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**Autarkic Policy and Efficiency in the Spanish Industrial Sector.
An Estimate of Domestic Resource Cost in 1958**

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Abstract:

The impact that the francoist autarkic economic policy had on the Spanish economy is assessed using the Domestic Resource Cost (DRC) as an indicator. This indicator compares the real opportunity cost of the primary factors used in the production of a certain good with its aggregated value at international prices. Since the DRC provides a ranking of sectors classified according their relative efficiency, it can be interpreted as an indicator of comparative advantage. Our results indicate that the inefficient allocation of productive factors induced by the interventionist economic policy resulted in a significant loss of efficiency for the economy, such that only 50 out of 125 industries, accounting for 39 percent of the Spanish industrial production, could be considered efficient. However, the paper also shows that the Spanish economy was in a good position to take advantage of the opportunities created by the 1959 reform, as the lion's share of industrial production was on the verge of relative efficiency.

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Introduction

In recent years, a large volume of literature has addressed the empirical and theoretical shortcomings of studies which have attempted to explore the relationship between trade policy and growth.¹ As a result, this relationship is considered an open and somewhat controversial question. However, there is little doubt that the distortions created by a highly protectionist policy can lead to inefficient resource allocation, which in turn seriously affects accumulation and hence growth². This paper offers an approximation of the resource misallocation produced by the autarkic policy in Spain, measured by the Domestic Resource Cost (DRC), in order to assess the cost to the Spanish economy of the deviation from the international specialisation pattern.

DRC is primarily an indicator of comparative advantage, as it provides an intersectoral comparison of the relative efficiency of the economy in production across sectors. Since it does not take into account actual trade flows, the DRC can be a good substitute for other indicators when barriers to trade have a significant influence on the configuration of the trade structure. Moreover, examined in conjunction with the goals and incentives supplied by economic policy, the DRC can also be used as an indicator of the impact of restrictions to external trade. It provides an approximation of the effects of trade policy on the efficiency of the allocation of production resources and hence of the influence of trade policy on the productive structure in a country.

In the post-war decades many developing countries followed an import substitution policy with the aim of rapid industrialisation. The main features of import substituting policies were complex exchange and import control systems, intense public direct intervention in industrial production and factor and goods price regulations. In general, such policies implied considerable distortions of the price system resulting in significant losses of allocative efficiency. Spain, which had started its import substituting policies in 1939, maintained its inward looking

¹ See, among others, Edwards (1993) or Rodriguez and Rodrik (2000)

² See Bhagwati (1978), Krueger (1978) and (1993) and Edwards (1993, 1998)

development strategy for nearly another two decades. It is widely recognised that this autarkic development policy had a negative impact on its economic growth. The argument is that the isolationist policies and the intense interventions created many distortions in the Spanish economy, which prevented efficient resource allocation. However, it is not clear how big an impact these policies actually had. Some authors believe that these policies, which focused mainly on industrial development, had a crippling effect on the Spanish economy, while others point out the sustained growth of the Spanish industrial sector during the 1950s to argue that the distortions were not so great.

The DRC has been calculated for the Spanish industrial sector in 1958. This is the last year in which autarkic policies were in effect, and the year in which the first input-output table of the Spanish economy was compiled. Thus, this year provided the best possible data source to analyse the effects of the autarkic economic policy before it was abandoned. Our results indicate that in fact the Spanish economy suffered considerable efficiency losses and that industrial production could have been significantly increased simply by reallocation of productive factors among different sectors. The DRC is a static measure and hence does not capture any dynamic effects. In any case, allocative inefficiency could have only contributed negatively to long-term economic growth. The rapid expansion of the Spanish economy that followed the stabilisation and liberalisation plan of 1959 suggests a great degree of allocative inefficiency due to twenty years of intervention and, equivalently, a large scope for reallocation in the Spanish industrial sector at the end of the interventionist period.

The rest of the paper is organised as follows. Section 1 discusses the concept of domestic resource cost and its measure. Section 2 presents the case of the Francoist policy as an example of industrialisation through import substitution. Section 3 describes our methodology for the estimation of DRCs for the Spanish industry in 1958. In section 4 we present our results and discuss them in the light of previous studies. Section 5 concludes.

1. The domestic resource cost as a measure of comparative advantage

The DRC was first applied by the economic authorities of Israel in the 1950's as an instrument in project appraisal, used as a investment criterion (Bruno 1963 and 1965). This indicator became popular after the publications of Bruno and Krueger (1968) in the 1960's where the DRC was already used as an ex post indicator of the effect of economic policy in Israel and Turkey. With same aim, Banerji and Donges (1974) estimated the DRC in Spain for 1962 and 1968. Since then, independent economists and international institutions like the World Bank have used the DRC to evaluate development policy in less developed countries.³

The idea behind DRC is to compare the domestic cost of producing a certain good with its value added at international prices.

$$DRC_i = \frac{DC_i}{VA_i^*}$$

where:

DC_i = domestic cost of production

VA_i^* = value added at international prices

Contrasting the DRCs of different activities provides an intersectoral comparison of relative efficiency, from which comparative advantage is derived. According to comparative advantage theory, in the absence of any distortions, like tariffs or exchange restrictions, the domestic can differ from international production cost because of technological factors or resource endowment. The DRC can be seen as a measurement of the Ricardian concept of comparative advantage based on technological factors, which would be given by the physical

³ See among others Greenaway and Milner (1990), Morris (1990), Alpine and Picket (1991), González et al. (1993) and Weiss (1991).

factor intensities. At the same time, factor prices can be seen as the result of the relative scarcity of a country's factor endowments. The more abundant a factor is the lower its relative price will be, and consequently those goods that are produced intensively using this factor will have lower DRC. In this way, the Heckscher-Ohlin contribution to the Ricardian theory would be also integrated in this index. Thus, DRC represents an integrated indicator of the comparative advantage of a country (Schydrowsky, 1984).

In the calculation of DRC, factor prices should reflect real opportunity cost which not always are captured by market prices. Price distortions can originate from imperfections of the markets or state interventions. Both factors are especially important in less developed countries. In this sense it should be noted that the DRC is a broad measure, since it incorporates not only the distortions created by tariff and exchange control policy but also other existing distortions in the economy at a point in time. These include, for instance, distortions created by state commerce, regulations of the financial sector, restrictions to foreign investment or the effect of labour policy. For this reason, the DRC has been considered the ideal instrument to measure the efficiency loss in less developed countries where the distortions in the economy are the result of a wide range of interventions by the state that go well beyond tariffs.

Using the standard notation of input-output tables, the DRC can be expressed as

$$DRC_i = \frac{DC_i}{VA_i^*} = \frac{\sum_h r_{hi} s_h}{p_i^*}$$

where:

r_{hi} = direct requirement of factor h in the production of good i

s_h = shadow price of factor h

and p_i^* = border price of good i.

The ratio compares the cost of producing a unit of a certain good with the cost of importing the same good. Therefore DRC can be also be interpreted as a measure of the cost of saving (producing) a foreign currency unit by means of an import substitution policy (export promotion policy), which makes it more appealing in cases where foreign exchange is relatively scarce, as in many developing countries. Usually, however, the production of a certain good not only requires primary factors but also raw materials and intermediates, than can be either domestically manufactured or imported. As imported inputs are a foreign exchange cost that reduces value added at international prices, the calculation of the DRC must take this cost into account. Formally the DRC for a particular good or sector, i, can be defined as

$$DRC_i = \frac{\sum_h r_{hi} s_h}{p_i^* - \sum_j m_j^* p_j^*}$$

where:

m_j = requirements of imported input j in the domestic production of a unit of good i

p_j^* = border price of input j.

