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Market Shares of Manufactured Exports and Competitiveness

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INTRODUCTION

The competitiveness and export market shares of the manufacturing industry usually attract considerable interest. There are several reasons for this. It is only possible for an economy to grow at the same rate as its competitors without burdening the balance of payments if export market shares can be maintained. This is of particular interest to a country which participates in a fixed-exchange-rate mechanism.

Increased market shares can reduce the usual conflict of objectives in economic policy since unemployment can be reduced concurrently with improvement in the balance of payments. Exports can thus play a central role in the business cycle and help to pull an economy out of a recession. On the other hand, the business cycle affects business enterprises’ competitiveness and export capacity. As a result, it is normally difficult to maintain export market shares throughout an upswing.

This article considers the course of manufactured exports and the competitiveness of the manufacturing industry since 1975, as well as the role of exports in the business cycle. The positive impact of German reunification on Danish exports is first described, followed by consideration of how Denmark’s export performance over the last 20 years has generally been in line with abroad, Danish exporters’ ongoing loss of market shares being mainly attributable to shifts in the exchange rates of the principal currencies. Many Western European countries have experienced a similar declining trend in market shares. The significance of exports to the business cycle is then examined and it is described how high capacity utilisation can reduce exports.

DENMARK’S EXPORT MARKET SHARES AND GERMAN REUNIFICATION

The export volume is normally assumed to be determined by the size of the export market and by competitiveness. Due to the limited availability and comparability of data the market for exports is normally measured as a weighted average of the import volumes of the recipient
countries using the country-specific weights for the breakdown of exports. This assumption is necessary for practical reasons, but it is also problematic, since it assumes that e.g. Danish exporters compete on the German market with exporters from all other countries, but not with German manufacturers. It is frequently assumed that exports follow the development in the export market at a given level of competitiveness, so that the market share (in volume terms) is determined by competitiveness. This can e.g. be illustrated by the log-linear market-share equation

$$\log(\text{Exports foreign demand}) = -\beta \log(\text{Export price competing price})$$

where $\beta$ is a constant numerical price elasticity. Chart 1 shows the relationship between the Danish market share and price competitiveness.

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Note: Manufactured exports are defined as SITC groups 5-9 and constitute approximately 2/3 of total Danish exports. The market share is calculated as the Danish export volume divided by an export market defined in volume terms as a weighted average of the imports of 22 OECD countries, i.e. Germany, Sweden, the UK, Norway, the USA, France, the Netherlands, Finland, Italy, Switzerland, Belgium and Luxembourg, Japan, Spain, Austria, Australia, Canada, Ireland, Iceland, Portugal, Greece and New Zealand. The weights are given in the breakdown by country of Denmark’s manufactured exports in 1989. Together, the 22 markets receive approximately 85 per cent of total Danish manufactured exports. Price competitiveness is calculated as the implicit deflator in Danish kroner on the defined export market divided by the Danish export price. For certain countries the variables for the most recent quarters are supplemented with the latest OECD estimates.

Sources: OECD data bank International Trade and Competitiveness Indicators, Statistics Denmark and own calculations.

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The correlation between competitiveness and market share is clearly positive up to 1990, so that a deterioration in competitiveness is accompanied by a decrease in the market share. However, in the period after 1990 the Danish market share increased, but with no improvement in price competitiveness. From its peak in 1993 the Danish market share fell by approximately 15 per cent up to 1998.

The strong increase in the market share around 1990, which cannot be attributed to price competitiveness, is related primarily to the German market and it is natural to view the increase as a result of German reunification. In a period with idle capacity Danish business enterprises apparently took the opportunity to benefit from their geographical proximity to the expanding German market and on average increased their market shares.

In more overall terms, Danish price competitiveness has shown a declining trend since the beginning of the 1980s, cf. Chart 1. Disregarding the favourable impact of German reunification, the deterioration in competitiveness was accompanied by an equivalent declining trend in the average market share, cf. Chart 2 which shows the Danish market share and competitiveness outside the German market.

