5	0,000	0,000	0,992	0,005	0,000	0,633	0,761	0,49	0,49
084	Vegetable oil	48,7	50,5	0,010	0,074	0,730	0,081	0,028	2,827	0,457	0,26	0,44
085	Perfumery	47,9	17,3	0,003	0,009	1,080	0,133	0,064	0,476	0,524	0,54	0,55
086	Liquors	89,1	115,6	0,088	0,027	0,761	0,049	0,284	1,481	0,180	1,67	1,41
087	Wines	31,3	67,9	0,002	0,001	1,345	0,005	0,116	0,495	0,146	0,30	0,30
088	Fruit & vegetables	22,3	24,0	0,001	0,002	0,892	0,011	0,015	4,252	0,335	0,21	0,62
089	Tobacco	55,8	52,6	0,000	0,000	1,006	0,007	0,006	0,595	0,125	0,23	0,30
090	Other food	50,6	34,0	0,002	0,009	0,910	0,052	0,024	0,993	0,476	0,29	0,60
091	Meat	42,8	27,0	0,001	0,005	0,889	0,008	0,011	1,182	0,556	0,43	0,45
092	Milk & dairy	37,2	27,3	0,004	0,018	0,856	0,018	0,019	1,172	0,441	0,81	0,92
093	Fish	44,9	33,6	0,001	0,006	0,838	0,147	0,094	4,634	0,364	0,46	0,55
094	Microbiological	17,2	10,1	0,005	0,031	0,764	0,234	0,063	na	na	0,53	0,53
095	Flour milling	65,0	60,3	0,001	0,013	0,876	0,495	0,013	0,994	0,122	0,76	0,78
096	Concentrated feed	na	31,2	0,003	0,030	0,812	0,061	0,020	1,245	0,415	0,73	0,75
097	Pharmaceuticals	na	22,5	0,004	0,018	0,410	0,216	0,082	0,423	0,685	0,87	0,87
098	Medical M&E	na	na	0,006	0,665	0,082	0,348	0,028	0,728	0,689	0,56	0,56
099	Medical ware	na	na	0,008	0,026	0,123	0,143	0,019	na	na	0,98	0,98
100	Other industries	na	na	0,024	0,112	0,627	0,133	0,140	2,088	0,548	0,70	0,70
103	Agriculture	73,2	67,8	0,003	0,031	0,844	0,053	0,019	1,186	0,37	0,69	0,71

Source: database compiled by the author.

* *
*

REFERENCES

1. A Study of the Soviet Economy, Joint publication of IMF, World Bank, OECD, EBRD, Three volumes, Paris, 1991.

2. Borensztein, E., Ostry, J.D., An empirical analysis of the Output Decline in three Eastern European countries, IMF Staff Papers, vol.40 N°1, March 1993.

3. Duchene, G., Le niveau de dŭveloppement de la CEI, Economie & Prevision N°109, 1993-3, pp 121-132, Direction de la Prŭvision du Ministere des Finances, Paris.

4. Duchene, G., Senik-Leygonie, C., Foreign trade liberalization and redeployment in the FSU: the Soviet economy at world prices, Workshop on FSU transition to market economy, 18 November 1991, European Community. Reprinted in European Economy, N°49.

5. Findlay, R., Wellisz, S., Central Planning and the "second economy" in Soviet-type systems, The Economic Journal, vol 96, 1986.

6. Gros, D., Goncjarz, A., A note on the trade potential of Central and Eastern Europe, CEPS Working Documents, Brussels, 1994.

7. Gros, D., Vandille, G., Causes of output decline and recovery in the transition economies, mimeo, CEPS Working Documents, Brussels, 1996.

8. Hugues, G., Hare, P., Competitiveness and industrial restructuring in Czekoslovakia, Hungary and Poland, CEPR Discussion Papers N°354, London, 1991.

9. Hummels, D., Levinsohn, J., Product differenciation as a source of comparative advantage, American Economic Review, vol 83, Papers and Proceedings, May 1993.

10. Marreese, M, Vanous, J., The content and controversy of Soviet trade relations with Eastern Europe 1970-1984, Berkeley University Press, 1983.

11. Maurel, M., Aspects commerciaux de la dŭsintŭgration d'une Union monŭtaire et douaniure: les Etats Successeurs de 1920 et l'URSS dans la transition, Thuse EHESS, Paris 1995.

12. Senik-Leygonie, C., Industrial restructuring in the CIS. Is Russia going in the right direction?, mimeo, Delta, Paris 1995.

13. Ukrainian Economic Trends, Bulletin of Macroeconomic Statistics edited jointly by the Ministry of Economy of Ukraine and the European Centre for Macroeconomic Analysis (Tacis), Kiev and Brussels, monthly and quarterly.

14. Vavilov, A., Vyugin, O., Trade patterns of former Soviet Republics after integration into the World economy, mimeo Institute of Forecasting, Moscow, 1992.