Moreover, it is also possible that some foreign factors are involved in the production process so that it would be also necessary to deduct the repatriated income of foreign owned primary factors. Then we have

$$DRC_i = \frac{\sum_h r_{hi} s_h}{1 - \sum_j m_{ji} - \sum_f r_{fi} v_f}$$

where all international prices have been normalised to unity and:

r_{fi} = requirements of imported factor f in the domestic production of a unit of good i

v_f = price of factor f

In the denominator of the former expression we have then the difference between the international value of a certain good and the foreign exchange paid for imported raw materials and primary factors. This is the net foreign exchange earned or saved by the economic activity. On the other hand, in the numerator we find the domestic real cost of production or the real added value generated in this activity. Therefore the DRC compares the real opportunity cost of the primary factors used in the production of goods with their value added at international prices.

The bigger the DRC is, the bigger is the opportunity cost for the country in producing a particular good. This is in the same way a smaller DRC reflects a lower domestic opportunity cost of producing a certain good. Moreover, the bigger the dispersion of DRC among sectors, the bigger the level of distortion to which an economy is subjected. As Banerji and Donger (1974, p.3) noted “high and differential DRC are then an indicator of welfare losses resulting from the impact of trade- restricting or trade-promoting measures on relative prices”.

There are two alternative concepts of DRC, namely, the direct and the total DRC.⁴ Up to this point we have been referring to the total DRC. While the total DRC (TDRC) takes into account the cost of all the factors that are required directly and indirectly to produce i , the direct DRC (DDRC) only considers the cost of the factors employed directly by sector i . Thus DDRC can be used to evaluate the efficiency in each state of the productive process, whereas the TDRC includes in the estimation the efficiency of any earlier stage of the domestic production process. For instance, a high TDRC of motor vehicle production can be the result of an inefficient steel and tyre production industry, while a high DDRC would be a reflection of the inefficiencies of the motor vehicle production sector itself. Hence, comparison of both measures of DRC for a particular sector will allow us to assess to what extent the loss of efficiency in the final sector is due to earlier stages in the production process.

2. The Spanish autarkic policy

Spain is a good example of the inward looking economic policies applied in less developed countries after the Second World War. After the Spanish Civil War (1936-39), authorities decided to force the rapid industrialisation of the country. Even though economic policy in Spain contained an idiosyncratic ideological and militaristic component, the policy measures that were adopted were very similar to those of other countries. For the first twenty years of the Franco regime economic policy was characterised, on the one hand, by the scope and intensity of state intervention and, on the other hand, by intense protectionism. As for external economic policy, rigid regulation of external relations tried to compensate for the sustained overvaluation of the peseta. A complex web of quotas and bilateral agreements accompanied by a very restrictive exchange control system affected both commercial and financial

⁴ It is also possible to distinguish between marginal DRC and average DRC, although this theoretical distinction has had no application in empirical studies (Fane, 1995).

operations, isolating the Spanish economy from any form of external competition (Martínez Ruiz, 2000).

Another staple of Francoist economic policy was heavily regulated capital markets. The banking sector was subject to very strict regulations, which extended from regulated interest rates, both for passive and active operations, to the imposition of compulsory investment coefficients (Pons, 1999 and 2001). Pons shows that the main objective of the regulation of financial markets was to bias resource allocation in favour of the authorities' preferred sectors (Pons, 1999). Foreign investors were restricted by law from owning more than 25 percent of the equity of any firm. This, along with the fact that it was very difficult to repatriate any eventual profits, made Spain a very unattractive country for foreign investment.

Direct intervention in the industrial sector is another main feature of Francoist economic policy at the time. The creation of the Instituto Nacional de Industria (INI) marked the first important step of this interventionist policy. The INI, created in 1941, was responsible for undertaking the investments necessary to achieve rapid industrialisation. In principle, the INI's main objective was to achieve self-sufficiency in those sectors directly or indirectly related to the country's defence and in those activities that were considered basic for the economy, such as the production of machinery and equipment and intermediates.

According to the literature, the autarkic economic policy led to serious distortions that were detrimental to economic growth. In this respect the government's preference for heavy industry, implemented mostly through public direct investment, and isolation from international markets have been heavily criticised. The high capital intensity of the INI's activities and the lack of consideration of economic criteria such as opportunity cost or profitability of the investment policy represented a waste of scarce resources (Martín Aceña and Comín, 1992; Prados and Sanz, 1996), while intense protectionism prevented the exploitation of the benefits of specialisation and economies of scale and made unnecessary any search for efficiency in production. (Donges, 1976; Catalan,

1995; Prados and Sanz, 1996). The overvaluation of the peseta made it impossible for Spanish exports to take advantage of the buoyant situation of European economy. Export stagnation and restrictions to foreign investment made foreign exchange a very scarce resource. This scarcity affected raw material and equipment imports which were indispensable for consolidation of the growth of the Spanish economy. Even more, isolation from international capital markets obliged the Spanish economy to rely on its own saving capacity. At same time, the protectionist measures increased the price of machinery and equipment, decreasing returns to investment. The rise in prices did not only affect equipment nor was it exclusive to imported inputs. Growing demand in the internal markets, which could not be satisfied due to exchange scarcity and high protection, allowed national producers to obtain some “scarcity premia”. As a result, the prices of intermediates and raw materials went up rapidly in the 1950s.

And yet industrial production grew rapidly during the autarkic period. After 10 years of very slow recovery, the rate of growth in Spanish industry increased notably between 1951 and 1959⁵. This growth has been ascribed to a greater availability of imports, the progressive relaxation of some controls in the domestic markets and the maturation of the big public investment projects of the previous decade (Barciela and others, 2001). Further, an intense structural change in the secondary sector took place since heavy industry grew more rapidly than the consumer goods sector, mainly because of the intense public investment in those industries. This has led some authors to conclude that state intervention, especially through the INI, and protection were not only positive but indispensable to achieve such rapid development in Spain’s industrial sector (Donges, 1976; Braña, Buesa and Molero, 1984). Nevertheless, as has been shown by other authors, the same results would have been possible using alternative policies that would have given incentives for private activity.

⁵ There are different estimates. See Morellá (1992) and Prados de la Escosura (2002).

Support of industrialisation was an important characteristic of the inward looking strategy of many developing countries at the time. Further, as in many other countries, the Spanish authorities were convinced that private initiative was either unable or unwilling to undertake the effort, so that a rapid industrialisation could only be achieved through direct public intervention. On the other hand, exposure to international market forces would encourage specialisation in primary goods which would accentuate dependency on foreign industrial goods. Overcoming this dependency was the main goal of the Spanish industrialisation programme, as Francoist economic policy responded to the idea that strong industry was indispensable to guarantee the political independence of the Spanish state. The estimation of the DRC will now be used to evaluate the success of the import substitution policy of Spain in achieving these goals.

3. The estimation of DRC for the Spanish industrial sector in 1958

The Stabilisation Plan set in motion in July 1959 was the beginning of the end of twenty years of massive intervention in the Spanish economy. With its incorporation into the main international economic organisations the Spanish government abandoned the inward looking policy followed since Civil War. For the external sector, this resulted in the end of quantitative restrictions, multiple exchange rates and other mechanisms used during the previous two decades to address the recurring balance of payments problems. The year 1958 is, therefore, the last year in which autarkic policies were in effect. It is also the year in which the first input-output table for the Spanish economy was compiled. Thus this year provided the best possible data source to analyse the effects of the autarkic economic policy before it was abandoned. The DRC will give us some insight into the level of misallocation of resources in Spain before the liberalisation wave.