Note: The market share is calculated as the total volume of Danish exports less exports to Germany divided by a weighted average of the imports of the remaining 21 recipient markets. Price competitiveness is the market deflator in Danish kroner divided by the Danish export price.

1 Exports in the 2nd and 3rd quarters of 1998 are affected by the labour-market conflict and should be averaged for the period.
The impact of reunification on Danish exports is illustrated in more detail in Chart 3 which shows Danish price competitiveness on the German market, as well as the actual market share on the German market, together with two synthetic market shares. The latter show the market share as from 1990 if 1) the market share on the German market had followed competitiveness with price sensitivity as in the Nationalbank’s model, Mona, or if 2) the market share in Germany had developed in line with market shares on the other markets.

It appears that in the period 1990-1993 the actual Danish market share in Germany increased by approximately 50 per cent, despite by and large unchanged relative prices. An analysis of the goods breakdown of Danish exports to Germany shows that the increase was broad-based within manufactures and therefore gives a general picture of exports.

One explanation for the increase in Danish exports to Germany is that German reunification created a high-growth market close to Denmark, giving Danish suppliers good opportunities to increase their deliveries. It is also likely that the composition of Danish exports was an especially good match for German demand for imports after reunification. Moreover, the impact of the Danish business cycle should also be considered, see p. 70.
It can be seen that some of the export gain has since been lost and that the Danish market share appears to be falling back to a pre-reunification level.

It is possible to calculate the value in kroner of the increased Danish market share in Germany by comparing the actual market share with the possible market share in an alternative scenario without reunification. This corresponds to comparing the actual market share with the synthetic market shares in Chart 3. Calculated in this way, the annual export gain is in the range of kr. 10-20 billion, cf. Chart 4. Accumulated since 1990, this corresponds to a considerable proportion of the accumulated current-account surplus, even after adjustment for the import content of manufactured exports of approximately 35 per cent.

The export gain has also stimulated income, consumption and investments and may have been a factor contributing to the cyclical upswing in 1993-1994 and to the weakening of average market shares outside Germany. In other words, the impact on the balance of payments was less than calculated initially, but in all circumstances the reunification effect fitted well into the cyclical pattern.

COMPARISON WITH OTHER COUNTRIES

Since 1982 Denmark has pursued a consistent fixed-exchange-rate policy and the central rate against the D-mark has remained unchanged since
1987. It is therefore natural to compare Denmark’s competitiveness and market share with those of Germany on the same markets, cf. Charts 5 and 6.

The development in price competitiveness in Denmark and Germany generally took a parallel course with a clear declining trend since the beginning of the 1980s. This is reflected in the average Danish and German market shares, which have both shown a clear falling trend, cf. Chart 6. Since the beginning of the 1980s Denmark’s export performance has been no poorer than Germany’s. On the contrary, the Danish export gain in Germany has contributed to the slightly more favourable development in the total Danish market share. Disregarding the export gain on the German market, the course of the Danish average market share was more in line with the German market share.

Chart 7 shows the market shares and price competitiveness of a number of countries, as the basis for a more broad-based comparison. It is seen that the negative trend characterising the Danish market share since the start of the 1980s is also found in several other countries, e.g. Germany, Japan, France, the UK, Belgium, Norway and Switzerland. The market shares of Italy, Finland and Sweden show a similar declining trend up to the devaluations in 1992-1993. Especially the USA, as well as Austria, Ireland, Spain and Portugal, gained market shares during the period.

Unlike Denmark, none of the countries in Chart 7 were able to increase their market share considerably in connection with German reuni-
fication without an improvement in competitiveness. Danish exporters thus seem to have benefited particularly from reunification. Belgium gained market shares in around 1993 without any equivalent improvement in competitiveness, but this was not concentrated on the German market to the same degree. It probably represents a data break on the commencement of the single market. Sweden, Finland and Italy all gained considerable market shares in the 1st half of the 1990s, but this reflected improved competitiveness after the devaluations in 1992-1993.

Chart 7 shows that the correlation between market share and relative price is not particularly apparent for all countries. Ireland, Portugal and Spain, in particular, gained considerable market shares even though their competitiveness remained relatively constant. This may reflect a low level of costs as a starting point and also that structural adjustments affecting the propensity to export took place in these countries in the relevant period.

The price competitiveness of Denmark and Germany and a large number of other European countries not least reflects substantial ex-

1 Viewed in isolation, the trend will be for countries like Denmark to lose market shares on the traditional markets as a result of globalisation, leading to new market participants on the import markets. However, the numerator in the market share expression used is total exports, so if Denmark can export to the new market participants to the same degree, the measured market share will not fall due to globalisation. A case in point is that Eastern European countries will be able to win market shares from Denmark on the traditional markets, but Denmark has equivalent opportunities to export to Eastern Europe. Globalisation will therefore only give a falling trend for the measured market share if the new market participants export more than they import, which is not typically the case, or they import other goods than those manufactured in Denmark.
change-rate fluctuations among the principal currencies. In the period between 1985 and 1995 the US dollar depreciated considerably and the price competitiveness of the USA improved by approximately 40 per cent, cf. Chart 7. The trend for several European countries to lose market shares thus appears to be a consequence of the exchange-rate course, resulting in redistribution of market shares from Europe and Japan to the USA.
THE POSITION OF FOREIGN TRADE IN THE BUSINESS CYCLE

In general, movements in net exports and the balance of payments are countercyclical, so that strong economic growth will normally cause the trade balance and the balance of payments to deteriorate. This leads
among other things to the classical conflict between the objectives concerning unemployment and the balance of payments which traditionally characterise the economic-policy debate.

The relation is illustrated in Chart 8 which shows growth in Danish domestic demand and net imports against 3 years previously.

Net imports in conformance with the cyclical course may reflect two factors. Firstly, imports are clearly procyclical, so that stronger domestic demand is accompanied by increased imports. This is due first of all to the import content of final demand, resulting in an immediate pull on imports. In addition, the marginal propensity to import exceeds the average propensity to import, giving positive variation in the import ratio with the business cycle. Chart 9 illustrates the relation between imports and domestic demand.

Secondly, exports may be countercyclical because increased domestic demand suppresses exports. In this case there is a negative correlation between exports and domestic demand. However, it is not logically necessary for exports to be countercyclical. Higher exports will increase earnings and thereby raise domestic demand. This corresponds to a posi-

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1 The change against 3 years previously corresponds to the sum over 12 quarters of the period-on-period change. This removes some volatility and makes the charts more transparent, but it is not of crucial importance to the conclusion.
tive correlation between exports and domestic demand in periods of export-driven economic growth. Chart 10 shows growth in exports and domestic demand.

Evaluated over the entire period the correlation between exports and domestic demand is clearly negative, i.e. high growth in domestic de-
mand is accompanied by low growth in exports. However, the mechanism does not clearly apply to the period 1993-1998 when there was rather a positive correlation between exports and domestic demand. This may indicate that the most recent upswing was initially driven partly by exports, due to such factors as the effects of German reunification.

Chart 3 showed that considerable market shares were lost during the most recent upswing, and Chart 11 shows a more clearly negative correlation between growth in export market share and domestic demand, even during the most recent upswing. This confirms that it is generally difficult to maintain export market shares during a boom. However, in the period 1993-1995 demand from abroad was so high that exports may have contributed to starting the upswing, despite falling market shares.

CAPACITY PRESSURE AND EXPORTS

There are several reasons for the negative correlation between exports and domestic demand. These can be identified by considering the simple market-share equation, rewritten as an equation for exports by adding the logarithm of foreign demand on both sides and adding a residual value to describe other factors:

$$\log(\text{Exports}) = \log(\text{Foreign demand}) - \beta \log(\text{Competing price}) + \text{residual}$$
A negative correlation between the left-hand side and domestic demand may be due to the correlation between domestic demand and each of the three elements on the right-hand side.