The DRC has been calculated for 125 industrial sectors, which include exporting as well as import substituting sectors. For each sector the direct and the

total DRC have been estimated. The TDRC formula that is used in the calculations is as follows

$$TDRC_i = \frac{\sum r_{hi} s_h}{p_i(1 - m_i)}$$

where r_{hi} and m_i represent the total (direct and indirect) primary factors and imports respectively required for the production of good i , which have been obtained from the 1958 Input-Output table. With respect to the DDRC the expression is given by

$$DDRC_i = \frac{\sum r_{hi} s_h + \sum \sum d_{ni} r_{hn} s_h}{p_i(1 - m_i)}$$

where:

r_{hi} = direct requirement of factor h in the production of good i

s_h = social price of factor h

d_{ni} = requirement of non-traded good n in the production of good i

r_{hn} = direct requirement of factor h in the production of non-traded good n

p_i = world price of good i

m_j = total requirements (direct and indirect) of imported inputs in the production of good i .

Besides the fact that TDRC considers total requirements and DDRC considers direct requirements, the second term of the numerator is different in both expressions. This term adds to the DRC calculation the primary resources that are needed to produce good i by taking into account the non-tradable inputs that are used in its productive process.⁶ This expression therefore is a more

⁶ This is not necessary in the case of total DRC, since direct and indirect requirements of primary factors are included.

comprehensive measure of the domestic cost which is incurred by producing a unit of foreign currency.⁷

The calculation of the DRC requires that production factors be valued at their real opportunity cost, so it is necessary to calculate a shadow price set. In this respect, the approach adopted has been to estimate their payment in the most probable alternative activity, which means that the shadow prices are understood as the social opportunity cost of using these productive factors in a particular activity. This requires an examination of the factor markets in Spain at the end of the autarkic period.

With respect to the labour market, it was characterised by under employment and administrative measures that were meant to guarantee full employment. This, along with the diverse regulations about minimum wage and social contributions, make it reasonable to think wages were above the opportunity cost of labour, which was the relatively abundant factor in the Spanish economy. Following Greenaway and Milner (1990) a shadow price for labour was calculated by applying a markdown to the prevailing level of wages based on the average wage differential between different labour categories. The shadow price of labour, w_s , is thus given by

$$w_s = w \left(1 - \frac{\nabla_a + \nabla_s}{2} \right)$$

where ∇_a is the percentage wage differential between agricultural occupation and unskilled occupation in industry and ∇_s is the percentage wage differential between skilled and unskilled occupations in industry and services. These data were unavailable for 1958 so data from the Instituto Nacional de Estadística for

⁷ It must be noted that none of our estimates of DRC account for the effect of repatriated income of foreign owned primary factors. This exclusion is due partly to data constraints and partly to the negligible role of repatriations in autarkic Spain given the extremely restrictive legislation.

the next year, 1959, were used.⁸ As a result of this adjustment our estimate for the social wage is 35% below the prevailing level of wages in 1958.

In the case of capital, the calculation was more complex. The intensive regulation of the financial sector distorted the profitability between sectors to the extent that a method similar to that used for labour proved to be infeasible. Further, not only the magnitude of the distortion but also the sign is difficult to determine. On the one hand the presumed relative scarcity of capital leads us to think that in certain cases the return to capital was below its marginal productivity. That was surely the case for capital invested by banks as a result of the compulsory coefficient or capital borrowed subject to the maximum interest rate legislation. The high rate of indebtedness of Spanish industrial firms also seems to suggest that interest rates may have been below the opportunity cost of capital. On the other hand, the fact that the Spanish economy had a high degree of protectionism and high barriers to entry suggest that at least in some industries it was possible to obtain sustained returns above the opportunity cost of capital. In order to deal with all these questions, data about profitability rate and the capital structure in each industry would be required but unfortunately these data are not available. An assumption is made that the net effect of government intervention was to set the cost of capital below its true opportunity cost, and a range of estimates of the DRC is obtained by assuming that the social opportunity cost of capital was between 10 and 50 percent higher than the actual rate of return.⁹

⁸ Data were obtained from INE (1987) and Maluquer de Motes (1989).

⁹ A similar approach is used for example in the estimate for Colombia in 1969 (Hutchenson and Schydrowsky, 1982), Argentina in 1969 (Berlinski and Schydrowsky, 1982) and 1973 (Szychowski and Perazzo, 1981) and Turquía (Krueger, 1978) in the late 1960's. As Bhagwati (1978) pointed out such shadow prices "should be regarded essentially as sensitivity estimates" p.90. The chosen range is in line with those used in the aforementioned studies.

The international prices of traded goods, understood as border prices, have been approximated following the standard expression

$$p_i = \frac{I}{I \pm d_i}$$

where d_i is the protection level to good i . Each d -factor was calculated based on the prevailing tariff corresponding to the sector division of the I-O table and the penalties (premia) implicit in the multiple exchange rate system applicable in 1958. Specifically, the official exchange rate -42 pesetas/\$- is taken as a reference and any rate above (under) this rate is considered a tax (subsidy) for an import good, whereas the opposite is true for export goods. A good is considered an export good if its export-production ratio is higher than 10 percent and if its exports are greater than its imports. In April 1957 a first attempt to rationalise the exchange policy was made when the peseta was devalued from 10.95 pesetas per dollar -the official exchange rate of the peseta from 1939 – to 42 pesetas per dollar. The devaluation was accompanied by a unification of the exchange rate. However, this measure was reversed a few weeks later and, *de facto*, the system of multiple exchange rates was restored. At the end of 1958 the multiple exchange rate system had 10 exchange rate categories for exports (ranging from 31 to 95 pesetas per dollar) and 4 for imports (42 to 126 pesetas per dollar). Finally the indirect taxes applicable to imported goods were taken into account. Due to the paucity of disaggregated information, an average tax rate was used.¹⁰

In order to determine the activities in which an economy enjoys a comparative advantage, and in which it should therefore specialise, it will be necessary to compare the DRC of each sector with the shadow exchange rate (SER). In an economy with distortions, the DRC can be higher or lower than the

¹⁰ Information on taxes was obtained from Fuentes Quintana (1963) and Fuentes Quintana and Albiñana (1967). It must be pointed out that no adjustment could be made for the protectionist effect of quantitative restrictions to trade due to lack of data.

SER depending on the sector. If in a particular sector the DRC is higher than the SER this means that it would be possible to use resources in a more efficient way by transferring the productive factors to an alternative activity and importing the good in question. Following the Bruno and Krueger approach, the SER should reflect the social cost of producing a unit of foreign exchange in the economy under study. Since the sectoral DRCs give the cost of producing a unit of foreign exchange in each sector, a widely used solution is to calculate an average or weighted average DRC and to use it as the cut-off point. In our case, the average total DRC of all tradable sectors, including the agricultural sector, has been calculated. This average, α , can be viewed, as noted by Pearson, Akrasanee and Nelson as the average efficiency of all activities producing tradable goods in the economy in transforming domestic resources into foreign exchange (1976, p.88). The α -factor can be interpreted as the relationship between official exchange rate and its shadow price (SER),

$$\text{SER} = \alpha * E$$

where E is the official exchange rate. The resulting value for α ($\alpha = 1.27$) implies that the SER would stand at 53.30 ptas/\$. This SER is in fact similar to the current exchange rate in the black market located in Tangier (54.99 pts/\$). (Martín Aceña, 1989). The difference between the official exchange rate and the estimated SER (about 27 percent) gives a first indication of the failure of the autarkic policy in allocating resources efficiently.

4. Results

Table 1 shows the distribution of the 125 activities according to their TDRC for three different values of the shadow return to capital. For simplicity the TDRC figures have been normalised to 1. A TDRC value below 1 indicates that the activity is relatively efficient while a value above unity indicates relative inefficiency. The table shows that the choice of shadow price of capital does not

have much influence in the ranking of activities.¹¹ For our central case only 50 out of the 125 industries could be considered efficient. Figure 1 shows the percentage of industrial output falling in a particular DRC range. The production of the efficient sectors accounted for a 38.51 percent of the Spanish industrial production -26.71 of the production of tradable goods -.

Figure 1 allows us to draw some preliminary conclusions about the situation of the Spanish industrial sector in the final stages of autarkic policy. Firstly, the large spread in the DRC values suggests a significant scope for increasing welfare through the reallocation among the different industrial sectors. The two measures of dispersion used, the standard deviation and the coefficient of variation, provide an indication of the negative impact of the Francoist policies. The coefficient of variation of the TDRC in industry is 28 percent, while the dispersion is larger in the case of the DDRC, being 41 percent.¹² This suggests substantial inefficiency in the allocation of resources in the Spanish economy.

Secondly, although the lion's share of the industry could be considered relatively inefficient, a high proportion of those were situated at the edge of the cut-off point -42.38 percent of the industrial production has a TDRC in the 1.0-1.25 range. This indicates that, in spite of the obvious misallocation of resources, Spanish industry did not need to make a radical transformation in order to improve its performance. This in turn would suggest that the Spanish industrial sector could take advantage of a relatively small change in economic policy, i.e. a devaluation, a liberalisation of the labour market or incomplete import liberalisation, to improve its performance significantly.

¹¹ That means that, although they refer only to the results for this central value, the following comments would be also valid for any value of the shadow price of capital. To test this, correlation coefficients between the different rankings obtained have been calculated. The results are very close to 1, which indicates a high degree of consistency between the different rankings. See Appendix 1.

¹² It must be noted that these numbers are not high compared with the values obtained by other studies. For instance, Donges obtained for the Spanish economy in 1962 a coefficient of variation above 66 percent. (Donges, 1976, p.223).

The work of Asensio, who studied the comparative advantage of the Spanish economy for the same year (1958), allows us to check the consistency of our DRC results. Using several indicators of revealed comparative advantage, Asensio found that the Spanish economy enjoyed comparative advantage in 26 out of the 64 sectors in the Department of Customs classification.¹³ Of these 26, 1 is an agricultural good and 7 others do not have equivalent sectors in the input-output classification. Among the remaining 18 industrial goods, which are present in the input-output table, 16 have a sectoral TDRC lower than 1.

Our results are hence broadly consistent with those of Asensio. The DRC ranking is also consistent with the actual export pattern of the Spanish economy of the time. Among the higher ranked sectors in the DRC classification are many of the traditionally important export sectors of Spain such as like iron ore, olive oil and cork. Figure 2 studies the relationship between export performance and DRC values. This figure plots the cumulative distribution of DRC values for the 23 most important industrial exporting sectors for Spain in 1958 and for the industrial sector as a whole.¹⁴ The cumulative distribution clearly indicates the higher efficiency of the exporting sectors (the distribution for industrial exports statistically dominates that of all manufacturing sectors). The average DRC of a dollar in the export industries was well below the general shadow exchange rate (44.02 pts/\$ vs. 53.3 pts/\$). The import competing sectors showed an average DRC per dollar very close to the general exchange rate (54.14 pts/\$), while the import sectors were among the most inefficient with a shadow exchange rate of 57.63 pts/\$.¹⁵ Apart from the food industry and the minerals sector, other sectors had both a low DRC and a high export performance. These include cotton

¹³ The results are compared with the indicator called by Asensio “relative advantage to trade balance” and defined as $VCR_{it} = ((X_{it} - M_{it}) / (X_{it} + M_{it})) - (\sum(X_{it} - M_{it}) / \sum(X_{it} + M_{it}))$ (Asensio, 1995, p.322 and 606). The data she used come from the Trade Statistics compiled by the Dirección General de Aduanas (Department of Customs).

¹⁴ Of the 50 main export products 19 were agricultural products and could therefore not be considered. When these sectors are considered the relation between exports and a low TDRC is strengthened.

¹⁵ Similar estimates for the Korean economy in 1968 showed significantly worse results for the import competing sector (Westphal and Kim, 1982, p.247)

weaving and silk products which were among the efficient sectors according to the DRC criterion and were two of the most important industrial exports at the end of the autarkic period¹⁶.

The situation of the Spanish economy in 1958 can be compared with that of other developing economies or economies in transition. Figure 3 presents DRC distributions for the Argentine economy in the 1970s and several Eastern European countries in the late 1980s alongside our results, all normalised to 1.¹⁷ Absolute values of the DRCs are not directly comparable as the studies considered use different methodologies. However the distribution, and in particular the dispersion, of the DRCs can provide an indication of relative level of allocative efficiency in these economies.

Two distinct groups of countries can be identified. Spain, Argentina and Poland have a distribution of DRCs clearly centred around 1, while Bulgaria, Hungary and Czechoslovakia have a more dispersed distribution and a relatively large frequency of values larger than 3. Furthermore, the negative DRCs for the latter countries indicate that some sectors in these countries had negative added value in absolute terms (their outputs had less value than their inputs). This suggests that there are two levels of allocative inefficiency in the cases considered and that, in spite of the significant scope for reallocation of resources, the degree of restructuring required by the economies of Spain (1958), Argentina (1973) and Poland (1988) was less severe than that of Bulgaria, Hungary and Czechoslovakia in the late 1980s.

Table 2 and Figure 4 show our results distinguishing between different sectors. The fact that the range of TDRCs overlaps across different sectors suggests that comparative advantage was not concentrated in any particular sector. The sector with the lowest TDRC is espadrilles in the consumer goods industry. However it is the food and drinks sector which takes up most of the

¹⁶ A full list of all the sectors ranked according to their DRC can be found in Appendix 2.

¹⁷ Results for Argentina in 1973 are taken from Szychowski and Perazzo (1981) while results from the Eastern European economies are taken from Hughes and Hare (1992).

highest slots in the ranking. This includes industries based on agricultural inputs, such as sectors related to the processing of olives, including olive oil production, and with cereal production, like milling and bakery industries. Intermediate goods and raw material industries such as fertilisers or processing of cork and leather also appear among the most efficient sectors. Extractive activities are also in the top positions of the efficiency ranking and, against what may be expected, the coal industry achieves a better ranking than the more traditional iron ore or pyrite industries.

Among the sectors that obtain high efficiency results are petroleum products and the defence industry. The high degree of efficiency shown by the petroleum sector is probably due to the intensive use of imported inputs in its production process and therefore its weak interrelationship with the domestic economy.¹⁸ In the case of the defence industry, including aircraft, its high ranking position could be explained by the fact that it was a sector highly favoured by the government, although the literature on the Spanish defence industry suggests that this sector was in fact characterised by considerable inefficiency (Martínez Ruiz, 1994; San Román, 1999). Its position, 37th among export products, can be explained in part by the existence of small weapons manufacturers producing pistols and hunting arms which are believed to have been relatively competitive.