Firstly, there may be a negative correlation between foreign demand for Danish exports and Danish domestic demand. In such case, the suppression of exports by domestic demand reflects that the Danish business cycle has been out of sync with those of competing countries, so that in periods of upswing in the Danish economy demand from abroad is modest, and vice versa. Chart 12 illustrates the correlation between Danish domestic demand and demand abroad for Danish goods. The correlation is generally positive throughout the period, reflecting that as a general rule Denmark was in sync with the business cycle abroad taken as one. However, in certain periods, most clearly around 1987-1992, the Danish economy moved against the business cycle abroad. This may be part of the explanation for the negative correlation between exports and domestic demand.

The fact that the Danish economy was out of sync with abroad in the period around 1990, with lower capacity utilisation and domestic demand in Denmark than abroad, may have contributed to the Danish export gain in Germany after reunification. Domestic demand in Denmark was weak after the economic tightening in the mid-1980s, making export markets relatively attractive to Danish manufacturers. Furthermore, the low capacity utilisation in Denmark provided good opportunities to increase production.
Secondly, domestic demand may play a role via other factors. This means that the capacity effects directly influence export volumes, disregarding competitiveness and demand from abroad. In general, untraditional markets are more attractive to business enterprises in periods with low capacity utilisation and moderate domestic-market sales. Capacity effects on volumes can arise e.g. as business enterprises ration the export market when sales on the domestic market are high, or when efforts to obtain export orders and export contracts vary with capacity utilisation.

Thirdly, there may be a positive correlation between relative prices and domestic demand. This would reflect capacity effects in business enterprises' price formation.

**CAPACITY EFFECTS VIA PRICE FORMATION**

The labour market exerts an obvious capacity effect via prices. A cyclical upswing, which reduces unemployment, typically entails a permanent wage reaction, increasing costs and diminishing competitiveness. This well-known mechanism represents a considerable capacity sensitivity in macroeconometric models such as Mona.

In addition, a faster-acting capacity effect directly from the price formation of business enterprises can be added. Business enterprises providing goods to export markets can to some extent set their own prices, which thus include a mark-up on costs. The chosen mark-up depends firstly on the competitive situation. In a scenario with high competing prices and high sales volumes, a proportion of the competitive edge can be used to raise the export price. This corresponds to business enterprises setting their prices to obtain optimum distribution on price and volume.

When the capacity pressure on business enterprises increases and it is difficult to expand supplies sufficiently, businesses must either give their orders different priority, or use the strong demand to increase their mark-up. Exporting is probably more time-consuming and cost-intensive than supplying to the domestic market, so that the export market may become the marginal market which business enterprises will tend to price themselves out and in of in line with respectively high and low capacity utilisation. This means that an expression of capacity utilisation is part of the export-price equation.

It is obviously most natural to regard the export market as the marginal market for business enterprises which sell a good part of their production on the domestic market. If the largest proportion of a business' production is exported, the enterprise will be less interested in the domestic market. On the other hand, exporting enterprises can easily sup-
ply goods to a wide range of markets of which the domestic market is neither the most central, nor the marginal, market. This would indicate that capacity utilisation may be a better measure than domestic demand of the total capacity pressure attributable to the cyclical course.

The relation between mark-up and capacity utilisation is illustrated by Chart 3 which shows the Danish export price divided to a weighted average of costs and competing price, as well as capacity utilisation in industry from the industrial-confidence indicator. The clearly positive correlation suggests that in addition to the capacity effects via wage costs high capacity utilisation has a direct effect on business enterprises’ price formation.

The Appendix illustrates how this effect is represented in Mona and its significance to exports and the overall economy.
CONCLUSION

The falling market share which has characterised Danish exports since the beginning of 1980s is a trend shared by economies like Denmark's and the shifts can be attributed primarily to considerable fluctuations in exchange rates between the principal currencies.