A substantial proportion of the machinery and equipment sectors is found to be inefficient in the sense of a DRC greater than one. These activities include the motor vehicles industry, most notably automobiles, railroad materials, shipbuilding, the basic iron and steel industry, metal products, building materials and the machinery industry which were some of the most inefficient sectors in the Spanish economy. These were precisely the sectors which the economic authorities wanted to help through their policies. The main aim of Francoist industrial policy was to provide the Spanish economy with a strong and fully-

¹⁸ It must be pointed out that many authors think that the DRC criterion biases the ranking in favour of those sectors that make an intensive use of imported inputs. (Masters and Winter-Nelson, 1995).

developed industrial sector, with a focus on heavy industry. These sectors not only enjoyed all incentives provided by the “National Industry Promotion and Protection” legislation of 1939, but also absorbed most of the public investment that was channelled mainly through the National Industry Institute (INI). (Martín Aceña and Comín, 1992, pp.147-263). In 1955, three sectors, namely iron and steel, metallurgy and metal products, mainly shipbuilding, accounted for 35 percent of the investment of INI. In 1960, after the creation and consequent expansion of Ensidesa – the biggest iron and steel conglomerate – this quota was raised to 50.8 percent. (Martín Aceña and Comín, 1992, p.152) Likewise, consistent with the interventionist philosophy of the Francoist authorities, public enterprises played the leading role –or at least a very important one- in most of these sectors. So, in 1960, approximately 79% of Spanish cars, 47% of ships, 60% of manmade fibres, 28% of steel, 78% of aluminium and 40% of nitrates were produced in public factories. The disappointing results of these pampered sectors reveal the high opportunity cost of the industrial policy of the Spanish government. The results also reveal that, as could be expected, the protection provided by tariff and exchange control policies was concentrated in the least efficient sectors and had not been able to create any new segment of comparative advantage. The sectoral TDRCs have a high correlation (.98) with the level of protection enjoyed by each industry.

Not only heavy industry but also some of the most important sectors in the consumer goods industry were in the bottom positions of the efficiency ranking. Notably the textile sector had a relatively high inefficiency level, despite the fact it was labour intensive, i.e. used the relatively more abundant factor. The same was true for some of the most important sectors in the food and drinks industry. It can be seen in Table 3 that part of these sectors’ inefficiency was caused by other sectors that were inputs to their production. Table 3 ranks each sector with respect to the difference between TDRC and DDRC. Since TDRC reflects the total opportunity cost of converting domestic resources into foreign exchange and the DDRC reflects the same cost but just in the final phase of the production

process, the difference between the two is a measure of the inefficiency imposed on a sector by the rest of the economy.¹⁹ The presence of activities in food and drinks in the leading positions in Table 3 suggests that, although many of the basic inputs came from highly efficient agricultural sectors, the efficiency of the wine derivatives, canned vegetables and canned fish sectors was significantly reduced as a result of the inefficiencies of other sectors in the economy, most notably by an inefficient tin production sector in the case of the last two.²⁰

Supporting evidence in this sense is provided by the comparison of the results of this study with the results obtained by Banerji and Donges (1974) for 1968. Although the values of the DRC cannot be compared directly, one can compare the position of certain sectors in the ranking of each year. Table 4 shows the results of this comparison. This table shows that the most important industries in the food and drinks sector, such as canned vegetables and fish, the wine industry, sugar or fortified wines, significantly improved their positions in the ranking after the Stabilisation and Liberalisation plan of 1959. The improvement in these sectors may suggest that they were able to obtain cheaper inputs either through international trade or as result of the improvement in domestic efficiency. In contrast, in the textile industry, only the first phases in the production process – preparation of raw materials and spinning – improved their ranking immediately after the Liberalisation plan. This suggests that the relative advantage of Spanish textile producers was questionable. By 1968, every textile sector – preparation of raw material, spinning, clothes and others - had improved their position in the ranking.

The results at a more aggregate level are summarised in Table 5. As expected, the most efficient sector was the so-called export agriculture sector that includes citrus fruits, olive, grapes, bananas, other fruits, nuts and vegetables. Traditional agriculture was the next most efficient sector. Both sectors have a

¹⁹ Banerji and Donges(1974, pp.20, 31-34) on the contrary adjust the calculation if one (or some) of the main productive inputs was imported instead of domestically produced.

²⁰ A similar case is mentioned by Krueger for the Turkish canned food sector (Krueger ,1978, pp.224-225).

weighted average TDRC below the cut-off point and therefore they can be considered efficient. The lower TDRC in agriculture, both traditional and export agriculture, reinforces the idea that economic policy affected particularly those final products sectors which had a very intense relationship with the domestic productive network, while those sectors where domestic inputs were less necessary or less important, were less affected by intervention and thus were relatively more efficient. However, this does not mean that the traditional agriculture sector was a relatively efficient sector on its own. Its DDRC was the highest in the whole economy which suggests that the opportunity cost of production in traditional agriculture was relatively high.

As for industry, the consumer goods sector obtains the best results, although it cannot be considered efficient, while the highest weighted average TDRC was the equipment and machinery industry. Under the DDRC criterion, the consumer goods industry appears to be remarkably efficient. The large difference between the weighted averages of the TDRC and DDRC shows once again that this sector was the main victim of Francoist policy. The importance and relative efficiency of this sector is further evidenced by the fact that no other industrial sector in the economy obtained a DDRC below the general average. Moreover, the average results are very similar in all other sectors. This suggests that considered in isolation, that is, without considering the relationships with other sectors in the economy, all sectors –excluding the consumer goods industry- turned domestic resources into foreign exchange at a very similar cost.

5. Conclusion

This paper attempts to assess the impact that the Francoist economic policy during the autarkic period (1939-1958) had on the Spanish economy and on individual industrial sectors through an analysis of Domestic Resource Costs (DRC). DRC was estimated for 1958 which marks the end of the autarkic period. As is common with this type of studies, the main problems revolve around the estimation of shadow prices. The lack of data to calculate the opportunity costs of the productive factors, which are understood as their payment in the most probable alternative activity, has resulted in the need to adopt some strong assumptions on their possible values, especially for the shadow price of capital. Despite the fact that sensitivity analysis allows us to conclude that the overall results are quite robust to the assumptions made, the details in the case of individual sectors must be taken with a certain degree of caution.

The results of the DRC estimations indicate that in 1958 the most efficient activities of the Spanish economy comprised export agriculture. This suggests that twenty years of an interventionist economic policy centred on industrialisation had been unable to develop a competitive manufacturing sector as is reflected in the small share of industrial goods in Spanish exports at the time. Furthermore, significant differences in efficiency can be observed within the secondary sector. The results demonstrate the negative impact of the Francoist policy on the use of domestic inputs and machinery on the most efficient industries, i.e. consumer goods. This effect is most notable in industries such as food, textiles and toys. In spite of being consistent with the general objective of a forced industrialisation, which is the promotion of heavy industry to the detriment of light industry, this adverse impact must have been very damaging for the Spanish economy. The machinery and equipment sector was also negatively affected by these policies, although in this case the results show that these activities were inherently inefficient irrespective of the rest of the economy. Less than 2.8 percent of the production of these industries could be

considered efficient, despite the fact they had been the main targets of the industrial policy for almost 20 years.

In general the results point to significant inefficiencies in the Spanish economy. These are reflected in the difference between the shadow price of exchange and the official exchange rate and the large coefficient of variation of DRCs. Our results indicate that the inefficient allocation of productive factors induced by the interventionist economic policy resulted in a significant loss for the economy, since the production of the more inefficient (efficient) sectors was over (under) expanded. A welfare gain could therefore have been achieved by a reallocation of resources within industry, from heavy industry to the consumer good sectors. These estimates provide an indication of the negative effect of the Francoist economic policies up to 1958, although the fact that most industrial production was close to relative efficiency suggests that the overall negative impact of economic policy on the industrial sector was not that big. The fact that the Spanish economy revealed a notable potential for growth following the Stabilisation and Liberalisation Plan of 1959 seems to confirm that the Spanish economy was in a good enough position to take advantage of the opportunities created by reform.

Appendix 1

In this appendix the correlation coefficients between the different results obtained under three different hypotheses over the shadow price of capital are calculated. The shadow price of capital has been expressed as a margin above the actual price. CDD (0.1), CDD (0.25) and CDD (0.50) denote the vector of DRCs when the value of this margin is 10, 25 and 50 percent respectively. The following table shows the Pearson correlation coefficient for these vectors. In all the cases the correlation is very close to 1 and statistically significant with a confidence level bigger than .001 percent, which indicates the strong linear relationship between the variables.

Pearson coefficients			
	TDRC (0.1)	TDRC (0.25)	TDRC (0.5)
TDRC (0.1)		0.9996 (0.0000)	0.9965 (0.0000)
TDRC (0.25)	0.9996 (0.0000)		0.9984 (0.0000)
TDRC (0.5)	0.9965 (0.0000)	0.9984 (0.0000)	

The robustness of these results in front of atypical values has been tested by the analysis of rank correlation of Spearman.

Spearman coefficients			
	TDRC (0.1)	TDRC (0.25)	TDRC (0.5)
TDRC (0.1)		0.9993 (0.0000)	0.9947 (0.0000)
TDRC (0.25)	0.9993 (0.0000)		0.9972 (0.0000)
TDRC (0.5)	0.9947 (0.0000)	0.9972 (0.0000)	

Appendix 2. Ranking of industries by TDRC

SECTOR	TDRC	DDRC
Espadrilles	0.727	0.432
Elaboration of cider	0.784	0.444
Processed olives	0.794	0.380
Fishery processing products (oil and meal)	0.796	0.409
Jewellery and accessories	0.811	0.781
Cork manufactories	0.829	0.512
Technical leathers	0.838	0.353
Cork first transformation	0.865	0.256
Ceramics	0.874	0.707
Lignite	0.884	0.841
Oil olive and subproducts	0.900	0.208
Others non ferrous/metallic minerals	0.904	0.786
Natural resins	0.907	0.270
Common salt	0.907	0.847
Charcoal	0.912	0.486
Masonry	0.917	0.862
Cotton weaving and final cloths	0.920	0.417
Limes and gypsum	0.929	0.569
Pyrites	0.950	0.905
Perfumes and cosmetics	0.963	0.499
Anthracite	0.967	0.930
Slaughterhouses	0.973	0.068
Edible oils refinery	0.976	0.337
Salted and dried fish	0.988	0.355
Coal	0.989	0.929
Furniture and other wood manufactures	0.990	0.512
Bakery industry	0.997	0.253
Press and graphic arts	1.003	0.652
Coal agglomerates	1.009	0.386
Defence industry (including aircraft)	1.042	0.506
Organic chemistry	1.052	0.413
Rice mills	1.055	0.169
Milling industries	1.071	0.187
Stones and abrasives industries	1.075	0.846
Iron ore	1.076	1.005
Nitrate fertilisers	1.102	0.492
Meat and animal fats industries	1.134	0.320
Other leather industries	1.143	0.610
Other fertilisers	1.157	0.591
Oilseeds milling	1.177	0.615
Others ferrous/metallic minerals	1.178	1.063
Coal and wood distillation	1.180	0.514
Petroleum products (petrol and lubricants)	1.193	1.092
Animal feed	1.195	0.266
Elaboration of industrial flour	1.207	0.389
Silk and manmade fibres industries	1.208	0.746
Elaboration of spices	1.227	0.357

Appendix 2. Ranking of industries by TDRC (cont.)

SECTOR	TDRC	DDRC
Footwear	1.257	0.516
Oils and fat decomposition	1.267	0.377
Potash	1.286	1.096
Hard fibres spinning	1.302	0.667
Cement derivatives	1.307	1.033
Other textiles industries	1.325	0.626
Clay products for construction	1.325	1.001
Other food industries	1.332	0.656
Wool cleaning industries	1.336	0.408
Other dairy industries	1.342	0.432
Opening and cleaning cotton industries	1.344	0.480
Electrical machinery and appliances	1.346	0.661
Other machinery	1.347	0.811
Carbon hydrates and adhesives	1.349	0.533
Alcoholic beverages and soft drinks	1.354	1.002
Industrial oils and fats	1.363	0.539
Instrumentation industry	1.376	1.080
Cotton spinning	1.380	0.734
Shipbuilding	1.384	0.776
Confectionery	1.386	0.711
Canned fish	1.386	0.550
Transformation and regeneration of plastics	1.391	0.809
Rubber industries	1.397	1.054
Cement and hydraulic lime	1.401	0.899
Glycerine distilling	1.402	0.569
Paper, cardboard and paper paste	1.404	0.852
Inks and writing material	1.407	0.881
Pesticides	1.413	0.765
Glass	1.425	1.082
Carpentry and treatment of wood	1.429	0.728
Metallic furniture	1.433	0.834
Tanning industries	1.441	0.751
Mineral water	1.442	1.370
Other metallic industries	1.444	0.906
Metal industry for construction	1.445	0.731
Explosives and pyrotechnics	1.451	0.729
Pharmaceutical industry	1.451	0.802
Spirits and liquors	1.464	0.798
Railroad materials	1.465	0.611
Pastry industry	1.471	0.823
Knitted cotton garments	1.483	0.929
Wood preparation and sawing	1.487	0.502
Paints and varnishes	1.494	0.717
Oils, fats and margarines	1.502	0.660
Iron and steel industry	1.504	0.717
Plastics raw materials	1.508	0.648

Appendix 2. Ranking of industries by TDRC (cont.)

SECTOR	TDRC	DDRC
Hard fibres weaving (sacks and cords)	1.510	0.524
Sweets	1.510	0.838
Non-ferrous metals industry	1.526	0.541
Motorcycles	1.530	0.726
Metalloids, gases and electrochemistry	1.549	1.122
Bicycles	1.550	0.663
Manmade and synthetic fibres	1.573	1.153
Acids and salts	1.574	1.046
Soup noodles	1.598	0.643
Photographic materials	1.611	0.929
Wax and paraffin	1.611	0.705
Textile recycling	1.627	1.227
Wine industry	1.636	0.625
Colorants	1.661	0.800
Clothing	1.668	0.644
Beer	1.677	0.996
Cocoa and chocolate	1.691	1.084
Common and industrial soap	1.703	0.682
Wool weaving and finished cloths	1.705	0.621
Wool spinning	1.717	0.611
Sugar	1.768	0.654
Condensed and powder milk	1.788	0.682
Coffee toast mills	1.861	1.609
Paper and cardboard manufactures	1.914	0.910
Knitted wool garments	1.927	0.814
Grain mills	1.938	0.257
Canned vegetables	1.986	0.891
Wine alcohols	2.235	0.994
Industrial alcohols	2.335	1.419
Cookies	2.345	1.215
Automobile industry	3.242	1.524