In overall terms, Denmark's export performance has been in line with Germany's. Furthermore, compared to other countries Danish business enterprises have shown a particular ability to benefit from German reunification, and in the early 1990s Denmark gained considerable market shares on the German market. Unfortunately, the figures point to a decline in Danish market shares towards the level prior to reunification. The increase in exports to Germany at the beginning of the 1990s and the subsequent loss of market shares can thus contribute to explaining the fluctuations in the Danish balance of payments in recent years.

Danish exports are clearly countercyclical and some of the fluctuations in market share can be attributed to the business cycle. One underlying factor is that in certain periods the course of the Danish economy has been out of sync with the economies of competing countries. However, capacity effects in export-price formation appear to play a more important role. The business cycle exerts pressure on wage costs via the labour market, and moreover business enterprises raise the mark-up on exports when capacity utilisation is high.

If the theory that on average the business enterprises themselves have contributed to the loss of market shares by more or less deliberately pricing their way out of the markets in order to reserve resources for their traditional customers on the domestic market is correct, the reverse also applies that business enterprises can price their way back into the export markets. A domestic dampening, releasing capacity, can therefore increase exports and improve the balance of payments without any significant consequences for employment.

The capacity effect in exports can thus act as an automatic stabiliser in the economy which generally makes the balance of payments more sensitive and activity less sensitive to fiscal policy.
APPENDIX

Illustration of capacity effects in Mona

The size and significance of the capacity effects in exports are not known with certainty, but the mechanism can be illustrated on the basis of the Nationalbank's model, Mona.

Mona's equations for export price and export volume do not directly include a capacity utilisation term, but the capacity effect is included implicitly as a marginal-cost pricing whereby the marginal unit labour costs instead of average costs are applied to export-price formation. Within Mona the difference between marginal and average costs is determined as the difference between marginal and average productivity and thereby by the current deviation from the production function of the model. The deviation from the production function is a measure of capacity utilisation in the model and is closely correlated with capacity utilisation as indicated by the industrial-confidence indicator.

Due to the close relation between the difference in average and marginal costs and capacity utilisation marginal cost pricing can alternatively be written as price setting relative to average costs, plus a capacity effect based on capacity utilisation. The intuitive difference is that by splitting up the marginal costs into an average cost and a capacity effect it is possible to estimate separate coefficients for the two effects. In addition, it is easier to illustrate the significance of the capacity effect in a model where the capacity effect is represented directly and in the following this representation is chosen, even though the marginal-cost-pricing principle would appear to be the most elegant.

In the long run the export price can be written as a weighted average of average unit labour costs, the import price and the competing price so that the weights add up to 1. Moreover, capacity utilisation contributes with a coefficient of 0.45, so that an increase in capacity utilisation of 1 per cent leads to an increase in the equilibrium price of almost 0.5 per cent.

\[
\log(\text{Export price}) = 0.33 \cdot \log(\text{Unit labour cost}) + 0.19 \cdot \log(\text{Import price}) + 0.48 \cdot \log(\text{Competing price}) + 0.45 \cdot \log(\text{Capacity utilisation})
\]

A possible reason for the positive correlation between mark-up and capacity utilisation in Chart 13 is that capacity utilisation acts as a proxy for the import prices in the price equation and that there is a positive correlation between import prices and capacity utilisation. A large proportion of manufactures are exported so that capacity utilisation will naturally be high in periods of strong growth on the world market. However, this will naturally push raw-materials prices up and a positive correlation will be observed. Even if imports are included in the cost expression, however, there is still a significant relation between export price and capacity utilisation.

The restriction that the weights must add up to one ensures that a proportional increase in prices of all input generates a corresponding increase in the export price.
At any given time the export price will generally deviate from the long-run equilibrium, and in the short run the change in costs, the competing price in Danish kroner and the change in capacity utilisation are included. The capacity-utilisation coefficient in the short run is 0.26, so that more than half of the long-run effect of an increase in capacity utilisation will already be apparent in the 1st quarter.