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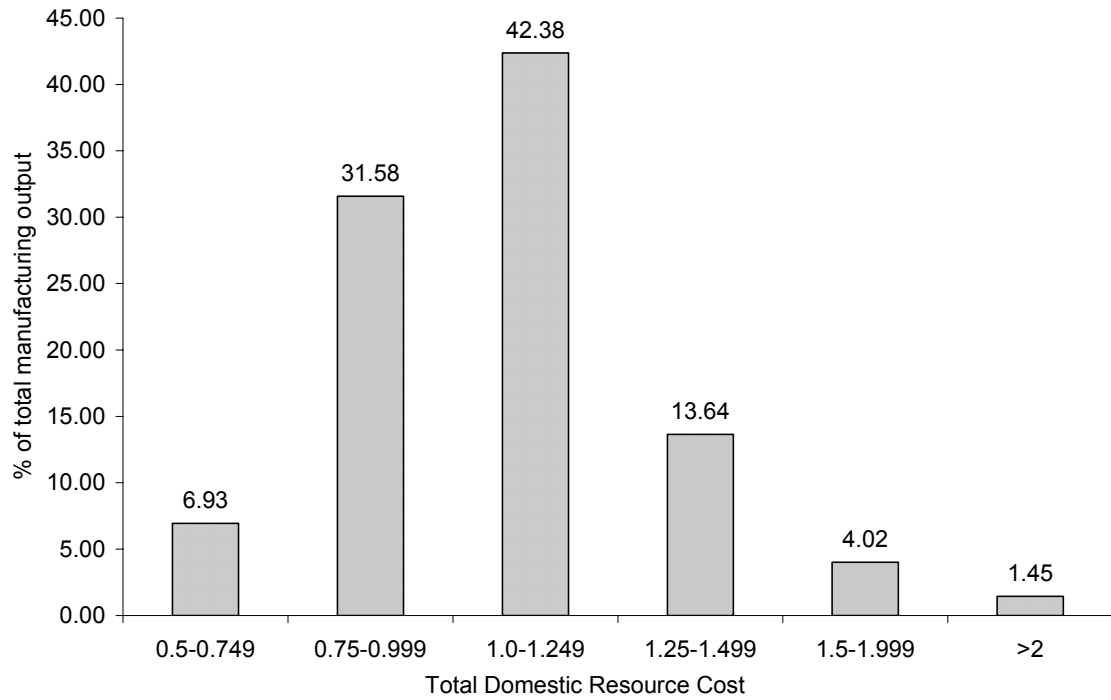
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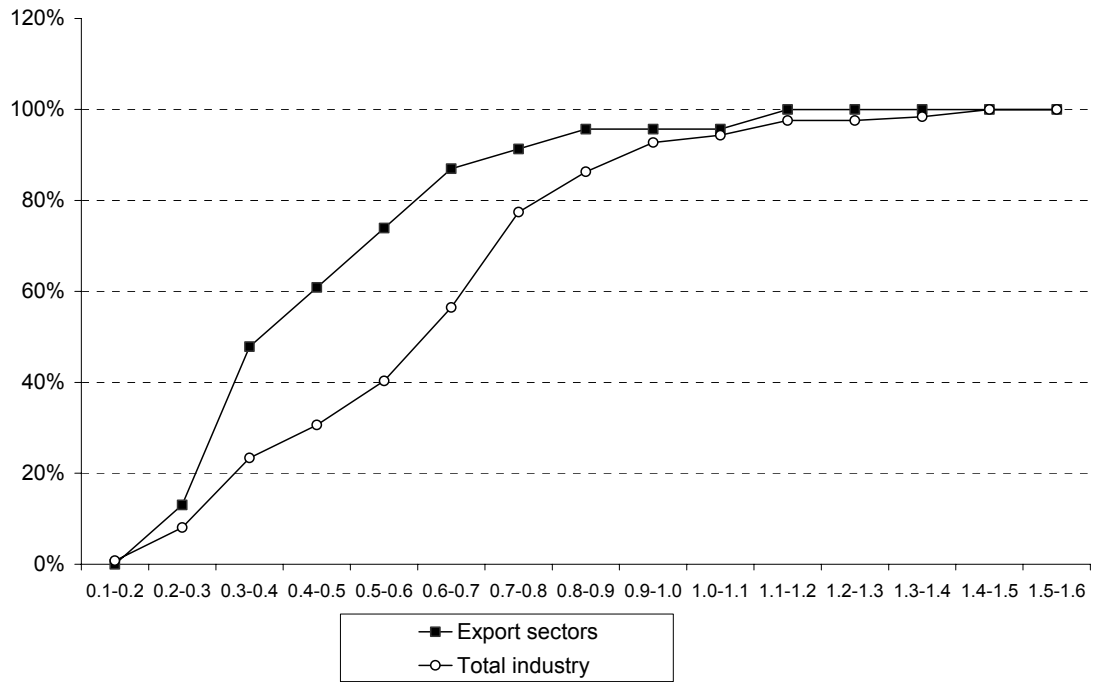
Figures

Figure 1. Distribution of industrial output by its DRC's



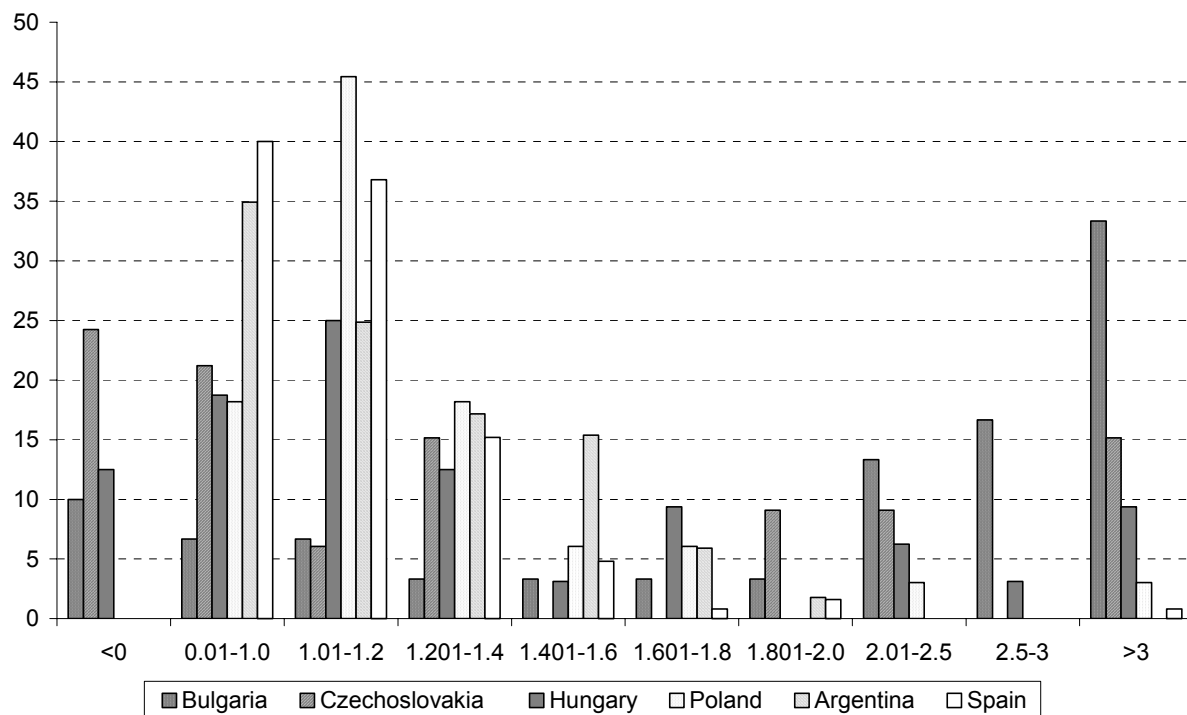
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Figure 2. Cumulative distribution of DRC for the export sector and all sectors