In the long run the market share is determined by price competitiveness, with numerical price elasticity of just over 3, i.e. a deterioration in price competitiveness of 1 per cent leads to a decrease in the market share in the long run by just over 3 per cent. Moreover, the estimated effect of reunification increases the Danish market share by approximately 10 per cent, all other things being equal.

\[
\log\left(\frac{\text{Export}}{\text{Foreign demand}}\right) = -3.14 \log\left(\frac{\text{Export}}{\text{Competing price}}\right) + 0.11 \times \text{Reunification dummy}
\]

In the short run the deviation from the long-run price relation is included in the dynamic volume equation where it represents a supply effect of a high export price. Finally, lagged changes are included in the short run.

The capacity effect is included directly in the export equation via the supply element, i.e. from the deviation from the long-run price relation. Higher capacity utilisation will increase the desired equilibrium mark-up, and for a given export price (and mark-up on the export market) it will reduce the incentive for business enterprises to export. Apart from this capacity effect via the export price no further contributions from capacity utilisation can be estimated.

The overall effect of capacity utilisation on market share and competitiveness can be found by historical simulation of the dynamic price and volume equations. In the basic calculation all variables assume their historical levels, and in an alternative calculation capacity utilisation is set to be constantly equivalent to its average for the period 1977-1998, corresponding to elimination of the capacity effect. Chart 14 shows the actual market share and a calculated market share assuming that capacity utilisation is unchanged throughout the period. The calculations indicate that the high capacity utilisation in manufacturing industry has currently pressed down the Danish market share by approximately 3 per cent. A domestic dampening, normalising capacity utilisation and eliminating the capacity effect, would thus be able to increase the market share by approximately 3 per cent.

1 The total sensitivity of exports to capacity utilisation is approximately one on the basis of the two dynamic equations, so that an increase in capacity utilisation of 1 per cent leads to a decrease in the market share of approximately 1 per cent.
Dampening of the domestic economy will transfer production resources to the export sector and will thereby be able to improve the balance of payments without any significant consequences for unemployment. The capacity effect thus functions as an automatic stabiliser in the economy, generally reducing the sensitivity of unemployment to demand shocks and fiscal policy.

The automatic stabiliser can be illustrated by a multiplier calculation in Mona whereby the dynamic interaction between all equations in the model is taken into consideration. The base solution is a steady-state growth course over 50 years with an annual real growth rate of 2 per cent and an inflation rate of 3 per cent. In addition, the model is given a permanent exogeneous shock in the form of an increase in public purchases of goods and services of 1 per cent of GDP for all years.

The dominating short-run mechanism in Mona is the Keynesian income multiplier, which will increase income, consumption and investments and result in rising employment. However, over time, declining unemployment will lead to stronger wage pressure, which will cause competitiveness to deteriorate and reduce exports. This crowding-out mechanism in the model dominates in the longer run, and it will continue until exports have fallen to a level which brings unemployment back to its level in the base solution.

As illustrated, the central crowding-out mechanism via wage formation can be supplemented by a faster effect via capacity and export price.
In order to show the significance of this capacity effect to the functioning of the economy the multiplier calculation is made with and without the capacity effect in exports. This corresponds to using the above equations in Mona, or alternatively equations excluding the capacity utilisation elements. Chart 15 shows the result of the multiplier calculations.

In the long run the increase in public purchases of goods has no effect on unemployment. This is because the crowding-out mechanism via wage formation in all circumstances will continue until the increased wage pressure has been eliminated. In the short run, unemployment will drop, but in the model’s dynamic adjustment for a certain period unemployment will be higher than in the base solution. The explanation is the strong initial wage reaction which temporarily reduces exports to the extent that growth in unemployment exceeds the level in the base solution.

It appears that the capacity effect in exports stabilises the effect of fiscal policy on unemployment. In the first year export market shares are subject to pressure from the capacity effect in export-price formation, thereby reducing the positive impact on unemployment. After a number of years capacity utilisation switches to being lower than in the base solution, inducing exporters to price their way back into the export markets, thereby augmenting the positive impact on unemployment. In the long run capacity utilisation has reverted to its level in the base solution and there is no capacity effect in the model.