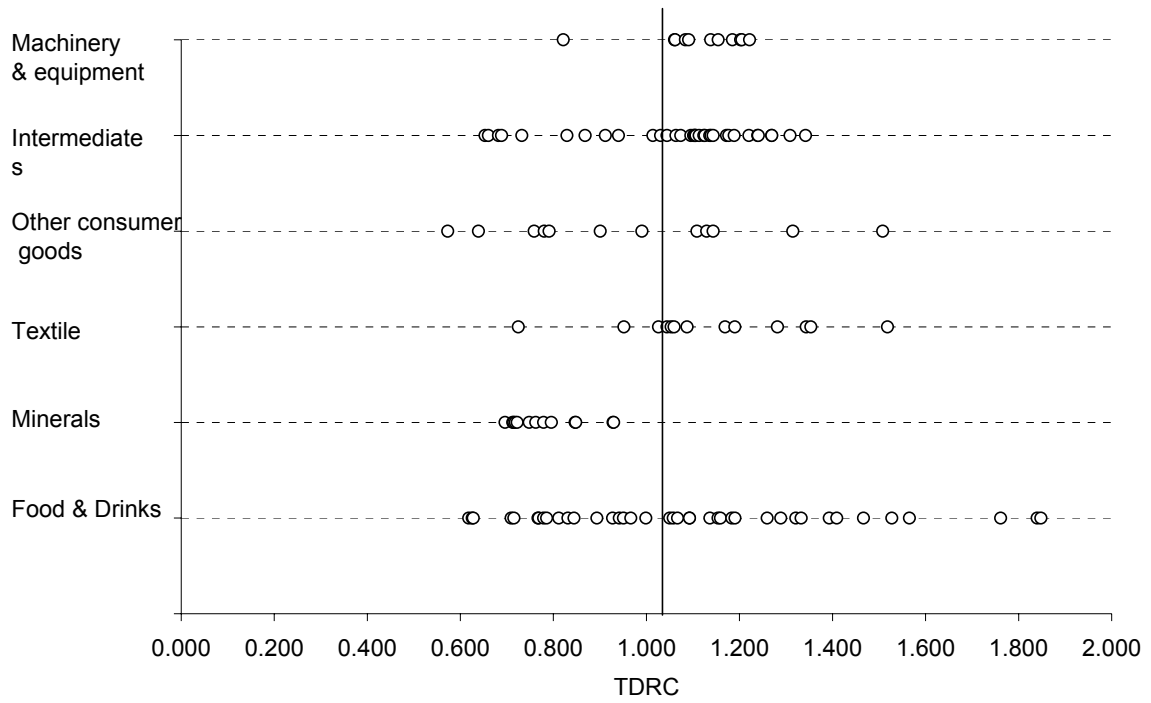
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Figure 3. Distribution of DRCs in different countries



Sources: for Argentina, Szychowski and Perazzo (1981); for Eastern European countries, Hughes and Hare (1992), for Spain, see text.

Figure 4. TDRC distribution by sectors



Source: see text.

Tables

Table 1. Distribution of TDRC by different SPK

TDRC	SPK= 1.15	SPK= 1.25	SPK= 1.5
0.5-0.749	19	19	19
0.75-0.999	31	31	30
1.0-1.249	52	52	51
1.25-1.499	15	15	18
1.5-1.749	5	4	3
1.75-1.999	2	3	3
>2	1	1	1

Source: see text

Table 2. Range of TDRC by industrial sector

Food and drinks	Max	1.848
	Min	0.618
Extractive industries	Max	0.930
	Min	0.696
Textile industries	Max	1.518
	Min	0.725
Other consumer goods	Max	1.508
	Min	0.573
Intermediates	Max	1.342
	Min	0.653
Machinery and Equipment	Max	2.554
	Min	0.821

Source: see text

Table 3. Ranking of industries according to the difference between total and direct DRC

Sector	Industry
1 Automobile industry	Machinery and Equipment
2 Grain mills	Food and drinks
3 Wine alcohols	Food and drinks
4 Cookies	Food and drinks
5 Sugar	Food and drinks
6 Knitted wool garments	Textile industries
7 Wool spinning	Textile industries
8 Condensed and powder milk	Food and drinks
9 Canned vegetables	Food and drinks
10 Wool weaving and finished cloths	Textile industries
11 Clothing	Other consumer goods industries
12 Common and industrial soap	Intermediates
13 Wine industry	Food and drinks
14 Paper and cardboard manufactures	Other consumer goods industries
15 Hard fibres weaving (sacks and cords)	Textile industries
16 Non-ferrous metals industry	Machinery and Equipment
17 Wood preparation and sawing	Intermediates
18 Soup noodles	Food and drinks
19 Animal feed	Food and drinks
20 Wool cleaning industries	Textile industries
21 Industrial alcohols	Food and drinks
22 Other dairy industries	Food and drinks
23 Wax and paraffin	Intermediates
24 Slaughterhouses	Food and drinks
25 Oils and fat decomposition	Food and drinks
26 Bicycles	Machinery and Equipment
27 Rice mills	Food and drinks
28 Milling industries	Food and drinks
29 Elaboration of spices	Food and drinks
30 Opening and cleaning cotton industries	Textile industries
31 Colorants	Intermediates
32 Plastics raw materials	Intermediates
33 Railroad materials	Machinery and Equipment
34 Oils, fats and margarines	Food and drinks
35 Canned fish	Food and drinks
36 Glycerine distilling	Intermediates
37 Industrial oils and fats	Intermediates
38 Elaboration of industrial flour	Food and drinks
39 Carbon hydrates and adhesives	Intermediates
40 Meat and animal fats industries	Food and drinks

Source: see text

Table 4. Comparison of sector rankings in different years

Positions climbed in the ranking between 1958-68		Positions descended in the ranking between 1958-68	
Automobile industry	45	Basic metallic industries	-3
Sugar	34	Slaughterhouses	-4
Grain Milling	26	Knitted garments fabrication	-5
Canned vegetable	25	Cement industry	-5
Edible Alcohols	23	Aircraft	-6
Oil and fat industries	21	Precision instruments	-7
Wine Industries	18	Paper and cardboard manufactures	-9
Wood preparation and sawing	18	Transformation of plastic materials	-11
Dairy Industry	16	Iron and steel industry	-11
Clothes	14	Manmade materials fabricates	-12
Other food industries	13	Non ferrous metals industry	-14
Tanning industries	11	Basic chemistry and fertilisers	-15
Canned fish	9	Soap, washing powder and perfumes	-16
Petroleum refineries and lubricants	9	Metallic fabricates	-17
Preparation of textile row materials and spinning	7	Motorcycles and bicycles	-17
Other textile industry	7	Paper and paper paste industries	-19
Other drinks	6	Metallic products for construction	-19
Meat industries	4	Editorials and printing	-20
Bakery and Pastry industries	2	Electric machinery	-21
Rubber industries	2	Other machinery	-22
		Jewellery and toys	-22
		Railway materials industry	-23
		Glass	-26
		Shipbuilding	-29
		Wood transformation industries	-30
		Footwear	-36
		Leather products	-36
		Weaving industries	-41
		Cork industries	-41

Sources: for 1968, Banerji and Donges (1974) p.29; for 1958, Appendix 2 .

Table 5. Total and Direct DRC. Sectoral aggregation

	N° of sectors	DDRC Simple Average	DDRC Weighted Average	TDRC Simple Average	TDRC Weighted Average
Traditional agriculture	30	0.835	0.772	1.071	1.111
Export agriculture	8	0.774	0.787	0.885	0.886
Intermediates	44	0.737	0.768	1.3	1.326
Consumer goods	62	0.664	0.482	1.378	1.295
Machinery and equipment	19	0.825	0.792	1.456	1.537
General	163	0.731	0.667	1.269	1.269

Source: see text.

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